



2021-2022 University Catalog

University of the Sciences in Philadelphia University Catalog. Published by University of the Sciences in Philadelphia, 600 South 43rd Street, Philadelphia, PA 19104-4495

Note regarding changes: As the educational process from admission through graduation requires continuing review and appropriate approval by the University, the provisions of this catalog are to be considered directive in character and do not constitute a contract. The University, therefore, reserves the right to change its rules, regulations, requirements for admission or graduation, or course offerings at any time. Please visit the University web site for more information: www.usciences.edu.

Additionally, the academic calendar is subject to change. For the most current academic calendar, please visit: <http://www.usciences.edu/registrar/calendar.shtml>

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Academic Calendar

Academic Year 2021–2022*

Summer 2021

Classes Begin Summer A	Monday, May 10
Classes Begin Summer 1	Monday, May 17
Memorial Day Holiday (No Classes)	Monday, May 31
Classes End Summer 1	Friday, June 2
Independence Day Holiday (No Classes)	Monday, July 5
Classes Begin Summer 2	Tuesday, July 6
Classes End – Summer 2	Friday, August 20
Classes End Summer A	Friday, August 27

Fall 2021

Semester Begins	Monday, August 30
Labor Day Holiday (No Classes)	Monday, September 6
Monday Schedule for Classes	Tuesday, September 7
Mid-Semester Pacing Break (No Classes)	Monday, October 11
University Is Open for Business	Wednesday, November 24
Thanksgiving Recess (No Classes)	Wednesday-Friday, November 24-26
Last Day of Classes	Friday, December 10
Final Examinations Begin	Saturday, December 11
Reading Day (No Classes or Exams)	Friday, December 17
Final Examinations End and Fall Semester Ends	Friday, December 17

Spring 2022

Semester Begins	Monday, January 17
Martin Luther King, Jr. Day of Service Spring Recess (No Classes)	Monday, January 17 Monday-Friday, March 7-11
Classes Resume	Monday, March 14
Last Day of Classes	Friday, April 29

Final Examinations Begin Saturday, April 30

Reading Day (No Classes or Exams) Wednesday, May 4

Final Examinations End and Spring Semester Ends Friday, May 6

*The Academic Calendar is subject to change. Please visit our website for the most accurate information: <https://www.usciences.edu/academics/academic-resources/registrar/academic-calendars.html>

Directory for Correspondence

Mailing Address

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Philadelphia, PA 19104-4495

Telephone

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E-Mail

admit@uscience.edu

Website

www.usciences.edu

Admission

Admission Office
Toll-free 888.996.8747

Alumni Relations

Casey J. Ryan
Director, Alumni Relations
215.596.8570

Athletics

Marc Caserio
Athletic Director
215.596.7432

Business Affairs

Brigid K. Isackman
Interim Chief Financial and Operating

Gifts and Bequests/Institutional Advancement

Robert M. Rudd
Vice President, Institutional Advancement
215.596.8948

Human Resources

Ruth Roberts
Director, Human Resources
215.596.8697

Records and Transcripts/Registrar

Registrar's Office
215.596.8813

Student Accounts

Karen Miller
Interim Associate Vice President, Finance and Controller
215.596.8701

Student Affairs

Ross Radish
Dean, Students
215.596.7573

About the University

At University of the Sciences, students embark on a challenging learning experience in a proving ground for successful professionals in the science and healthcare-related fields. A private institution dedicated to education, research, and service, and distinguished as the nation's first college of pharmacy, the University has produced leaders in the science and healthcare marketplaces since its founding in 1821. Students in USciences' three colleges learn to excel in scientific analysis and to apply their skills to improving healthcare in their communities and in the lives of people worldwide through such disciplines as

pharmacy, biology, chemistry, psychology, physics, physical therapy, and healthcare business.

Mission

University of the Sciences prepares students to become leaders, innovators, and skilled practitioners in the sciences, the health professions, and related disciplines. We deliver excellence in teaching, research, and service through a safe and supportive environment in which our students live, learn, and succeed.

Vision

University of the Sciences will be recognized as a leader of science and healthcare education and research. We provide interdisciplinary, collaborative educational experiences and global opportunities that inspire our graduates, faculty, and staff to promote positive change. Graduates will be pursued because they are compassionate healthcare providers, critical thinkers, and diplomats of change, effecting innovative transformation for the betterment of society.

Values

- We champion innovation in inter-professional education, teaching, and research.
- We embrace scholarship, developing technology, and life-long learning.
- We foster entrepreneurship, professionalism, and collaboration, building upon our proud legacy as the first pharmacy school in the country.
- We cultivate respect, diversity, citizenship, civility, and inclusiveness.
- We pursue quality, integrity, and sustainability in all aspects of university life.
- We support our community and contribute to its economic vitality.

History

The proud legacy of University of the Sciences began when 68 Philadelphia apothecaries met in Carpenters' Hall in 1821 to establish improved scientific standards and to train more competent apprentices and students. These visionaries sought to enhance their vocation, as well as protect public welfare. A year later, they organized and incorporated the Philadelphia College of Pharmacy (PCP), the first college of pharmacy in the nation. Thus, education in the profession of pharmacy in the U.S. was born.

The college began to grow in enrollment, curriculum, and stature. Although matriculation was originally limited to men, the college became coeducational in 1876. The college initially emphasized the biological and chemical sciences as mainstays of the curriculum in pharmacy but later instituted separate curricula in three other areas: bacteriology, biology, and chemistry.

In 1921, the name of the institution was changed to Philadelphia College of Pharmacy and Science, with state authorization to grant not only the baccalaureate degree but also the master's and doctorate in all four disciplines.

As the world of science continuously made advancements throughout the decades, the college evolved and expanded its curriculum to prepare students for the new wave of scientific breakthroughs. The college also enhanced the role of the humanities and social sciences in its science-based curricula. Primarily a commuter campus in its early days, the institution began to transform into one in which residential life and extracurricular activities played a larger role in student development.

The Commonwealth of Pennsylvania approved the institution's application for university status in February 1997. In recognition of the broad spectrum of new health and science programs introduced by the institution, the college changed its name to reflect the broader range of academic opportunities offered to its students. On July 1, 1998, Philadelphia College of Pharmacy and Science officially unveiled its new identity as University of the Sciences in Philadelphia.

Accreditation

University of the Sciences is accredited by the Middle States Commission on Higher Education (MSCHE). MSCHE is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation (CHEA). The Commission's offices are located at 3624 Market Street, 2nd Floor West, Philadelphia, PA 19104; 267.284.5000. Their website is <https://www.msche.org/>.

The doctor of pharmacy degree program is accredited by the Accreditation Council for Pharmacy Education (ACPE). The ACPE is an autonomous and independent agency whose Board of Directors is derived through the American Association of Colleges of Pharmacy (AACCP), the American Pharmacists Association (APhA), the National Association of Boards of Pharmacy (NABP), and the American Council on Education (ACE). ACPE's offices are located at 190 S. LaSalle St., Suite 2850, Chicago, IL 60603-3410; 312.664.3575. The agency website is www.acpe-accredit.org. ACPE requires that colleges of pharmacy respond to any written complaints related to the accreditation standards. Students should submit written complaints to the Office of the Dean of Pharmacy (GH Suite 2000); they will receive a written response to their complaint within two weeks of its receipt. If a student feels that their complaint has not been adequately heard or addressed by the College, they can submit their complaints directly to ACPE (see the ACPE website at www.acpe-accredit.org/complaints/).

The master of occupational therapy (MOT) and doctor of occupational therapy (DrOT) programs are accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 6116 Executive Boulevard, Suite 200, North Bethesda, MD 20852-4929. ACOTE's telephone number, C/O AOTA, is 301.652.AOTA, and its web address is www.acoteonline.org.

The Doctor of Physical Therapy Program at University of the Sciences in Philadelphia is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), 1111 North Fairfax Street, Alexandria, Virginia 22314; telephone: 703-706-3245; email: accreditation@apta.org; website: <http://www.capteonline.org>. If needing to contact the program/institution directly, please call 215-596-8677 or email l.packel@uscience.edu.

The master of business administration (MBA) and bachelor of science (BS) programs in pharmaceutical and healthcare business are accredited by the Accreditation Council for Business Schools and Programs (ACBSP). The address for the accrediting agency is 11520 West 119th Street, Overland Park, KS 66213; 913.339.9356. Their website is <https://www.acbsp.org>.

The Accreditation Review Commission on Education for the Physician Assistant (ARC-PA) has granted **Accreditation-Provisional** status to the **University of the Sciences Physician Assistant Program** sponsored by the **University of the Sciences**. Accreditation-Provisional is an accreditation status granted when the plans and resource allocation, if fully implemented as planned, of a proposed program that has not yet enrolled students appear to demonstrate the program's ability to meet the ARC-PA *Standards* or when a program holding Accreditation-Provisional status appears to demonstrate continued progress in complying with the *Standards* as it prepares for the graduation of the first class (cohort) of students. Accreditation-Provisional does not ensure any subsequent accreditation status. It is limited to no more than five years from matriculation of the first class. The address for ARC-PA is 12000 Findley Road, Suite 275, Johns Creek, GA 30097; 770.476.1224. Their website is <http://www.arc-pa.org/>.

The bachelor of science (BS) degrees in chemistry, biochemistry, and pharmaceutical chemistry offered through the Department of Chemistry and Biochemistry are certified by the American Chemical Society (ACS), provided students complete the specified curriculum, including in-depth courses and a minimum of 400 hours of laboratory experience in four out of five areas of Chemistry (Analytical, Biochemistry, Inorganic, Organic, and Physical). The address for the ACS is Office of Professional Training, 1155 16th Street, NW, Washington, DC 20036; 202.872.4589. Their website is www.acs.org.

The bachelor of science (BS) in biochemistry program is accredited by the American Society for Biochemistry and Molecular Biology (ASBMB). The address for the ASBMB is 11200 Rockville Pike, Suite 302, Rockville, MD 20852-3110; 240.283.6600. Their website is <https://www.asbmb.org/>.

The bachelor of science (BS) in exercise physiology program has received endorsement as an educationally recognized program by the National Strength and Conditioning Association (NSCA). The address for NSCA is 1885 Bob Johnson Drive, Colorado Springs, CO 80906; 719.632.6722; and, website: <https://www.nasca.com/>.

The program in medical laboratory science is affiliated with hospital programs that are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The address is 5600 N. River Rd., Suite 720, Rosemont, IL 60018; 773.714.8880. Their website is www.naacls.org.

State Authorization

University of the Sciences, established as an institution of higher learning in the Commonwealth of Pennsylvania, is an authorized Pennsylvania degree-granting institution.

The University meets all the criteria for approval for veterans' education under the provisions of Title 38, United States Code,

State Authorization Reciprocity Agreement

Pennsylvania is a member state of the State Authorization Reciprocity Agreement (SARA), and University of the Sciences (USciences) is approved as a SARA participating institution.

The State Authorization Reciprocity Agreement (SARA) is a voluntary agreement among its member states that establishes comparable national standards for interstate offering of postsecondary distance education courses and programs. The advantage for students is that SARA makes it easier for them to participate in online educational courses and programs that are offered by authorized colleges and universities located in a state outside of where the student is located. As a SARA participating institution, USciences is authorized to provide distance education to students who reside in another SARA member state. Presently, 49 states, the District of Columbia, Puerto Rico and the US Virgin Islands are SARA members (only California is not a member). More information about SARA can be found at www.nc-sara.org.

Although the USciences health professions degree programs are not distance education programs (e.g., occupational therapy, pharmacy, physical therapy, physician assistant), provisions of SARA facilitate the placement of enrolled students at experiential learning (e.g., clinical) sites located outside of Pennsylvania.

Professional Licensure Disclosures

Federal regulations [34 CFR § 668.43(a)(5)(v)] require colleges and universities that offer programs designed to lead to professional licensure to disclose if those programs meet the educational requirements for licensure in the state where a student is located.

It is important to note that:

1. Each state has the legal authority to independently determine its requirements and processes for professional licensure;
2. The educational requirements necessary to pursue professional licensure in a given state are subject to change; and,
3. States often have other eligibility requirements, in addition to education, that must be satisfied in order to seek professional licensure.

University of the Sciences (USciences) programs designed to lead to professional licensure include:

- Occupational Therapy (MOT and DrOT)
- Pharmacy (PharmD)
- Physical Therapy (DPT)
- Physician Assistant (MSPAS)
- Medical Laboratory Science (BS)

For each of the above programs, the latest determinations for program graduates to meet the educational requirements needed to pursue professional licensure in all fifty states and the District of Columbia are provided on the University's public website: <https://www.usciences.edu/>

Student Grievance Policy

A grievance is a complaint or allegation made by a student who feels that an action (or lack of action) by the University is unfair; is arbitrary, capricious, or unjust; or does not comply with University policies. Some grievances, however, cannot be initially addressed through the Student Grievance Policy. These include allegations of discrimination related to gender (including sexual harassment), race, ethnicity, religion, and sexual orientation, all of which must be referred to the Affirmative Action Office (AAO). The AAO and/or the Director of Human Resources may conduct an investigation into the allegations. If warranted, Human Resources may take appropriate disciplinary actions against any University employee as described in the Employee Handbook, or they may refer the situation to Student Affairs for resolution under this Grievance policy. In addition, conduct matters cannot be grieved, as stated in the Student Conduct Policy. It is the policy of the University to provide a mechanism by which grievances can be openly and objectively reviewed, with a goal of reconciliation or resolution of University-related issues. If an issue cannot be resolved informally, students may use the Student Grievance Policy and procedures without fear of reprimand or reprisal.

Further information about the Student Grievance Policy and associated procedures is available in the most recent version of the

USciences Student Handbook which is available online at www.usciences.edu/studenthandbook/.

Student Complaint Process for Out-of-State Distance Learning and Field Experience Students

University of the Sciences (USciences) is committed to resolving student grievances, complaints and concerns in an expeditious, fair and amicable manner. Students located outside of the Commonwealth of Pennsylvania while attending USciences who desire to resolve a grievance should follow the University's Student Grievance Policy, as provided in the most recent USciences Student Handbook. In addition, students may find it helpful to consult with their academic advisor and/or program director regarding the various means for resolving student grievances, complaints and concerns.

If the student bringing a complaint is not satisfied with the outcome of USciences' student grievance process, the student may file a complaint with the Pennsylvania Department of Education (complaints may be filed by students located in any state). To lodge a complaint with the Pennsylvania Department of Education, complete and follow the procedure process on the appropriate form. (Note that grade appeals and student conduct appeals will not be addressed by this process.) For additional information, contact: Division of Higher Education, Access, and Equity; Pennsylvania Department of Education - Postsecondary and Adult Education; 333 Market Street, 12th Floor, Harrisburg, PA 17126-0333, 717.783.8228, RA-HigherEducation@pa.gov

Assessment of Academic Programs and Student Services

The University continues to enhance its activities to assess academic and student service programs. Program assessment is an ongoing, prospectively planned, comprehensive set of activities to collect information on the quality of the education and student services at the University. Essentially every student and faculty member of the University, plus many staff members, will have a role in program assessment. Students may be asked to complete surveys, participate in discussion groups, answer knowledge-based questions, demonstrate skills, complete portfolios, and participate in other methods of data collection.

Students may also be asked to help in the design, analysis, and critique of assessment activities. Alumni will also be asked to participate in assessment program activities. It is the responsibility of each student and alumnus to participate honestly in these activities. The information collected in assessment activities will be analyzed, communicated, and then used to improve the educational experience at the University and the assessment process.

Student academic performance data (such as course grades, test, and assignment scores) are sometimes used for academic program assessment purposes—that is, analyzing how well students, as a whole, are achieving the learning goals of a major program or general education. All student performance data is aggregated and completely anonymous—no individual student information is analyzed or reported. Assessment of student learning enables the University to better understand student academic performance and helps our programs continually improve the educational experiences for our students. For additional information regarding program assessment or assessment of student learning, contact the Office of the Provost (215.596.8865).

Affirmative Action

University of the Sciences recognizes that a diverse campus community is essential to enriching intellectual exchanges and enhancing cultural understanding and, as such, values equality of opportunity, mutual respect, and diversity. USciences does not discriminate in admission, employment, or administration of its programs on the basis of gender, age, disability, race, religion, creed, national origin, veteran status, sexual orientation, gender identity, or in violation of federal, state, and local laws or executive orders.

The Affirmative Action Officer is responsible for addressing all grievances related to discrimination and, in cooperation with the Office of Human Resources and the Division of Student Affairs, seeks to support and advance these principles by providing leadership and coordination to ensure that USciences adheres to equal opportunity, affirmative action, and nondiscrimination policies.

For all questions and concerns regarding Affirmative Action policies, or if you require assistance with resolving an issue related to discrimination, please contact:

Marcia Conrad
Affirmative Action Officer
Senior Human Resources Manager

University of the Sciences
600 South 43rd Street
Philadelphia, PA 19104
Telephone: 215.596.7533
Email: m.conrad@uscience.edu

Sexual Misconduct (Title IX)

University of the Sciences is committed to maintaining a safe and healthy educational and work environment in which no member of the University community is denied the benefits of, or discriminated against as it relates to, any University program or activity, on the basis of sex, sexual orientation, or gender identity. Gender-based and sexual harassment, including sexual violence, are forms of sex discrimination in that they deny or limit an individual's ability to participate in or benefit from University programs or activities.

For additional information, including one's rights, prohibited behavior, resources, and options following an incident, visit the Sexual Misconduct website.

For information or to ask questions without the disclosure of personally identifiable information or notification to the Title IX team, one may seek the assistance of a confidential resource:

Student Health and Counseling (SHAC)
Whitecar Hall – Suite 1200
215.596.8536

Employee Assistance Program (EAP)
<http://higheredeap.com>

For additional questions or to report an incident, one may seek the assistance of the University's Title IX Team:

Jessica Rickmond, Title IX Coordinator
Telephone: 215.596.7635 (this phone number may also be used after business hours)
Email: j.rickmond@uscience.edu

Ross Radish, Deputy Title IX Coordinator - Students Title IX Coordinator
Telephone: 215.596.8950
Email: r.radish@uscience.edu

Caroline Kelleher, Title IX Investigator
Telephone: 215.596.7041
Email: ckelleher@uscience.edu

To submit an anonymous report:

EthicsPoint Compliance Hotline
Telephone: 888.266.0218
<https://secure.ethicspoint.com/domain/media/en/gui/18902/index.html>

Ethics Point

University of the Sciences in Philadelphia is committed to excellence at all levels and strives to support the USciences community in practicing the highest standards of ethical conduct. To facilitate this, the University has selected EthicsPoint, Inc. to provide an on-line system to anonymously and confidentially report activities involving misconduct, violations of government regulations or university policies, or otherwise inappropriate, unethical or illegal activities involving the USciences community.

Reports can be made via telephone toll-free 888.266.0218 or the web
at: <https://secure.ethicspoint.com/domain/media/en/gui/18902/index.html>

Campus Life

Academic Deans' Offices

The educational experience of students consists of both academic efforts in the classroom and developmental opportunities

through Student Affairs. The academic deans and the dean of students provide the leadership through their respective colleges and division toward an optimum educational experience for students.

The offices of the dean of Misher College of Arts and Sciences, dean of Philadelphia College of Pharmacy, and dean of Samson College of Health Sciences provide information and direction concerning academic and related matters such as course assignments, approval for summer courses, and information and applications pertaining to selected advanced degree programs and admissions tests. All student academic matters are channeled through these offices, which also issue a list of those students attaining sufficient academic averages to qualify for the Dean's List.

Student Accommodations

University of the Sciences supports the educational endeavors of all its students. If a student believes that he/she has a condition that may impair his/her ability to fulfill any degree requirements, or other educational endeavors, and would like more information on applying for an accommodation, please contact the administrator of the Office of Student Accommodations at 215.596.8758. To learn more about the University's policy, see the General Information and University Policies section of the *Student Handbook*.

Office of Student Conduct and Grievances

The University of the Sciences student conduct system contributes to the mission and goals of the University by holding students accountable for their actions in an environment that is fair, just, and unbiased.

The conduct process is designed to be educational in nature and exists to protect the interests of students and the community. When students engage in prohibited conduct, the student conduct process is used to uphold the Student Conduct Policy and to address behavior not in accordance with our policies. If a student is found responsible for a policy violation, the Office of Student Conduct and Grievances will work with the student to explore the cause of the action and address any underlining challenges or concerns. When necessary and appropriate, sanctions will be assigned to address students' moral and ethical decision-making and to help bring behavior into accord with our community expectations. The aim is to facilitate the necessary personal and professional development of students so that they demonstrate academic, personal, and professional behavior of the highest integrity.

Detailed information regarding the Student Conduct Policy and procedures can be found in the Student Handbook. If you believe a student has violated the Student Conduct Policy or if you have questions regarding the conduct process, please contact the Office of Student Conduct and Grievances at 215.596.8844.

University Services

For information on the following services, please consult the appropriate section of the Student Handbook.

- Bookstore
- Dining Services
- Transit Service
- Varsity Sports

The University is a Division II member of the National Collegiate Athletic Association (NCAA). Our teams currently compete within the 14-member Central Atlantic Collegiate Conference (CACC), which has members in Delaware, Pennsylvania, New Jersey, New York, and Connecticut.

Undergraduate Admission

Application, Admission, and Enrollment Policies

University of the Sciences practices a rolling admission policy, accepting qualified applicants until the class is filled, for most first-year and transfer candidates. For transfer candidates seeking admission into our pharmacy, physical therapy, and occupational therapy programs, please refer to the transfer section for specific application deadlines. University of the Sciences does not discriminate in admission, employment, or administration of its programs on the basis of gender, age, disability, race,

religion, creed, national origin, veteran status, sexual orientation, or gender identity or in violation of federal, state, and local laws or executive orders.

Direct-Entry

Our direct-entry admission policy grants first-year students admission directly into our doctor of pharmacy, doctor of occupational therapy, or doctor of physical therapy majors. Students who meet the progression standards will have a guaranteed spot in the professional phase of the program.

Application

Applications for admission may be submitted online at <https://www.commonapp.org>. Certain programs require the use of specific applications, which are available on our website: <https://www.usciences.edu/admission/index.html>

First-Year Students

Undergraduate first-year students may apply using the Common Application. First-year applicants to all majors are reviewed via a rolling admission process. Students are urged to apply in the fall preceding the fall semester in which they intend to enroll. For traditional-age students, this is generally during the fall or winter of the final year of high school. For the University's most competitive majors, an early fall submission is strongly recommended. Acceptable applicants who apply for admission after a class is filled may be placed on a waiting list.

Admission Requirements Transcripts

- Every applicant for first-year admission must present evidence of satisfactory completion of, or enrollment in, a high school course leading to a diploma or its equivalent. Typically, academic, college preparatory, or scientific high school courses are acceptable. Commercial and vocational training courses are not accepted for full credit. First-year applicants must arrange to have their high school transcripts submitted to the Admission Office. High school transcripts should include a list of senior coursework.

Minimum Academic Entrance Requirements

The University requires these high school courses:

- Mathematics: Two years of algebra and one year of geometry. An additional year of higher-level mathematics (e.g., trigonometry, elementary functions, precalculus, and/or calculus) is strongly recommended.
- Science:
 - Pharmacy (PharmD), Physical Therapy (DPT) and Physician Assistant pre-professional phase: three years of laboratory sciences, which must include at least two of the following: biology, chemistry, and physics. All three are strongly recommended.
 - Pharmaceutical & Healthcare Business (BS): one year of laboratory science. Biology is strongly recommended.
 - All other programs: two years of science (biology, chemistry or physics), including one year of laboratory science. Three years of science are strongly recommended

College Entrance Exams

- All applicants for admission for fall 2022 have the option to submit the results of the SAT (School Code: 2663) or the ACT (School Code: 3671) or not to submit results from the SAT or ACT. SAT and/or ACT scores will only be used to put a student in a better position to be considered for acceptance.
- If a student decides to submit SAT or ACT results, the University will only accept official results sent directly from the College Board or the ACT.
- The University participates in the College Board's Advanced Placement Program (AP), the College Board's College-Level Examination Program (CLEP), and the International Baccalaureate Diploma Programme (IB).
- If English is not an applicant's first language, it may be recommended or required that he/she complete and submit scores from the Test of English as a Foreign Language (TOEFL).

Essay

Applicants should submit an essay as part of the application requirements for the Common Application. The Common Application essay will be evaluated for admission purposes.

Letter(s) of Recommendation

Applicants must submit one (1) letter of recommendation. Up to two (2) additional letters of recommendation may be submitted; however, additional recommendations are not required.

Additional Requirements

The University reserves the right to supplement the basic admission requirements with a personal interview or special entrance examination.

Notification of Admission Decision

First-year students are reviewed on a rolling basis once all required materials are received by the Admission Office. Students will be notified of the admission decision via the U.S. mail, shortly after the admission decision is rendered. Admission to the University is provided with the expectation that the accepted student's record of academic achievement will be maintained throughout the completion of current coursework.

Enrollment Reservation

Applicants accepted for first-year admission are asked to submit an enrollment reservation deposit no later than **May 1** to secure a guaranteed place for the fall semester. This deposit is not refundable; however it will be credited toward the student's first-semester tuition. The enrollment reservation deposit must be received before a housing deposit will be honored. Entering first-year students may request an extension but are asked to submit such requests in writing prior to May 1. Approval of an extension request is subject to the availability of space in the student's intended academic program.

All applicants accepted after May 1 are asked to submit the enrollment reservation deposit **within 15 days** of the date of acceptance.

Deferring Your Enrollment

First-year students who have submitted an enrollment reservation may request a deferral of enrollment for one year. This request must be submitted to the Admission Office in writing at least two weeks prior to the start of the term or academic year to which the student was admitted. Requests received after this date will be reviewed on a case-by-case basis. Approval is dependent upon the academic program. Approval of deferred enrollment guarantees a student's seat for the following academic year; however, a student's merit or need-based financial award is not guaranteed. Merit and need-based awards will be reevaluated utilizing the criteria established for the term or academic year in which the student matriculates.

Students approved for deferred enrollment who choose to take college-level coursework at another college or university may lose their first-year status and, thus, forfeit their deferred status.

Transfer Students

University of the Sciences welcomes students who wish to apply for transfer to any of our undergraduate majors. Applications for most of our majors can be submitted on a rolling admission basis. Students interested in applying to the professional phase* of a few majors have application deadlines.

Physical Therapy November 1

Occupational Therapy January 1

Pharmacy Priority deadline: November 1; Applications close February 15

The application and all required application materials (see below) are due by the deadline in order to begin the application review process for professional programs (pharmacy, physical therapy, and occupational therapy).

* The first professional year (P1) of the pharmacy program is year 3; the first professional year (P1) for the occupational therapy

and physical therapy program is year 4.

Admission Requirements

Application

Transfer students applying to the first professional year of the pharmacy, physical therapy, and occupational therapy programs are required to apply through their respective Centralized Application Service (PharmCAS, PTCAS, or OTCAS). The links to these applications are located on the University website. All other transfer applicants are required to use the Common Application for transfer students.

Transcripts

The transfer applicant is responsible for the submission of all required documents, including official transcripts from all current and/or previously attended colleges or universities. Applicants for transfer who do not possess an associate's or bachelor's degree are required to submit an official final high school transcript.

College Entrance Exams

Applicants for transfer who have less than 24 college credits and who graduated from high school within the last two years are required to submit official SAT or ACT results. SAT and ACT results must be sent directly from the College Board or ACT.

Additional Requirements

Transfer candidates applying for physical therapy, and occupational therapy must submit a professional goal statement and one to three letters of recommendation. More information is available here: <https://www.usciences.edu/admission/transfer/index.html>

Transfer applicants may be asked to supplement the basic application requirements with a personal interview, college entrance examination, or high school transcript.

Transfer applicants who are applying for the first professional year of the doctor of pharmacy degree and doctor of physical therapy degree may be invited to participate in an interview. This interview is required to complete the evaluation process.

Notification of an admission decision will occur on a rolling basis prior to the fall semester for fall applicants, and during the fall semester for spring applicants. After review, the student will be notified of the admission decision via the U.S. mail shortly after the admission decision is made.

Transfer admission is contingent upon the satisfactory completion of coursework in progress and/or required before enrollment. Completion of current or required coursework must be documented in order to finalize admission.

Transfer Credit

Accepted students receive a preliminary transfer credit evaluation that includes the courses and credits acceptable by the University for transfer. Transfer credit is usually granted for comparable coursework completed at an accredited college or university. A grade of "C" or better must be achieved, and the coursework must meet the specific requirements of the applicant's program of study.

Pre-professional courses completed 10 or more years prior to enrollment may not be accepted for transfer credit or may require additional validation by the University.

Residency Requirements

Undergraduate and professional degree programs have varying residency requirements. For more information, see the Academic Standards and Academic Progress section and the individual program descriptions elsewhere in this catalog.

Enrollment Reservation

Applicants accepted for transfer admission are asked to submit an enrollment reservation deposit by the date listed in their acceptance letter. This deposit is not refundable; however, it will be applied to the student's first-semester tuition.

Deferring your Enrollment

Transfer students who have submitted an enrollment reservation may request a deferral of enrollment for one year. This request must be submitted to the Admission Office in writing at least two weeks prior to the start of the term or academic year to which the student was admitted. Requests received after this date will be reviewed on a case-by-case basis. Approval is dependent upon the academic program. Approval of deferred enrollment guarantees a student's seat for the following academic year; however, a student's merit or need-based financial award is not guaranteed. Merit and need-based awards will be reevaluated utilizing the criteria established for the term or academic year in which the student matriculates.

Students approved for deferred enrollment who choose to take college-level coursework at another college or university may forfeit their deferred status and may require a reactivation of the original application as well as an additional admission evaluation.

International Students

Application Deadline—April 15

Undergraduate first-year students may apply using the Common Application. In order to provide an admission decision in time to process matriculation documents, international students must apply and provide all required materials by April 15. The application deadlines that apply for transfer candidates also apply for international candidates. Please refer to the Transfer section of this document for application deadlines. It is recommended that applications be submitted as early as possible due to space limitations in certain programs.

Transcripts

First-year and transfer applicants who have completed coursework outside the United States must have their coursework evaluated by a National Association of Credential Evaluations Services (NACES.org) member, preferably World Education Services (WES) or Educational Credential Evaluators (ECE). Once completed, the official evaluation must be submitted to the Admission Office. Information concerning WES may be obtained online at www.wes.org. Information concerning ECE may be obtained online at www.ece.org.

College Entrance Exams

Each international applicant must submit scores from an English language proficiency examination such as the test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS). The English language proficiency examination requirement may be waived if evidence is presented to show that the applicant has completed at least four years of instruction conducted in English.

All applicants for admission for fall 2022 have the option to submit the results of the SAT (School Code: 2663) or the ACT (School Code: 3671) or not to submit results from the SAT or ACT. SAT and/or ACT scores will only be used to put a student in a better position to be considered for acceptance.

If a student decides to submit SAT or ACT results, the University will only accept official results sent directly from the College Board or the ACT.

Essay

Applicants should submit an essay as part of the application requirements for the Common Application. The Common Application essay will be evaluated for admission purposes.

Letter(s) of Recommendation

Applicants must submit one (1) letter of recommendation. Up to two (2) additional letters of recommendation may be submitted; however, additional recommendations are not required.

Certification of Finances

International students seeking an F-1 visa need to submit a Certification of Finances form. For more information visit www.usciences.edu/applying/international.

Additional Requirements

Candidates may be requested to participate in an on-campus interview or supplemental testing designed to assist in the evaluation

of their academic credentials.

Notification of Admission Decision

Applications are reviewed on a rolling basis once all required materials are received by the Admission Office. Students will be notified of the admission decision via email, shortly after the admission decision is rendered. Admission to the University is provided with the expectation that the accepted student's record of academic achievement will be maintained throughout the completion of current coursework.

Enrollment Reservation

International students who wish to enroll at the University are asked to provide an enrollment reservation deposit to secure a space in the entering class.

First-Year Students

Students admitted with first-year status are asked to submit an enrollment reservation deposit no later than **May 1** to secure a guaranteed space for the fall semester. This deposit is not refundable; however, it will be credited toward the student's first-semester tuition. The enrollment reservation deposit must be received before a housing deposit will be honored. Entering first-year students may request an extension but are asked to submit such requests in writing prior to May 1. Approval of an extension request is subject to the availability of space in the student's intended academic program.

All applicants accepted after May 1 are asked to submit the enrollment reservation deposit **within 15 days** of the date of acceptance.

Transfer Students

Applicants accepted for transfer admission are asked to submit an enrollment reservation deposit by the date listed in their acceptance letter. This deposit is not refundable; however, it will be credited toward the student's first-semester tuition. The enrollment reservation deposit must be received before a housing deposit will be honored.

Deferring Your Enrollment

International students who have submitted an enrollment reservation may request a deferral of enrollment for one year. This request must be submitted to the Admission Office in writing at least two weeks prior to the start of the term or academic year to which the student was admitted. Requests received after this date will be reviewed on a case-by-case basis. Approval is dependent upon the academic program. Approval of deferred enrollment guarantees a student's seat for the following academic year; however, a student's merit or need-based financial award is not guaranteed. Merit and need-based awards will be reevaluated utilizing the criteria established for the term or academic year in which the student matriculates.

Students approved for deferred enrollment who choose to take college-level coursework at another college or university may lose their first-year status and, thus, forfeit their deferred status.

Part-Time Undergraduate Students

Admission Requirements

Students are enrolled as part-time students on a space available basis. Students wishing to enroll as non-matriculated part-time students are asked to complete and submit a part-time application form with the undergraduate Admission Office. Part-time application forms may be obtained by contacting the undergraduate Admission Office.

Notification of Approval

Approval for part-time enrollment is provided by the Admission Office for humanities and social science courses, as well as basic science and mathematics courses that are part of the University's first- and second-year curricula. Approval is granted upon verification of required prerequisites. Approval for advanced science or professional courses is granted by the department chair in the department in which the course is offered. Students intending to take more than one course must be granted approval by the

department(s) in which each course resides.

ROTC Programs

Students at the University are eligible to participate in ROTC programs through agreements with two nearby universities. For more information, see the Office of the Provost section elsewhere in this catalog.

Veterans

The University of the Sciences requires students using VA education benefits to submit, no later than the first day of class, a copy of their Certificate of Eligibility, along with an USciences Veterans Benefit Certification Form, signed by the student, to provide additional information to properly certify enrollment each semester [fall, spring, summer]. Courses registered must count toward the program of study requirements. Once properly identified, students receiving VA education benefits may attend courses during the period requested and for which they are officially registered.

No late fee penalty will be imposed nor any services denied due to a delay in disbursement funding from the VA. The covered individual will not be required to borrow additional funds to meet financial obligations to the University due to delayed disbursement funding from the VA.

The VA will be notified of any student receiving VA education benefits who is withdrawn or dismissed from the University either on the grounds of conduct or of academic standing. Documentation from the appropriate Dean to the Registrar will initiate such action.

More information about education benefits offered by VA is available at the official U.S. government website at www.benefits.va.gov/gibill.

Graduate Education

One of the main goals of University of the Sciences is to provide high-quality education to graduate students in the sciences and health-related fields. The USciences' philosophy of graduate education is to provide high-quality graduate-level courses in a flexible, convenient manner, characterized by close personal interactions between the students and the faculty. Most of our graduate-level courses are offered in the early evenings for the convenience of nontraditional students who either wish to obtain advanced training and/or certificates of training without formally entering a graduate program and/or wish to earn a graduate degree. These courses are delivered both traditional on-campus and in online and blended formats. Graduate-level courses are taught by USciences faculty and other highly qualified experts. These courses are constantly monitored and updated to ensure that their content is current and meaningful in the real world.

USciences enjoys an excellent international reputation that allows us to attract graduate students from all over the world as well as from the United States. The interaction of such a diverse body of students and faculty adds strength and depth to our programs. Our graduate students are not only trained in the content of their profession but are also trained to be critical thinkers, to work in group settings, and to be effective communicators.

We train our graduate students to be leaders in academic, industrial, and governmental settings. Our graduates are likely to continue their education, earning PhD, SciD, JD, MBA, MD, DO, and other professional degrees. Our PhD graduates also are likely to enter academic and industrial post-doctoral fellowships for additional training. Our graduate students may end up teaching at the university level; working in industry; working in local, state or federal governmental positions; or working for other agencies.

Admission

Admission into a Graduate Program

The graduate faculty of USciences encourage highly qualified individuals to apply to: 1) a graduate degree credit program [i.e., PhD, MS (thesis), MS (non-thesis), or MBA degree]; 2) a graduate certificate program, or 3) take one or more courses as a non-matriculated student without being in a degree program.

Unless applying for USciences' integrated graduate credit degree program, an applicant must be a graduate of a reputable college or university with at least the equivalent of an earned bachelor's degree and meet the eligibility requirements established by both the graduate faculty and the specific graduate program to which the individual is applying.

Admission into an Integrated Graduate Credit Program(IGCP)

Our graduate programs offer qualified current USciences undergraduate students to simultaneously pursue a graduate degree while completing their undergraduate coursework. Acceptance into the integrated graduate credit program:

- Allows qualified undergraduate students who have the necessary prerequisites to take graduate-level coursework.
- Allows students to apply graduate coursework toward earning a graduate degree from USciences while concurrently earning an undergraduate/first-professional degree provided the minimum academic standards criteria are maintained.

Students may apply for the Integrated Graduate Credit Program either as entering freshmen, as entering transfer students, or as current USciences undergraduate students (prior to their fourth year if in a BS track, fifth year if in a professional master's degree track, or sixth year if in the PharmD, DrOT, or DPT degree track). Admission is competitive and based on both the availability of positions and the academic record of the student. Normal standardized examinations, such as the GRE or LSAT and normal programmatic entrance (e.g., proficiency) examinations will not be required of the applicant. Language examinations such as the TOEFL and IELTS may be required at the discretion of the graduate program director and/or dean of the College under which the program is offered. Admission into these programs is granted only by the dean upon the recommendation of the appropriate graduate program director.

To be considered for this program, incoming freshmen must meet the following criteria:

- A minimum high school GPA of 3.40/4.00.
- A minimum SAT score of 1200 total with a minimum individual verbal and math score of 550.
- Three letters of recommendation from high school faculty.
- Signature of the student's USciences undergraduate program director signifying that he/she has discussed the implications on how this program might impact the student's undergraduate studies.

To be considered for this program, incoming transfer students and current matriculated USciences students must have met the following criteria:

- A minimum cumulative GPA of 3.00/4.00.
- A minimum SAT score of 1200 total with a minimum individual verbal and math score of 550 if not matriculated in an undergraduate or first professional degree program for at least one academic year (at least a fall and spring semester) at USciences; otherwise, there is no SAT requirement.
- Three letters of recommendation from college faculty members, if student is seeking graduate credits outside of their department. One letter is required from faculty and/or research mentors if student is applying for graduate credits within their current department.
- Signature of the student's current USciences undergraduate program director signifying that he/she has discussed the implications on how this program might impact the student's undergraduate studies.

Students in the program will have separate undergraduate and graduate transcripts. Courses used to earn an undergraduate degree cannot also be used to earn a graduate degree. The student should work closely with his/her undergraduate/graduate advisors to ensure the appropriate courses get assigned to the proper transcript during registration.

Admission into Graduate Courses

While many of our graduate students enter our graduate programs after completing their undergraduate degree, we also have many nontraditional students who usually hold one or more college degrees and are currently employed but wish to obtain advanced training to enhance their careers. Many of these students wish to take one or two courses to "test the waters" before matriculating into a graduate program; others are looking to receive training in specific areas without pursuing a degree. USciences offers the option for qualified students to take graduate-level courses without formally entering a graduate program if they have the appropriate prerequisite background. Information and assistance in this regard can be obtained from the Graduate Admissions Office at 215.596.8810 or through our website at <https://www.usciences.edu/admission/graduate/index.html>.

In order to register for courses without formally enrolling in a graduate program, the applicant must provide proof via a copy of a transcript that shows that he/she meets all prerequisites for the course. Such students should complete the application for enrollment and provide a copy of the pertinent transcript showing that they meet the prerequisite requirements prior to the start of the course. Approval for enrolling in a course is granted by the graduate program director with the approval of the dean.

USciences allows a maximum of 12 credits of coursework taken at USciences prior to formal enrollment in a graduate program to

count toward the minimum degree requirements of the graduate program. In addition, up to 12 credits of coursework from prior learning assessment, transfer credit from appropriate courses taken at other accredited institutions, and credit earned by examination can be counted towards the minimum degree requirements of the graduate program.

For priority review and consideration for University financial support, such as teaching or research assistantships, completed applications must be submitted by March 1 for entry in the fall semester, and October 1 for entry in the spring semester. Applications received after these dates but not later than August 1 for entry in either the fall or summer semester, and not later than December 1 for the spring semester will be processed, but admission will depend upon availability of openings in the program and the awarding of financial support in terms of teaching assistantships is less likely to occur.

The application for graduate programs and complete information regarding admission requirements are available at <https://www.usciences.edu/admission/graduate/index.html>.

Acceptance by a Graduate Program

The graduate program director and the program's admissions committee, whose members come from the ranks of their program's graduate faculty, will review applications to their program. This committee will consider all valid information that has been provided about the applicant to arrive at its recommendation of admission. However, as an institution that follows affirmative action/equal opportunity, recommendations may not be made based on the applicant's age, gender, sexual orientation, race, religion, creed, national origin, veteran status, or gender identity, or in violation of federal, state, and local laws or executive orders.

Based on the application documentation, the program director may make one of the following recommendations:

- Accept the applicant into the degree track for which the individual applied.
- Conditionally accept the international applicant into the degree track for which the individual applied. They will be required to submit official TOEFL or IELTS results or complete specified English training programs prior to entering a USciences graduate program.
- Recommend the applicant consider applying to a different degree track within a program (in this case, either the program director and/or personnel from Admissions will discuss this with the applicant before acting on the application).
- Reject the application. In this case, it is USciences policy not to inform the applicant of the rationale for the rejection.

The program director will relay the committee's recommendations to the dean, usually through the Admissions Office. The dean makes the final determination as to which applicants will be granted offers of acceptance.

Notification of any University-based financial support in the form of graduate student instructorship may accompany the notification of the applicant's acceptance but typically follows at a later date.

For international students, the Certification of Finances form will be sent from the university's International Student Office after the accepted student has submitted a Graduate Enrollment Reservation form and nonrefundable deposit of \$150; this deposit will be credited to the student's first semester's tuition. However, deadlines for submission of the completed Certificate of Finances form are June 1 and December 1 for entry into the fall and spring semesters, respectively. Once the University receives the Certification of Finances form, the University will send the applicant's Certificate of Eligibility form I-20A, which is required for a student visa.

It should be recognized that admission into graduate school is usually highly competitive in nature. Many times, there are many more applicants than there are openings in the programs, and even highly qualified applicants may not be accepted into a program.

Immunization Records, Health History Forms and Health Insurance

All international and full-time students must have proof of completed immunization records and must have completed the University's Medical History Questionnaire. This form should be completed by the student's physician prior to the student's arrival on campus. Unless exempted, all international students must participate in the health insurance program sponsored by the University. Additionally, all students must show proof that they are covered by health insurance. Students may secure accident and sickness insurance covering medical and hospital expenses through a plan offered by the University. Details of this plan are available in the Office of the Dean of Students. For more information on USciences' health insurance policies, visit <https://www.usciences.edu/student-life/student-health-and-counseling/health-insurance-policy/index.html>.

Financial Assistance

There are several financial aid programs available for graduate students to help meet the costs of an advanced education. For more information on financial aid options, visit <https://www.usciences.edu/admission/cost-financial-aid/information-for-graduate-students-ms-phd-programs.html>.

Endowed Fellowships/Scholarships for Graduate Students

Clayton French Fellowship: Provided by Mrs. Mary I. Banks in honor of her father, Clayton French, for a graduate student conducting pharmaceutical research at the University.

William H. Gano Memorial Scholarship: Provided by Mrs. William H. Gano (Class of 1884) in memory of her husband for a graduate student engaged in research at the University.

Jacob Gelb Scholarship: Established by Jacob Gelb (Class of 1931), and his brother Samuel Gelb and awarded to newly matriculated graduate students. One graduate student from each program can be nominated to receive a one- or two-semester scholarship; the second semester may be awarded if the student maintains good academic standing in the graduate program.

Abraham Glasser Fellowship: Provided through the generous gift of Abraham Glasser (Class of 1943), and his wife Gloria. Full-time PhD students enrolled in chemistry, biochemistry, pharmacognosy, pharmaceuticals, or pharmacology and toxicology programs who have passed their comprehensive examinations, have been admitted to candidacy, and have demonstrated a reasonable degree of progress in their research are eligible to apply for this fellowship.

F. B. Kilmer Research Fellowship: Provided by the late Dr. Frederick B. Kilmer for a graduate student conducting research in pharmacology and natural product/plant chemistry (i.e., pharmacognosy).

For more information and to apply for any of these fellowships, contact the Office of Graduate Education at 215.596.7312.

External Funding Sources

Fellowships and traineeships awarded by organizations such as the National Science Foundation, the National Institutes of Health, and the American Foundation for Pharmaceutical Education may be available to graduate students. Students interested in such programs should apply to these agencies after consulting with their research advisor, program director, and the Office of Sponsored Projects and Research.

Graduate Student Instructors (GSI's)

The University provides financial aid to a select group of matriculated graduate students who work as Graduate Student Instructors (GSI's). GSI's assist in teaching, grading, and proctoring courses. If English is not your primary language, you are required to submit scores from the Test of Spoken English or TOEFL IBT (Internet-based test) and demonstrate adequate English skills upon arrival on campus.

The Provost Designee awards GSI funding to highly qualified students recommended by the graduate program directors. GSI's are assigned by the Provost Designee to various departments across campus based on need. GSI's are required to participate in all teaching assistant training sessions sponsored by their department, the Department of Safety, and the Office of Graduate Education.

Graduate Student Instructor Contracts (Stipends and Tuition Scholarships)

Most GSI's begin their studies in the fall semester and receive an initial contract that spans the fall and spring semesters. New contracts are usually awarded in May before the start of the summer session and generally last a full calendar year. Contracts specify the amounts of the stipend and the tuition scholarship. GSI's are required to provide 17 hours of service per week.

The amount of the stipend is based on experience and is considered taxable income, as it is a fee for service. Tuition scholarships are applied against a student's tuition bill during the contract period; the student is responsible for all tuition beyond the amount of the award and outside the contract period. GSI's enrolled in PhD degree tracks may receive stipend and tuition scholarship for a maximum period of five years while in the graduate program.

Tuition scholarships are not considered taxable, as they do not qualify as a fee for service.

To be considered for a Graduate Student Instructorship, contact your program director.

Graduate Research Assistantship (GRA's)

Graduate students may be supported by extramural support to perform research. Usually, the support is in the form of a research stipend. This stipend may or may not be taxable depending if it is a fee for service or a fellowship to perform research.

Students who receive the equivalent to a GSI stipend may be eligible to receive a tuition scholarship depending on the size of the stipend received.

The tuition scholarship is considered to be not taxable as it is not a fee for service. To apply for Graduate Research assistance, contact your program director.

Graduate Assistantship (GA's)

Matriculated graduate students may also be hired to perform specific services for the University for which they receive graduate assistantships. Graduate assistantships are awarded at the rate of one semester hour of credit for 3 hours of service per week per semester. A student may have up to one-third of the credits taken each semester covered by tuition waivers. The maximum number of credits that can be covered by a graduate assistantship is 3.

A graduate student may receive assistance in the form of a graduate assistantship for a maximum of two and a half years for a MBA/MS track or five years for a Ph.D. track.

Graduate assistantships are deemed to be taxable as they are considered a fee for service. To be considered, contact your program director.

For more information, call the Office of Graduate Education at 215.596.7312 or visit <https://www.usciences.edu/admission/cost-financial-aid/>.

Tuition and Fees

Tuition, Fees, and Refunds

Tuition (21/FA 20/FA Cohort)	Semester	Year
Full-Time		
Undergraduate	\$12,900	\$25,800
Part-Time (<i>per credit</i>)	\$1,075	----
Tuition (18/FA 19/FA Cohort)		
Full-Time (Fall and Spring Semesters)		
Undergraduate (U1-U4)	\$11,650	\$23,300
Part-Time (<i>per credit</i>)	\$971	----

Professional DPT (21/FA 20/FA Cohort)		
P1	\$6,700 (SU)	\$38,300
	\$15,800 (FA/SP)	
P2	\$19,150 (FA/SP)	\$38,300
P3	\$6,700 (SU)	\$38,300
	\$15,800 (FA/SP)	
Professional DPT (18/FA 19/FA Cohort)		
P1	\$5,700 (SU)	\$33,000
	\$13,800 (FA/SP)	
P2	\$19,150 (FA/SP)	\$38,300
P3	\$6,700 (SU)	\$38,300
	\$15,800 (FA/SP)	
Professional DPT Post Bac (18/FA 19/FA 20/FA 21/FA Cohort)		
P1	\$10,530 (SU)	\$52,654
	\$21,062 (FA/SP)	
P2	\$21,062 (FA/SP)	\$49,144
P2	\$7,020 (WI)	
P3	\$14,040 (SU)	\$56,164
	\$21,062 (FA/SP)	
Professional DOT (21/FA 20/FA Cohort)		
P1/P2/P3	\$6,700 (SU)	\$38,300
	\$15,800 (FA/SP)	

Professional DOT (19/FA Cohort)		
P1	\$6,700 (SU)	\$33,300
	\$13,800 (FA/SP)	
P2/P3	\$6,700 (SU)	\$38,300
	\$15,800 (FA/SP)	
Professional DOT (18/FA Cohort)		
P1/P2	\$5,700 (SU)	\$33,300
	\$13,800 (FA/SP)	
P3	\$16,650 (FA/SP)	\$33,300
P4	\$6,700 (SU)	\$33,300
	\$13,300 (FA/SP)	
Professional DOT Post Bac (20/FA 19/FA 18/FA)		
P1/P4	\$10,530 (SU)	\$52,654
	\$21,062 (FA/SP)	
P2	\$7,020 (SU)	\$49,144
	\$21,062 (FA/SP)	
P3	\$21,062 (FA/SP)	\$42,124
Professional DOT Post Bac (21/FA Cohort)		
P1/P2/P3	\$10,530 (SU)	\$52,654
	\$21,062 (FA/SP)	

Professional MOT Post Bac (18/FA 19/FA 20/FA Cohort)		
P1	\$10,530 (SU)	\$52,654
	\$21,062 (FA/SP)	
P2	\$7,020 (SU)	\$49,144
	\$21,062 (FA/SP)	
P3	\$12,285 (SU)	\$33,347
	\$21,062 (FA)	
Professional MOT Post Bac (21/FA Cohort)		
P1	\$10,530 (SU)	\$52,654
	\$21,062 (FA/SP)	
P2	\$8,775 (SU)	
	\$21,062 (FA/SP)	\$50,899
P3	\$15,795 (SU/FA)	\$31,590
Professional PharmD		
P1 Post Bac (18/FA 20 FA Cohort)	\$14,150 (FA/SP)	\$28,300
P2/P3 Post Bac (18/FA 20/FA Cohort)	\$16,650 (FA/SP)	\$33,300
P1/P2/P3 Post Bac (19/FA 21/FA Cohort)	\$16,650 (FA/SP)	\$33,000
P1/P2/P3 (21/FA 20/FA Cohort)	\$17,150 (FA/SP)	\$34,300
P1/P2/P3 (18/FA 19/FA Cohort)	\$16,650 (FA/SP)	\$33,300
P4 (18/FA 19/FA Cohort)	\$11,100 (SU/FA/SP)	\$33,300
P4 (21/FA 20/FA Cohort)	\$11,434 (SU/FA/SP)	\$34,300
P4 Post Bac (18/FA 20/FA Cohort)	\$12,767 (SU/FA/SP)	\$38,300
P4 Post Bac (19/FA 21/FA Cohort)	\$11,100 (SU/FA/SP)	\$33,300

Masters in Physician Assistant Studies		
P1/P2 Post Bac (21/FA Cohort)	\$16,100 (SU/FA/SP)	\$48,300
Graduate (per Credit)	\$1,676	----
Certificate Programs (per credit)	\$1,000	----
Tuition - Summer Special Arts and Science Undergraduate Courses (per Credit)	\$700	----
General Fee Undergraduate and Professional (full-time)	\$850	\$1,700
General Fee Undergraduate and Professional (per credit)	\$53	----
Medical Laboratory Science Fee - 4th Year	\$820	\$1,640

Tuition (Students enrolled prior to 2018)

	Semester	Year
Full-Time (Fall and Spring Semesters, except as noted)		
Undergraduate	\$19,147	\$38,294
Undergraduate – Professional Years <i>(b)</i>	\$21,062	\$42,124
6th Year PharmD (including post-bac) <i>(c)</i>	—	\$59,676
Masters and Doctorate of Occupational Therapy and Doctorate of Physical Therapy (Post Baccalaureate) <i>(d)</i>	\$21,062	\$42,124
Medical Laboratory Science – 4th Year	\$820	\$1,640
Part-Time <i>(per credit)</i>		
Undergraduate	\$1,596	—
Professional Years <i>(b) (e)</i>	\$1,755	—

Masters and Doctorate of Occupational Therapy and Doctorate of Physical Therapy (Post Baccalaureate) <i>(f)</i>	\$1,755	—
Masters in Physician Assistant Studies (full time) 20/FA Post Baccalaureate	\$16,667 (SU/FA/SP)	\$50,000
Graduate <i>(per credit)</i>		
Masters and PhD in Health Policy, MBA in Pharmaceutical and Healthcare Business (on-line and in-seat), Masters in Biomedical Writing, Masters in Health Psychology, Masters in Bioinformatics <i>(g) (h)</i>	\$1,000	
All Other Graduate <i>(g)</i>	\$1,676	
Summer		
Summer Special Arts and Science Undergraduate Courses <i>(per credit)</i>	\$700	—
IPPE (Introductory Pharmacy Practical Experience, PP 418)	\$3,510	—
Certificate Programs <i>(h)</i>	\$1,000	—

(b) Applies to 3rd through 5th-year Pharmacy and Pharmacy post-bac (P1 – P3 years), 3rd through 6th-year Occupational Therapy (P1 – P4 years), and 4th through 6th year Physical Therapy (P1 – P3 years). Amount does not include any tuition charge for mandatory winter and summer sessions. Physical Therapy students have two additional summer terms and one additional intersession billed at part-time professional rates. Occupational Therapy students have three additional summer terms billed at part-time professional rates. Students are advised to confirm with their deans the requirements for additional coursework that may affect total tuition.

(c) Billed in equal amounts over three terms starting with the summer term.

(d) Amount does not include any tuition charge for mandatory winter and summer sessions.

(e) Pertains also to 6th Year PharmD and PharmD post-bac.

(f) Pertains to mandatory winter and summer sessions, as well as fall and spring sessions, in which student does not register full-time.

(g) No general fee for these courses.

(h) Most of these programs will initially be billed at the standard rate. The discounted rate of \$1000 per credit will be applied after the students' schedules are finalized after the drop/add period each semester.

Registration Credit Limits

No undergraduate/professional student is permitted to register for more than 20 credit hours per semester without written permission from the dean of the college in which the student is pursuing a degree. If permission is granted, the student will be assessed the appropriate per-credit rate for each credit hour in excess of 20 credit hours per semester.

Fees

	Semester Year	
General Fee Undergraduate and Professional (<i>full-time</i>)	\$850	\$1,700
General Fee Undergraduate and Professional (<i>per credit</i>)	\$53	
General Fee 6th Year PharmD (<i>full-time</i>) (a)		\$2,232
Late Payment Fee (b)	—	—
Health Insurance (c)		\$2,025

(a) Billed in equal amounts over three terms starting with the summer term.

(b) Late payment fee is assessed at \$100 per month.

(c) Mandatory for full-time and half-time students (excluding online programs) unless proof of other comparable insurance is provided according to the requirements outlined by Student Health and Counseling Office. Annual premium (as shown) is payable in full in the fall semester. Students are advised to consult the SHAC webpage for details on exact requirements

Auditing Course Fee

Undergraduate/professional students who audit a course without exceeding the 20-credit limit will not be charged additional tuition. Part-time students will be charged for audited courses at 50% of the applicable part-time rate plus full general fee; overload charges will be computed in the same way for full-time students whose audited courses result in an excess of 20 credits per semester.

Since graduate courses are charged entirely on a per-credit basis, audited courses will be charged at 50% of the applicable per-credit rate.

Residence Halls(a)

	Semester	Year
Osol		
Double Room	\$3,500	\$7,000
Single Room (a)	\$4,000	\$8,000
Wilson		
Double Room	\$5,151	\$10,302
Single Room (a)	\$6,439	\$12,878
Learning & Living Commons		
Double Room	\$5,410	\$10,820
Single Room	\$6,994	\$13,988
Security Deposit	\$200	

(a) There are limited single rooms available for people with disabilities. To provide proof of a disability, please consult with the

Student Accommodations administrator. Single rooms not occupied by people with disabilities may be released to other students at the discretion of the Director of Student Life.

Board Plans

	Semester	Year
Ultimate 700 Plan: 14 all-you-care to eat breakfast/brunch and dinner meals per week (unused meals expire every Thursday at midnight), \$700 declining balance dollars per semester, plus 10 Guest Meal Passes per semester	\$3,387	\$6,774
11 Meal Plan: 11 all-you-care to eat breakfast/brunch and dinner meals per week (unused meals expire every Thursday at midnight), \$625 declining balance dollars per semester, plus 10 Guest Meal Passes per semester	\$3,278	\$6,556
5 Swipe Meal Plan: 5 all-you-care to eat breakfast/brunch and dinner meals per week (unused meals expire every Thursday at midnight), \$350 declining balance dollars per semester, plus 3 Guest Meal Passes per semester	\$1,446	\$2,892
3 Swipe Meal Plan: 3 all-you-care to eat breakfast/brunch and dinner meals per week (unused meals expire every Thursday at midnight) plus \$300 declining balance dollars per semester	\$964	\$1,928

Note: Unused declining balance dollars for the plans described above will expire at the end of each semester.

"All DCB" Plan

There are 3 buy-in amounts: \$250, \$450, and \$850 per semester. Each plan includes a 25% discount on the Guest Meal Rate for the "All You Care to Eat" meals during breakfast and dinner in Wilson Dining Hall (also brunch on weekends), plus no sales tax when used in our retail dining locations. The 450 DCB plan has a 5% bonus (total \$472.50 DCB dollars), and the 850 DCB plan has a 15% bonus (total \$977.50 DCB dollars).

Students can have the \$250 or larger plans billed to their student account.

Fall semester balance will roll to spring semester, only when the student enrolls in the same or higher DCB plan for spring. All unused balances expire at the end of spring semester.

Resident Hall Plans: Residents of Commons (LLC) and Wilson Halls must select either the Ultimate 700 Plan or the 11 Meal Plan. All other students may participate in any of the four-block plans or the "All DCB" Plans as described above.

Apartment Resident and Commuter Plan: Off-campus residents and commuter students may choose from any of the four blocks plans or the "All DCB" Plans as described above.

The University Administration reserves the right to make changes in tuition, fees, and room and board charges.

Refunds

A student who leaves the University without obtaining withdrawn status and without completing the semester, or who is dismissed or suspended from the University for disciplinary reasons or scholastic deficiency, is not entitled to any refund.

Refunds to students who officially withdraw from the University will be made according to the schedule that follows. (For students who are enrolled in special programs that feature sessions that are shorter than the full semester, refunds will be computed on a proportionate basis.) Regardless of the reason for vacating, refunds will not be made for unused dormitory room fees, except for official withdrawal from the University. Such refunds will be consistent with the following tuition refund schedule. Pro rata refunds, less processing fees, will be made for meal plan fees, based on patterns of usage. Devils Dollars account balances in the USciences OneCard system are maintained from semester to semester and from year to year. When a student leaves the University for any reason, a credit to the student's tuition account will be granted, less a \$5 service fee for Devils Dollars accounts.

The general fee and other incidental fees are only refundable before the first day of the semester. If withdrawal is authorized by the University, a tuition refund will be made in accordance with the following schedule. The official University opening of classes and not the first day in actual attendance governs the refund computation. Courses scheduled outside the standard term

calendar will be governed by policies devised for their respective programs.

Segment of Semester Refund (Fall/Spring Only)

Before first day of class 100%
To end of first week 90%
To end of second week 80%
To end of third week 50%
To end of fourth week 25%
Beyond fourth week No Refund

For students who withdraw during a semester, Title IV funds will be returned in accordance with federal regulations (34CFR 668.22). The Return of Title IV Funds (Return) regulations do not dictate an institutional refund policy. Instead, a statutory schedule is used to determine the amount of Title IV funds a student has earned as of the date he or she ceases attendance. The amount of Title IV program assistance earned is based on the amount of time the student spent in academic attendance; it has no relationship to the student's incurred institutional charges.

Up through the 60% point in each payment period or period of enrollment, a pro rata schedule is used to determine the amount of Title IV funds the student has earned at the time of withdrawal. For example, if a student has completed 20% of the semester, then he/she has earned 20% of the funds that have been or could have been disbursed. After the 60% point in the payment period or period of enrollment, a student has earned 100% of the Title IV funds.

If a student has received more funds than he/she has earned at the time of withdrawal, grant money, as well as loans, may need to be returned under certain circumstances.

Students should be aware that the regulations may prevent the refund of any personal funds used for payment of tuition and fees. In instances where a student has received a cash payment prior to the official notification of his or her withdrawal, the student may be required to return such payment to the University.

Refunds for Dropped Courses

Students who remain active with the University, but drop one or more classes prior to the end of each semester's drop-add period, may receive a refund of charges for those classes under certain circumstances. If an undergraduate student is registered and billed at the full-time rate and maintains full-time registration (as defined by program and class level), drop/add activity will not affect charges for tuition and fees. If, however, a student is billed at a per-credit rate (all graduate students and any undergraduate students who are, or become, less than full-time), tuition charges will be refunded as follows when drops occur

Before first day of class 100%
To end of first week 90%
The end of second week 80%
Beyond second week No Refund

The general fee and other incidental fees are only refundable before the first day of the semester. The official University opening of classes and not the first day in actual attendance governs the refund computation. (For students who are enrolled in special programs that feature sessions that are shorter than the full semester, refunds will be computed on a proportionate basis.)

Students who receive financial aid should be aware that a change in the number of registered credits may affect their eligibility for some or all of their awards. Students are responsible for consulting their award letters and/or any other materials issued by the Financial Aid Office – or for contacting the Financial Aid Office directly – to determine the effect drop/add activity might have on their awards.

Summer I / II Terms and Short Summer Semester

(MOT/DOT/DPT Professional summer sessions that are not a full summer)

Because the Summer I and Summer II terms as well as the MOT/DOT/DPT Summer A sessions operate on a shorter schedule, full withdrawals and dropped courses are governed by special tuition refund rules:

Before first day of class 100%

First five days of semester 50%

Beyond five days No Refund

The general fee and other incidental fees are only refundable before the first day of the Summer A, Summer I or Summer II semester.

Financial Aid

The Financial Aid Office at University of the Sciences is located in Griffith Hall, Room 100. The office staff is available to assist students in applying for federal, state, and University grant and loan funds.

Student Eligibility

A student is eligible for federal, state, and University financial aid if he/she:

- Is a high school graduate or holds a GED.
- Is regularly admitted and matriculated in a degree-granting program and certain certificate-granting programs of study at the University.
- Is making satisfactory academic progress.
- Is a citizen or permanent resident of the United States.
- Is taking at least six credits per semester as an undergraduate or professional student or five credits per semester as a graduate student (some financial aid programs require full-time enrollment, which is defined as 12 credits per semester for undergraduate or professional students and 9 credits for graduate students).
- Meets the eligibility criteria for each specific financial aid program.

Eligibility for most programs is based on financial need, which a student demonstrates by completing the Free Application for Federal Student Aid (FAFSA) available online at www.fafsa.gov, with the exception of awards offered by the Admissions Office, which are based on merit.

Note: *A student who is auditing classes cannot receive any University, federal, or state aid to assist in the payment of audited courses.*

Application Process

The FAFSA may be filed online at studentaid.gov. The University's Federal School Code is 003353. Awards are made by the Financial Aid Office on a first-come, first-served basis, starting on or about February 1 of the prior academic year for continuing students. Students should allow 2–3 weeks for FAFSA processing by the Federal Processing Center; and FAFSAs may NOT be completed or signed before October 1 of the prior academic year.

Federal Financial Aid

Federal Pell Grant

Federal Pell Grants, available only to undergraduate students, are determined by the Financial Aid Office based on the information provided on the FAFSA. The number of credits a student takes per semester may affect the amount of a Federal Pell Grant.

Federal Supplemental Educational Opportunity Grants (FSEOG)

FSEOG amounts are determined by the Financial Aid Office, based on a combination of significant need as demonstrated on the FAFSA and by availability of funds. Students who are eligible for Federal Pell Grants are considered first for this award.

Federal Direct Loans

Federal Direct Loans are low-interest loans borrowed directly from the government. The loans have a fixed interest rate which is set each year by the Department of Education. Each type of Direct Loan also has an origination fee which is deducted from the loan disbursements. Origination fees are set each year by the Department of Education.

Federal Direct Subsidized Loan

Federal Direct Subsidized Loans are only available to undergraduate students and allow principal payments to be deferred and interest to be subsidized by the government, while the student is enrolled at least half time.

Annual Borrowing Limits:

\$3,500 for first-year undergraduate students

\$4,500 for second-year undergraduate students

\$5,500 for third- and fourth-year undergraduate students

The aggregate limit for subsidized Direct Loans (for dependent undergraduate students) is \$23,000.

Federal Direct Unsubsidized Loans

Federal Direct Unsubsidized Loans are available at a fixed interest rate. The Unsubsidized Loan can be issued for the full amount of eligibility or in combination with a Federal Direct Subsidized Loan for undergraduates. These loans require that payment of interest during the in-school period, grace period and other periods of deferment is the responsibility of the student.

Undergraduate students can borrow at least \$2,000 annually. In addition, independent students and, in special circumstances dependent students, may borrow up to an additional \$4,000 per year for the first two years of undergraduate study, and up to \$5,000 per year for the third and fourth year of study. The aggregate limit for dependent undergraduate students for Federal Subsidized and Unsubsidized Direct Loans combined is \$31,000. The aggregate limit for subsidized and unsubsidized loans for independent undergraduate students is \$57,500.

First time subsidized and unsubsidized Direct Loan borrowers must complete a Master Promissory Note and Entrance Counseling at studentaid.gov. Additionally, each year borrowers must view their aggregate federal student loan debt at studentaid.gov to be eligible to continue borrowing federal student loans.

Health Professions Student Loans (HPSL)

Health Professions Student Loans are determined through a combination of significant need as demonstrated on the FAFSA and availability of funds. The interest rate on the loan is 5%, and no interest or principal payments are due until one year after a student graduates or drops below halftime status. This program is only for PharmD students who are eligible, and able to provide parental information on the FAFSA. PharmD students may request an application for HPSL funding and awards will be made based on available funding.

Loans for Disadvantaged Students (LDS)

Loans for Disadvantaged Students are determined through a combination of significant need as demonstrated on the FAFSA and specific parameters determined by the Department of Health and Human Services. Awards are also based on availability of funds. This program is only for PharmD students who are eligible, and able to provide parental information on the FAFSA. The interest rate is 5%, and no interest or principal payments are due until one year after a student graduates or drops below halftime status.

. PharmD students may request an application for HPSL funding and awards will be made based on available funding.

Federal Direct Parent PLUS Loans

This program allows parents of dependent undergraduate students to borrow up to the cost of education, minus financial aid. Repayment begins 60 days after the final disbursement is issued unless the parent-borrower requests to defer payment while the student is enrolled at least half-time. The program is limited to parents who do not have an adverse credit history. A credit check and Master Promissory Note (MPN) are required. Visit studentloans.gov.

Federal Direct PLUS Loan

Parents of dependent Undergraduate students and Graduate students are eligible to borrow under the Federal Direct PLUS Loan program up to their cost of attendance minus other estimated financial assistance including other loans. These requirements include a determination that the applicant does not have an adverse credit history, repayment begins 60 days after the last disbursement of the loan. Applicants for Federal PLUS Loans are required to complete the Free Application for Federal Student Aid (FAFSA) at studentaid.gov.

Federal Work-Study Program (FWS)

This program provides the opportunity for students to work part-time and earn money. The pay scale for USciences student employees is published on USciences' Financial Aid Google Site. Awards are based on a determination of need demonstrated on the FAFSA. Jobs are offered on and off campus and offer excellent scheduling flexibility.

State Aid

Pennsylvania State Grant Program (PHEAA Grant)

The PA State Grant, funded by Pennsylvania Higher Education Assistance Agency (PHEAA) provides awards for up to four academic years, based on student need; the funds are to be used for the payment of tuition, fees, books, and room and board only.

In order to be eligible, students must be citizens or permanent residents of the United States and must have been residents of Pennsylvania for a period of at least 12 months prior to their first term of enrollment.

A FAFSA must be filed prior to May 1 annually to be considered for the Pennsylvania State Grant.

Pennsylvania National Guard EAP

Residents of Pennsylvania who are enrolled in a degree- or certificate-granting program of study and who enter into a service commitment with the Pennsylvania National Guard for a period of six years may qualify for a tuition benefit. Please go to the Pennsylvania Department of Military and Veterans Affairs website at www.dmva.pa.gov.

Aid from Other States

If you are from a state other than Pennsylvania, please check with the Office of Higher Education in your state for information regarding out-of-state use of grants. Only Delaware, Maryland, Massachusetts, and Vermont allow students to use their grants out-of-state. Please check with your State's Department of Education for more information and to apply.

Note: *A student who is auditing classes cannot receive any University, federal, or state aid to assist in the payment of audited courses.*

Satisfactory Academic Progress for Financial Aid

Students who receive financial aid while attending the University must maintain satisfactory academic progress (SAP) in order to continue to be eligible for financial aid funding. SAP is measured at the end of each academic year or its equivalent. SAP will

be checked after each semester for students enrolled in certificate programs that are expected to be completed in under a year. This measure, and the rules of academic probation for financial aid, may be different from the rules of academic progress and probation imposed by individual academic departments. For financial aid purposes, a student maintains satisfactory academic progress if he/she:

- Maintains at least a 2.00 cumulative grade point average for undergraduate and professional programs, and at least a 2.50 cumulative grade point average for graduate students
- Successfully completes at least 67% of the total cumulative hours attempted
- Successful completion is based on the total number of earned credits divided by the total number of attempted credits. Earned credits for a course cannot be counted more than once. Grades of "F" (failure), "W" (withdraw) or "I" (incomplete) are attempted credit hours but do not count as earned credit hours.
- Not exceed 150% of the normal number of credits needed to complete his/her academic program.

A student who fails to meet SAP has the right to appeal and may be placed on financial aid probation for the next semester of enrollment, and may continue to receive financial aid during that semester. At the end of the probationary semester, if the student has not raised his/her academic performance to meet the measures described above, all further disbursements of financial aid will be withheld.

Financial Aid Probation

A student who fails to meet SAP has the right to appeal and may be placed on financial aid probation for the next semester of enrollment, and may continue to receive financial aid during that semester. At the end of the probationary semester, if the student has not raised his/her academic performance to meet the measures described above, all further disbursements of financial aid will be withheld.

University of the Sciences Financial Aid Funds

University of the Sciences funds are a combination of endowed institutional funds, the income from which is allocated exclusively for support of students, and University funds in the form of grants and loans for students who require supplemental financial assistance.

Merit Awards

Merit scholarships and merit grants are available to entering students and are awarded on the basis of academic excellence in high school and comparative scores on the SAT or the ACT. The determination of these awards is made by the Admission Office. Renewal of these awards is contingent upon satisfactory academic progress for undergraduate full-time study.

The determination of these awards is made by the Admission Office. Renewal of these awards is contingent upon satisfactory academic progress for a student's undergraduate years, and do not apply to professional coursework. Students who entered USciences prior to the 2018-19 school year may receive scholarship funding for maximum of four years of full-time study.

University of the Sciences (USciences) is grateful to its many contributors and benefactors who value the educational opportunities that we offer. In order to provide the maximum financial support to all of our students, USciences provides a generous merit award program. It is USciences practice to acknowledge the generosity of our donors by attaching the name of the donor who provided the funds. Consideration for need-based awards is determined by the Office of Financial Aid on an individual basis, thereby allowing maximum flexibility in judging students' eligibility and the amounts to be awarded. There is no formal application process.

A number of grants are available to students entering the University as transfer students from another educational institution. The admission file of each transfer applicant accepted into any entry-level degree program is reviewed and considered for scholarship assignment.

In addition, a number of scholarships are awarded each year to students who demonstrate academic excellence. Decisions on these scholarship awards are made by the Faculty Senate Subcommittee on Scholarships based upon academic performance and financial need, if required by the

If a student, to whom a scholarship or grant is awarded, fails to maintain satisfactory academic progress, or is found responsible for a violation of the Student Conduct Policy, which results in Probation, Suspension, or Expulsion, he/she may have their award canceled.

Academics

The information, academic policies, and procedures outlined below are designed to guide students during their studies. They do not constitute a binding contract and may be changed at any time. For assistance with these policies and procedures, see your adviser or college dean.

Please note that some academic departments (e.g., pharmacy, occupational therapy, physical therapy) have additional requirements that are delineated in the individual college or program sections of the *University Catalog* and in department handbooks or publications. Comprehensive information on academic requirements, clinical education, and professional behavior is available from the individual departments.

Graduate Students

All graduate students are expected to abide by all University policies including the Student Code of Conduct outlined in the *Student Handbook*.

Majors

Declaring a Major and the Undeclared Programs

All students must be enrolled in an academic program (major). Students who are not enrolled in a degree-granting program must enroll in an undeclared program.

The undeclared programs include Misher Pre-Professional Studies and Undeclared Transitional.

While students attending University of the Sciences often declare a major field of study during the admission process, matriculating students may enroll at the University in the undeclared program, Misher Pre-Professional Studies. This option enables students to begin their academic studies while gaining more information on which to base a decision regarding a specific major field of study. Students in this program are seeking a baccalaureate or first professional degree and are expected to complete such a degree. Therefore, they must apply to bachelor's or first professional degree programs at USciences no later than April 1 of their second (U2) year at the University, and they must change their major to a degree-granting program no later than the end of the drop-add period of the fall semester of their third (U3) year.

Students also may elect to enter an undeclared program while considering a new choice of major. Students in their first (U1) or second (U2) year may choose to enroll in Misher Pre-Professional Studies or in the Undeclared Transitional program. Students in their third (U3) year or later will enroll in the Undeclared Transitional program. All these students are expected to consult regularly with their advisor so that they can move into a degree-granting program expeditiously.

Students can remain in an undeclared program no longer than four full-time (12 credits or more) semesters (excluding summer sessions) or through the end of their third (U3) year, whichever comes first. Students who have not declared a major by this deadline will be administratively withdrawn.

Changing Majors

Changing from one major field of study to another major at this University is often possible, but it is neither automatic nor guaranteed.

Following consultation with his/her academic advisor, the student intending to change his/her major should meet with the college dean and program director responsible for the degree program into which the student desires to transfer.

Formal requests for change of major must be submitted to the student's prospective program director and college dean using the Change of Major Form (available from the Registrar's office). Requests for changes can be made at any time to:

- Misher College - all majors
- Philadelphia College of Pharmacy - Pharmaceutical Sciences and Pharmacology & Toxicology only
- Samson College - Health Science and Exercise Physiology only

Deadlines for the other majors are:

- Occupational Therapy (DrOT) program (Samson College) - no later than February 15 for the summer session, not later than April 15 for the fall semester, and not later than October 15 for the spring semester.

- Pharmacy (PharmD) program (Philadelphia College of Pharmacy) - not later than April 1 for entry in fall semester.
- Physical Therapy (DPT) program (Samson College) - not later than February 15 for the summer session, not later than April 15 for the fall semester, and not later than October 15 for the spring semester.

A change of major is subject to approval of the appropriate program director(s) and college dean(s) and is based on a review of the student's academic record, other qualifications for acceptance into the degree program under consideration, and space availability.

Approved change-of-major forms must be submitted to the Registrar's Office no later than the end of the drop/add period in order to be effective for a given term.

Students who change their major while being enrolled in a minor (or specialization) program must be reevaluated and approved to continue the minor (or specialization) by the minor (or specialization) advisor and the chair of the minor (or specialization) department, followed by the chair/program director or dean of the new major program. Minors are not granted until graduation, therefore, this procedure must be followed even if requirements for the minor have been completed prior to the change of major request.

Minors

An academic minor is a selection of courses, usually with a common theme, that enables the student to develop a degree of formal expertise in an area outside of the student's major. It is intended to supplement the student's academic training by broadening the scope of knowledge and experience beyond that obtained from courses required for the student's major degree.

While obtaining a minor is not a requirement, a minor can offer several advantages, such as enhanced job opportunities, increased potential for advancement and/or greater opportunity for more challenging assignments, and the demonstration of a broader academic background that may increase the student's chances of being accepted into graduate or professional school. The student's transcript will note that the student is enrolled in a minor program. Satisfactory completion of the requirements for the minor will be noted only on the student's transcript, not on the student's diploma when the degree completion is recorded.

Eligibility

To be eligible for acceptance into a minor program, a student must:

- Be in good academic standing.
- Obtain the approval of the student's academic advisor and major program director and/or dean.
- Obtain the approval of the chairperson of the department offering the minor program.

A student should apply to participate in a minor program early in his/her academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of the academic year in which the bachelor's degree will be awarded. A student may enroll in a minor program offered by his/her major department as long as the requirements for the minor (listed below) are met.

Requirements

In addition to any introductory courses (course numbers ranging from 100-199) in the area of the minor, a minimum of 18 credit hours of coursework having a common intellectual theme is required for a minor. Of the 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Students may complete more than one minor, provided a minimum of 12 credits of coursework be completed in addition to any courses required in the major curriculum and any other minor curriculum(s). General education coursework and free electives may be used to fulfill minor requirements without restriction. An academic minor is designed by the faculty of the offering department(s) and approved by the appropriate college council(s). The student must achieve a cumulative average of 2.00 in all the courses taken as part of the minor. Up to six semester hours of coursework, with an earned grade of "C" or better, taken at another accredited institution, may be applied to the course requirements of the minor upon prior approval of the chairperson(s) of the department(s) offering the minor.

Information regarding the academic status of a student in a minor program should be forwarded by the chair of the department offering the minor to the faculty advisor, program director, appropriate college dean, and registrar.

The requirements for the minor must be completed before graduation with a bachelor's degree. Successful completion of the minor will be determined by the department chair(s) and college dean(s) of the minor program.

Students who change their major while being enrolled in a minor program must be reevaluated and approved to continue the

minor by the minor advisor, and the chair of the minor department, followed by the chair/program director or dean of the new major program. Minors are not granted until graduation with a bachelor's degree; therefore, this procedure must be followed even if requirements for the minor have been completed prior to the change of major request.

Double Degrees and Double Majors

Students wishing to earn two degrees or pursue two majors must be accepted by both of the degree programs. The addition of the second major requires the approval of the dean(s) and program directors of each major.

Students may earn two baccalaureate degrees, one baccalaureate and one entry-level professional degree, or one degree with two majors by completing the following:

General Education Requirements: Courses taken to fulfill General Education requirements may be used for both degrees

1. or both majors. Courses taken to fulfill the General Education Unrestricted Elective may not be required by either degree program or major and may not be from the department(s) offering the degree programs or majors.

2. **Required courses of the degree programs or majors:** All required courses for both degrees or both majors must be completed with the exception of when the degree programs or majors require different courses (or course sequences) on the same topic. In such cases, the student must take the course (or course sequence) with the higher number of credits. If both courses have the same number of credits, the course selected must have written approval of both program directors.

Elective courses of the degree programs or majors: Students pursuing two degrees or two majors may not use courses required by one of the degree programs or majors to fulfill elective requirements of another degree program or major.

3. Courses that are electives in both degree programs or both majors may be used to fulfill the elective requirements of both degrees or both majors. Exceptions may be made only with the permission of both program directors and of the college dean(s) to whom they report.

Completion of Degrees

A degree may be awarded once all requirements for that degree are met:

- A double major is awarded when the student has satisfied the requirements for earning a degree and all requirements for both majors are met.
- The first degree of the double degree may be awarded when the student has completed the requirements of that degree. The second degree may be awarded once the student has earned the credits for the second degree, including the minimum 30 credits beyond what is required for one of the degrees.

Catalog Year for Degree Requirements

Catalog Year is a term that refers to a set of degree requirements as they apply to individual students in their progress toward earning a degree from USciences. Catalog Year starts with the summer term of each academic year. For example, the 2021 Catalog Year starts with the 2021 summer semester (21/SU).

Generally, students are responsible for the degree requirements in force for their major at the time when the student initially enrolls as a first-year (U1) student. Catalog Year is used by the Degree Audit system to evaluate a student's progress toward meeting the degree requirements that apply to them in their current major. Certain circumstances listed below have special rules governing Catalog Year.

- **Transfer Students**—Catalog Year for transfer students will be backdated to the Catalog Year when they would have started attending the University as a first-year student. Students entering with a prior bachelor's degree are considered to have met the requirements of General Education and do not have to satisfy the specific requirements of General Education.
- **Change of Major**—If a student changes his/her major, his/her Catalog Year will remain the same as his/her original entering year.
- **Leave of Absence**—Students who return from an official Leave of Absence retain their original Catalog Year, which is based on their original entrance to USciences.
- **Readmitted Students**—Students who are readmitted after having been separated from the University should have the same Catalog Year as a normally progressing student in the Class Level into which the student is readmitted. This is the same as a transfer student.

- **Readmitted Students (Academic Fresh Start)**—Students who are readmitted under the Academic Fresh Start program are treated as new first-year admissions. They will have the Catalog Year appropriate for a first-year (U1) student entering USciences in the semester in which they reenter the University.
- **Double Degree UG/GR**—Students enrolled in double degrees that involve one undergraduate/first professional degree and one graduate degree (e.g., BS/MS, PharmD/MBA) will have Catalog Years assigned to each academic program as appropriate, based on original matriculation at each academic level.

General Education

Philosophy

The General Education program at University of the Sciences (USciences) supports the mission of the University and fosters the development of well-rounded college-educated leaders who are lifelong learners prepared to become informed, thoughtful, and meaningful contributors to a multifaceted society.

The General Education curriculum serves as the cornerstone of USciences education by providing a shared learning experience to all students, across all programs and majors. Students will interact, challenge ideas, and gain a deeper appreciation for diverse perspectives and experiences of the world and themselves. The General education curriculum is designed to encourage individual avenues for student exploration and growth.

The General Education curriculum is intentionally designed as a blend of knowledge and skills requirements through which students gain understanding of the human experience in its manifold aspects. The knowledge component ensures that all students are exposed to different perspectives and ways of knowing and attain a broad understanding of the modes of inquiry of the major disciplines in the arts and sciences. Such a body of knowledge broadens students' perspectives of the world and themselves. The skills component of the curriculum strives to prepare students to think critically, ethically and creatively, to communicate effectively, and to demonstrate information and technology literacy. Mastering these skills gives USciences graduates a voice in society and the tools necessary to actively participate in an increasingly diverse global community.

Curriculum

General Education Disciplines

Students must complete a minimum of 41 credits of coursework in general education distributed among the following seven knowledge/discipline areas of the arts and sciences (choose courses from appropriate subject codes):

General Education Discipline Requirements

Discipline	Credits	Choose from subject codes/courses listed below
Natural Science (1 semester of lab required)	7	BS, CH, PY, GL
Mathematics	6	MA, ST
Communication (Written & Oral)	9	WR, CO, (at least 3 credits must have a WR prefix and least three credits must have a prefix of CO)
Social Sciences	6	PS, SO, AN, SS, EC, PO
Humanities	6	AC, AR, CA, EN, ET, HI, HU, LA, PL, RS, SP
Multidisciplinary Inquiry	6	MD
Physical Education	1	PE

Knowledge component:

Students who complete the General Education program shall:

- Demonstrate, interpret and apply knowledge of fundamental concepts, method and content in the major disciplines in the arts and sciences (Humanities, Behavioral and Social Sciences, Natural Sciences, Mathematics and Communication);
- Understand, apply and integrate knowledge in and across disciplines; and
- Recognize the importance of mental, physical and social well-being.

Skills component:

Students who complete the General Education program shall demonstrate the ability to:

- Think critically, solve problems, and analyze ethical issues;
- Identify, access and evaluate sources of information;
- Use technology effectively and appropriately; and
- Use the English language to communicate effectively and appropriately to target audiences using a variety of methods and media.

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In addition to the knowledge and elective coursework, students must demonstrate that they have been introduced to a total of 6 skill areas. Students are expected to fulfill their Skills requirements within the context of the forty-one (41) credits taken to meet the Discipline course requirements.

This requirement is designed to ensure student are prepared to think critically, ethically and creatively, to communicate effectively, and to demonstrate information and technology literacy.

Oral Communication and Written Communication are particularly important parts of the general experience. Therefore, students are required to augment the Oral Communication and Written Communication knowledge courses by completing different courses with Applied Oral Communication Skills and Applied Written Communication Skills.

General Education Skill Requirements

Skill	Overall Goal
Ethics	Students will engage in ethical and moral reasoning and act ethically in public, professional, and personal responsibilities.
Information Literacy	Students will identify the need for information and access it, evaluate it, and use it legally and ethically.
Oral Communication	Using standard English, students will communicate in a personally effective and socially appropriate manner.
Reasoning and Problem Solving	Students will recognize, analyze, and propose solutions to problems.
Technology	Students will use appropriate technology and understand its impact.
Written Communication	Students will use the English language to write effectively in a variety of contexts.

Registration and Student Records

Transfer Credit

Recognizing that students often study at more than one college, transfer credit may be awarded for courses completed at another

accredited institution. Credit may be granted for courses taken prior to matriculation at the University. After matriculation students may take courses at other institutions and transfer in credit with the prior approval of their department chair or program director and the approval of the teaching departments. The course must be comparable in content and depth to a course offered at the University.

Transfer credits awarded will be entered on the student's record and transcript with the source and number of credits granted. No grade will be entered on the USciences transcript for transfer credit; the GPA will reflect only courses completed at University of the Sciences.

- Transfer credit are awarded for a course in which a grade of "C" or greater has been achieved after submission of an official transcript. Transfer credits noted on the USciences transcript with the source and number of credits.
- No grade is entered; the grade point average [GPA] reflects only courses completed at the University of the Sciences.
- A course approved for transfer has the same number of credits and fulfills the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.
- Students matriculating at USciences in the third year or above may substitute six transfer credits of humanities and/or social science for Multidisciplinary [MD] courses in fulfillment of the multidisciplinary inquiry discipline of General Education.
- Students who matriculate into USciences with an earned baccalaureate degree from an accredited institution recognized by USciences will be approved as fulfilling the General Education requirements of USciences. An official transcript from the institution that conferred the degree is required.

Prior Learning Credit (PLC) by Examination

Recognizing that students may have achieved learning outcomes of college-level courses through various examinations prior to matriculating at USciences, credit for prior learning by examination may be awarded to students who have received the necessary minimum score on the examination.

External Assessment Methods: Prior learning credits by examination may be obtained for the following examinations.

- Advanced Placement (AP) program, administered by the College Board
- International Baccalaureate (IB) program
- College-Level Examination Program (CLEP), administered by the College Board
- DSST (previously DANTES Subject Standardized Test) Examination Program
- Excelsior College Examination (ECE)

Awarding of Credit Hours: For new students, official score reports must be submitted to the Admission Office. Current students must submit official score reports to the Registrar's Office, and they must be received prior to the end of the drop/add period of the first semester of the last didactic year. *The actual credits awarded through PLC by Examination will be at the discretion of the individual programs.*

- Students can receive a *maximum of 45 credits* through PLC by Examination.
- PLC by Examination credits submitted directly to USciences, can only be requested if the external assessment was taken *within 4 years* prior to matriculation at USciences. Transfer students who have PLC by Examination credits approved by another institution will be required to submit the official score report to the Admission Office in order to be evaluated for USciences credits.
- Credits from PLC by Examination taken after matriculation at USciences (i.e., CLEP and DSST exams) will be considered on a case by case basis.
- A student **cannot** use PLC by Examination to pass a course which the student has failed, either at USciences or any institution.
- The credit for prior learning will not be calculated in the student's GPA, cannot duplicate any previously awarded credit, and cannot be used to satisfy University residency requirements.
- If a student who has been awarded prior learning credits changes their major, then the credits awarded are subject to re-evaluation by the new program.
- Credit granted will not exceed that assigned to the course as listed in the University Catalog.
- A student cannot earn credit for PLC by Examination while on probation, on Medical Leave of Absence, or suspension.
- Credits for prior learning cannot be re-used for additional credit once credits have been awarded.

A list of acceptable scores on each of the external assessment methods (AP, IB, CLEP, DSST, ECE) and their USciences equivalent courses specific to each program at USciences is below.

Advanced Placement Program (AP)

Students may qualify for Advanced Placement (AP) credits as administered through the College Board's Advanced Placement program. Official AP scores are sent from the College Board to the University of the Sciences Admission Office so they may be considered for advanced credit. To receive credit, the student must submit a completed Advanced Placement/International Baccalaureate (AP/IB) Action Form, with the signature of the student's advisor, to the Registrar's Office prior to the end of the last day of the drop/add period of the first semester of enrollment at University of the Sciences. Advanced Placement (AP) course is awarded the same number of credits and fulfills the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.

ADVANCED PLACEMENT (AP) EXAMS	USciences Equivalent	Credits	Min. Score
Art History	AR101	3	4, 5
Biology *	BS109/110 & BS119/120	4 & 4	4, 5
	BS132/134 & BS133/135	4 & 4	
Calculus AB	MA107 & MA110	3 & 3	4, 5
	MA107 & MA122	3 & 4	
Calculus BC	MA107 & MA110 & MA221	3 & 3 & 4	4, 5
	MA107 & MA122 & MA221	3 & 4 & 4	
Chemistry §	CH101/102 & CH103/104	4 & 4	4, 5
	CH111/112 & CH113/114	4 & 4	
Chinese Language & Culture	CI101	3	4, 5
Computer Science A	CS201	3	4, 5
Computer Science Principles	CS201	3	4, 5
Comparative Government & Politics	PO101	3	3, 4, 5
English Language and Composition	WR101	3	4, 5
English Literature and Composition	WR101	3	4, 5
Environmental Science #	BS276	3	4, 5
European History	HIA01	3	4, 5
French Language and Culture	FR101	3	4, 5
German Language and Culture	GE101	3	4, 5
Human Geography	AN103	3	4, 5
Italian Language & Culture	IT101	3	4, 5
Japanese Language and Culture	HUX01	3	4, 5
Latin	LA101	3	4, 5
Microeconomics	EC201	3	4, 5

Macroeconomics	EC101	3	4, 5
Music Theory	MU210	3	4, 5
Physics 1 & Physics 2 – Algebra-Based ^&	PY201 & PY202	4 & 4	4, 5
Physics C: Electricity and Magnetism ^	PY212	4	4, 5
Physics C: Mechanics ^	PY211	4	4, 5
Psychology @	PS101	3	3, 4, 5
Spanish Language and Culture	SP101	3	4, 5
Spanish Literature and Culture	SPA01	3	4, 5
Statistics	STA01	3	4, 5
Studio Art Drawing	ARA01	3	4, 5
Studio Art 2-D Design	HUX01	3	4, 5
Studio Art 3-D Design	HUX01	3	4, 5
US Government & Politics	PO101	3	3, 4, 5
US History	HIA01	3	4, 5
World History	HI101	3	4, 5

* Biology, Biomedical Sciences, Environmental Science, Microbiology, Med Lab Science, Neuroscience, Pharmacy, PPEA and Misher Pre-Professional majors require a score of 5 to receive college credits

§ Chemistry, Biochemistry, Pharmaceutical Chemistry majors require a score of 5 to receive college credits

@ Neuroscience, DrOT and Misher Pre-Professional majors require a score of 4 to receive college credits

Environmental Science majors are not eligible to receive college credits for AP environmental science

^ Physics majors are not eligible to receive college credits for Physics 1 & 2 and require a score of 5 to receive credits for Physics C.

& Students must take both Physics 1 and Physics 2 to receive credit.

International Baccalaureate (IB) Programme

Students may qualify for advanced standing through the International Baccalaureate Programme (IB). To receive credit, new students must submit a completed Advanced Placement/International Baccalaureate (AP/IB) Action Form, with the signature of the student's advisor, to the Registrar's Office prior to the end of the last day of the drop/add period of the first semester of enrollment at University of the Sciences. International Baccalaureate (IB) course credits will be awarded the same number of credits and fulfill the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.

International Baccalaureate (IB) EXAMS	USciences Equivalent	Credits	Score
Anthropology	AN103	3	5, 6, 7
Arabic A, B	AC101	3	5, 6, 7

Art History	ARX01	3	5, 6, 7
Biology & *	BS109/110 & BS119/120 or BS132/134 & BS133/135	8	6, 7
Business and Management	PB120	2	5, 6, 7
Chemistry *	CH101/102, CH103/104 or CH111/112, CH113/114	8	6, 7 (HL)
Economics %	EC101 or EC201	3	5, 6, 7
English A Language and Literature	ENX01	3	5, 6, 7
English B	ENX01	3	5, 6, 7
Film	HU301	3	5, 6, 7
Geography	SSX01	3	5, 6, 7
Global Politics	POX01	3	5, 6, 7
History: Africa	HIX01	3	5, 6, 7
History: Americas	HIX01	3	5, 6, 7
History: Asia/Middle East	HIX01	3	5, 6, 7
History: Europe	HI301	3	5, 6, 7
Mathematics	MA107 & MA110 MA107 & MA122	3 & 3 3 & 4	6, 7
Music	MUX01	3	5, 6, 7
Philosophy	PLX01	3	5, 6, 7
Physics ^	PY201 & PY202	4 & 4	6, 7
Psychology	PS101 or PS111	3	5, 6, 7
Spanish	SP101	3	5, 6, 7
Theatre Arts	HUX01	3	5, 6, 7
Visual Arts	HUX01	3	5, 6, 7
World Religions	RS310	3	5, 6, 7

<i>Languages:</i> Chinese, Danish, French, German, Greek, Hindi, Indonesian, Italian, Japanese, Korean, Latin, Mandarin, Portuguese, Russian, Swahili, Swedish, Thai, Turkish, Vietnamese	HUX01 (for all)	3	5, 6, 7
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& Biology, Biomedical Sciences, Environmental Science, Microbiology and Med Lab Science require HL in order to receive college credits

^ Physics majors are not eligible to receive college credits

* Neuroscience majors are required a score of 7 to receive college credits

% Pharmaceutical and Healthcare Business majors will receive elective credits PBX01

International Baccalaureate (IB) EXAMS - Not approved for credits
Computer Science
Dance
Design Technology
Information Technology

College-Level Examination Program (CLEP)

The College-Level Examination Program (CLEP) is administered by the College Board. The CLEP examinations measure mastery of college-level introductory course content. Credit for CLEP is awarded for examinations in the subject areas of business, composition and literature, foreign languages, history and social sciences, and science and mathematics.

Credits from CLEP examinations taken after matriculation at USciences will be considered on a case by case basis. Current students must have official score reports from the College Board sent directly to the Registrar's Office, and they must be received prior to the end of the drop/add period of the first semester of the last year of didactic work.

CLEP EXAM	USciences Equivalent	Credits	Score
<i>Business</i>			
Financial Accounting	PB316	3	50 or higher
Information Systems	PBX01	3	50 or higher
Introductory Business Law	PB315	3	50 or higher
Principles of Management	PB323	3	50 or higher
Principles of Marketing	PB319	3	50 or higher
<i>Composition & Literature</i>			
American Literature	EN318	3	50 or higher
Analyzing and Interpreting Literature	EN201	3	50 or higher
College Composition [#]	WR101	3	50 or higher
English Literature	EN201	3	50 or higher
Humanities	HUX01	3	50 or higher
<i>Foreign Languages</i>			

French Language: Levels 1 and 2	FR101 & FR102	3 & 3	50 or higher
German Language: Levels 1 and 2	GE101 & GE102	3 & 3	50 or higher
Spanish Language: Levels 1 and 2	SP101 & SP102	3 & 3	50 or higher
<i>History & Social Sciences</i>			
History of the United States I: Early Colonization to 1877	HI201	3	50 or higher
History of the United States II: 1865 to the Present	HI202	3	50 or higher
Human Growth and Development [@]	PS200	3	50 or higher
Introductory Psychology	PS101	3	50 or higher
Introductory Sociology	SO101	3	50 or higher
Principles of Macroeconomics	EC101	3	50 or higher
Principles of Microeconomics	EC201	3	50 or higher
Social Sciences and History	PS200	3	50 or higher
Western Civilization I: Ancient Near East to 1648	HI101	3	50 or higher
Western Civilization II: 1648 to the Present	HI102	3	50 or higher
<i>Science & Mathematics</i>			
Biology * #	BS109 & BS119 or BS132 & BS133	6	50 or higher
Calculus #	MA110 or MA122	3 or 4	64 or higher
Chemistry ^ * #	CHX01 & CHX02	6	50 or higher
Precalculus #	MA107	3	64 or higher

[^] Physics majors are not eligible to receive college credits

* Neuroscience majors are required the following minimum scores to receive college credits: Biology 56; Chemistry 66

PharmD, PPEA and Misher Pre-Professional students are not eligible to receive college credits

@ DrOT and Misher Pre-Professional are not eligible to receive college credits

CLEP EXAM - Not approved for credits
College Composition Modular
American Government
Introduction to Educational Psychology
College Algebra

College Mathematics
Natural Sciences

DSST Examination Program

The DSST Examination Program, originally developed for military service members and previously known as DANES Subject Standardized Tests, was acquired and is now administered by Prometric. Prometric has also made the DSST exams available to civilians. There are over 30 exams in the subject areas of business, humanities, mathematics, physical science, social science, and technology, and exams are available for lower- (100- and 200-) and upper- (300-) level credit.

Credits from DSST examinations taken after matriculation at USciences will be considered on a case by case basis. Current students must have official score reports sent directly to the Registrar's Office, and they must be received prior to the end of the drop/add period of the first semester of the last year of didactic work.

DSST EXAM	USciences Equivalent	Credits	Min. Score
<i>Business</i>			
Business Ethics and Society	ET313	3	400 or higher
Human Resource Management	PB X01	3	400 or higher
Introduction to Business	PB120	2	400 or higher
Management Information Systems	PB X01	3	400 or higher
Money and Banking	PB X01	3	400 or higher
Organizational Behavior	PB320	3	400 or higher
Principles of Finance	PB318	3	400 or higher
Principles of Supervision	PB323	3	400 or higher
<i>Humanities</i>			
Ethics in America	HUX01	3	400 or higher
Introduction to World Religions	RS310	3	400 or higher
<i>Mathematics</i>			
Principles of Statistics	STX01	3	500 or higher
<i>Physical Science</i>			
Environmental Science	BS276	3	400 or higher
<i>Social Science</i>			
A History of the Vietnam War	HI324	3	400 or higher
Art of the Western World	HUX01	3	400 or higher
Criminal Justice	SO304	3	400 or higher
General Anthropology	AN103	3	400 or higher

History of the Soviet Union	HI311	3	400 or higher
Lifespan Developmental Psychology	PS 200	3	400 or higher
Substance Abuse	SO 206	3	400 or higher
The Civil War and Reconstruction	HI306	3	400 or higher
<i>Technology</i>			
Computing and Information Technology	CS250	3	400 or higher
Fundamentals of Cybersecurity	CSX01	3	400 or higher

DSST EXAM - Not approved for credits

Business Mathematics
Personal Finance
Principles of Advanced English Composition
Principles of Public Speaking
Fundamentals of College Algebra
Math for Liberal Arts
Astronomy
Health & Human Development
Principles of Physical Science I
Foundations of Education
Fundamentals of Counseling
Human/Cultural Geography

Excelsior College Examination (ECE)

University of the Sciences has reviewed the UExcel exams offered by Excelsior College located in Albany, NY, and credits are accepted for an exam score that meets or exceeds the listed score for the respective examinations identified in the table below. Students should request that the Excelsior College Office of the Registrar send an official examinations transcript directly to the USciences Registrar's Office. The USciences Registrar's Office must receive the transcript prior to the end of the last day of the drop/add period of the first semester of the student's enrollment at University of the Sciences.

Excelsior College Examination (ECE) EXAM	USciences Equivalent	Credits	Score
<i>Business</i>			
Business Ethics	ET313	3	C or higher
Business Law	PB315	3	C or higher
Financial Accounting	PB316	3	C or higher

Managerial Accounting	PB317	3	C or higher
Introduction to Macroeconomics	EC101	3	C or higher
Introduction to Microeconomics	EC201	3	C or higher
Labor Relations	PB X01	3	C or higher
Operations Management	PB X01	3	C or higher
Organizational Behavior	PB320	3	C or higher
Principles of Finance	PB318	3	C or higher
Principles of Management	PB323	3	C or higher
Principles of Marketing	PB319	3	C or higher
<i>Humanities</i>			
Bioethics: Philosophical Issues	ET303	3	C or higher
Ethics: Theory & Practice	ET303	3	C or higher
Introduction to Music	HUX01	3	C or higher
Introduction to Philosophy	HUX01	3	C or higher
Spanish Language	SP101	3	C or higher
<i>Natural Sciences & Mathematics</i>			
Calculus	MA110 or MA122	3 or 4	B- or higher
General Chemistry I ^	CH101	3	A
Physics ^	PY201	4	A
Statistics	STX01	3	B or higher
<i>Social Sciences/History</i>			
Cultural Diversity	HUX01	3	C or higher
World Conflicts Since 1900	HIX01	3	C or higher
<i>Technology</i>			
Introduction to Computer Programming Using JAVA	CS201	3	C or higher
Introduction to Cybersecurity	CSX01	3	C or higher

^ Physics majors are not eligible to receive college credits

Excelsior College Examination (ECE) EXAM - Not approved for credits	
Business Information Systems	Precalculus Algebra

Human Resource Management	Science of Nutrition
Quantitative Analysis	Weather and Climate
Workplace Communication with Computers	Abnormal Psychology
College Writing	Foundations of Gerontology
English Composition	Introduction to Psychology
Interpersonal Communication	Introduction to Sociology
Anatomy & Physiology	Juvenile Delinquency
Anatomy & Physiology I	Life Span Developmental Psychology
Anatomy & Physiology II	Political Science
Basic Genetics	Psychology of Adulthood & Aging
Contemporary Mathematics	Research Methods in Psychology
Earth Science	Social Psychology
Microbiology	World Population
Pathophysiology	

Partnership Courses for General Education Requirements

A course taken at an institution with which USciences has established an approved academic partnership may be used to meet the General Education requirements at USciences. The chair (or designee) of the USciences teaching department will determine if a given partnership course is comparable to a particular USciences course. The approved partnership course will fulfill the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences. The approval will be communicated to the Registrar's Office from the chair or designee of the USciences teaching department.

Cooperative Program Articulation Agreements and General Education Requirements

- Students admitted to USciences professional programs under Cooperative Program articulation agreements will be considered to have satisfied the USciences General Education requirements provided they have submitted official documentation of general education requirements completion at the sending institution prior to the awarding of their professional degree.
- The student's completion of the general education requirement will be reflected in a notation on their USciences degree audit.

Family Educational Rights and Privacy Act (FERPA) Policy

Access to Education Records

Annual Notice to Students

University of the Sciences fully complies with the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. This law is sometimes referred to as the Buckley Amendment.

The act grants students specific rights and protections with regard to their education records. It governs access to, release of, and corrections to the records kept by the University on current and former students. These rights do not extend to individuals who never actually attend the University.

Students wishing to review or correct their education records should submit a written request to the registrar indicating which records they wish to review or what corrections they believe are necessary. If the records in question are not in the control of the registrar, the request will be forwarded to the appropriate University official. While prompt attention is given to all such requests, the University reserves the right to respond no later than 45 days after receiving a request.

Education records are available to University officials and agents with legitimate educational interest. Such interest exists when access to the records is necessary for the official or agent to perform his/her professional duties. An agent may include a person or company (including contractors and consultants) with whom the University has contracted to provide a service that the University would otherwise perform and may include a communication and data service, an attorney, an auditor, a collection agent, etc. This also may include officials at other educational institutions with which USciences has a partnership agreement for student enrollment. Personally identifiable information from students' education records is only released, other than to University officials and agents, upon a specific written and dated request from the student or as provided for by federal or state law.

As of January 3, 2012, the U.S. Department of Education's FERPA regulations expand the circumstances under which a student's education records and personally identifiable information (private information) contained in such records—including Social Security number, grades, or other private information—may be accessed without the student's consent. First, the U.S. Comptroller General, the U.S. Attorney General, the U.S. Secretary of Education, or state and local education authorities ("Federal and State Authorities") may allow access to a student's records and private information without the student's consent to any third party designated by a Federal or State Authority to evaluate a federal- or state-supported education program. The evaluation may relate to any program that is "principally engaged in the provision of education," such as early childhood education and job training, as well as any program that is administered by an education agency or institution. Second, Federal and State Authorities may allow access to a student's education records and private information without the student's consent to researchers performing certain types of studies, in certain cases even when the University objects to or does not request such research. Federal and State Authorities must obtain certain use-restriction and data security promises from the entities that they authorize to receive a student's personally identifiable information, but the Authorities need not maintain direct control over such entities. In addition, in connection with Statewide Longitudinal Data Systems, State Authorities may collect, compile, permanently retain, and share without the student's consent private information from education records, and they may track a student's participation in education and other programs by linking such private information to other personal information about the student that they obtain from other federal or state data sources, including workforce development, unemployment insurance, child welfare, juvenile justice, military service, and migrant student records systems.

The following information related to a student is considered "Directory Information" and under FERPA, the University may release the following without a student's prior consent: the student's name, USciences ID number, address, e-mail address, telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, enrollment status, degrees and awards received, photograph, class level, undergraduate/graduate status.

The University reserves the right to disclose directory information to anyone inquiring without the student's written consent and will limit information made public to these categories. Students can request that any or all such information not be released by informing the Registrar's Office, in writing before the end of drop/add each semester.

A copy of the University's policy in compliance with FERPA can be obtained upon request from the registrar's Office. All questions regarding FERPA should be directed to the Registrar. Information is also available from, and students have a right to file a complaint regarding compliance with, the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202-5920.

Enrolling in Courses

Registration

Registration is conducted for all students (with the exception of those entering their first semester at the University) twice during each academic year: beginning the month of April for the summer sessions and fall semester and beginning the month of November for the spring semester. The April and November registration dates are listed each year in the Academic Calendar. The most updated version of the schedule of classes is available on WebAdvisor at <https://webad.usciences.edu>. First- and second-year students are required to obtain approval of their advisor prior to registration. Students register online through WebAdvisor.

Administrative Holds

A student may be kept from registering for classes, dropping or adding courses, attending classes, receiving grades, official transcripts, participating in commencement or graduating if the student has not complied with any University requirement.

Administrative holds include conduct, health, library, registrar's, dean's, and financial holds. If left unresolved, a hold will result in administrative withdrawal.

Students may be informed of an administrative hold by the appropriate administrative unit. The dean of the student's college will maintain a record of administrative holds and their resolution by the return to good standing or administrative withdrawal.

Dropping/Adding Courses

Registration changes must be completed by the student by the end of the designated drop/add period as noted on the Academic Calendar. All changes will be made on a space-available basis. Students may make registration changes online through WebAdvisor at <https://webad.usciences.edu>, or by submitting drop/add forms to the Registrar's Office when approval signatures are required.

First- and second-year students are required to obtain approval of their advisor prior to dropping or adding courses. For first- and second-year students a change in lecture, laboratory, or recitation *section* in a course for which the student is *already* approved and registered may be transacted at the student's request by the registrar; permission from the instructor may be necessary for section changes in some cases. This transaction must occur during the drop/add period.

Upperclass students are encouraged to consult their advisor regarding course deletions and/or additions.

Course Withdrawal

Students are permitted to withdraw officially from a course after the drop/add period but before completion of the tenth week of a 15-week semester (or an equivalent period in a shorter term). A doctor of pharmacy student may not withdraw from an Advanced Pharmacy Practice Experience (APPE) course except for an approved Leave of Absence (LOA). To withdraw officially from a course, the student must submit to the Registrar's Office a completed Request for Course Withdrawal form that includes the signatures of the course instructor and the department chair or program director. First- and second-year students are required to obtain the signature of their advisor on withdrawal forms. The student must discuss the withdrawal with the course instructor, advisor, and department chair. (Third-year and above students do not require an advisor's signature, but they are strongly encouraged to consult their advisor regarding course deletions and/or additions since withdrawal can impact both financial aid and progress in the program.) The designation "W" (for withdrew; no point value; not included in calculation of the GPA) will be assigned after completion of the official withdrawal from a course. Except in special circumstances as determined in consultation with the department chair, program director, or college dean with jurisdiction over the student's major program of study, a student may not withdraw officially after the eighth week of a semester. Special circumstances for a late course withdrawal may include accident, injury, illness requiring hospitalization, or distress from bereavement. This is intended as partial relief from a full academic course load.

A student who fails to complete the Request for Course Withdrawal form and either discontinues attendance or exceeds the number of absences permitted in a course is not officially withdrawn from the course. Such students may, at the discretion of the instructor, receive a final grade of "F" for the course.

A student who withdraws officially from a course and subsequently registers for the same course a second time will not be permitted to withdraw from that course after the drop/add period except in special circumstances as determined in consultation with the department chair, program director, or college dean with jurisdiction over the student's major program of study.

Audit

A student may audit a course with the written permission of the instructor and the dean of the college that offers the course. Instructors may or may not require auditors to take examinations, complete course assignments, and meet course attendance requirements. Students who audit a course do not receive a grade for the course. The audit symbol "AU" is entered for the registered course on the student's record. Students cannot convert from audit to credit status, or the reverse, after the designated drop/add period. The audited course may be subject to additional charges based on the student's total credit load.

Pass/Fail Option

An instructor may designate an elective course as being available as a pass/fail elective for some or all students taking the course. Some required courses, such as a professional orientation course or clinical experience course, may also be designated pass/fail for all students. A student who wishes to take, on a pass/fail basis, a course that has been designated as a "pass/fail election" must

make all necessary arrangements with the instructor and submit a Pass/Fail Election form to the Registrar's Office prior to the end of the drop/add period. After the drop/add period, the election is irrevocable. A student may make only one pass/fail election per semester.

All pass/fail courses will appear on a student's transcript; for those pass/fail courses a student passes, credits will count toward the minimum number of semester hours required for a degree.

Final grades for courses taken as pass/fail are either "P" (pass) or "F" (failure). The grade of "P" has no assigned quality point value and, therefore, is not included in the calculation of the GPA. The grade "F" carries a point value of zero (0) and is included in the calculation of the GPA. A grade of "F" for a pass/fail course or election is taken into account with respect to the provisions of academic probation and other academic policies.

Repetition of a Course

Students may register for a course taken previously, provided all course eligibility criteria and prerequisites are satisfied. The grades for both the original and all repeated course(s) will appear on the student's transcript and be counted in the grade point average. Credit toward graduation requirements will be counted only once for the repeated courses with the exception of courses that were given College Council approval to be counted more than once towards graduation requirements. Courses will be noted "repeatable for credit" in the course description. Students registering to take a course for the third time should consult with the Financial Aid Office prior to registration as repeating these courses may affect financial aid eligibility.

When a course is failed at this University but successfully completed with a grade of "C" or better at another accredited institution, credit may be granted. However, the repeated off-campus course grade is not computed in the University of the Sciences grade point average and does not appear on the University transcript. The original grade remains on the University transcript and is used in the calculation of the grade point average.

Implementation: fall 2016

Grade Replacement

Students eligible for grade replacement are those whose course load, at the time the course was originally taken, consisted of 50% or more of the credits required in the first-year curriculum of their program major. Courses eligible for grade replacement must be repeated (completed) within 12 months of the end of the semester in which the original course was taken. This time frame is suspended for those students on approved leave of absence. The courses eligible for grade replacement must be repeated (completed) before progressing to any other course for which the repeated course is a prerequisite. For example, a student cannot grade replace CH-101 while enrolled in or having completed CH-102. A maximum of two course grades may be replaced.

An approved Repeat Course form must be submitted to the Registrar's Office no later than the last day of the course withdrawal period for the term in which the course is being repeated. If the above criteria are not satisfied, the Repetition of a Course policy will be applied (see above). When a course is repeated for grade replacement at this University, each course will appear on the transcript and academic record. The data will appear such that one will be able to distinguish a replaced grade from the original. The higher of the two course grades will be used in calculating the grade point average. Credit toward graduation requirements will be counted only once.

Implemented: Summer II (July 2) 2012

Taking and Completing Courses

Attendance Regulations

There are certain kinds of information and certain intangible values gained by attendance in classes that are not capable of being measured by examinations and which a student will lack as a result of excessive absence. Accordingly, attendance in all classes is strongly encouraged. University-wide attendance regulations are listed below; additional requirements for attendance are determined by course instructors and will be included in the course syllabus.

- Attendance is required in laboratory classes. For absences from laboratory classes, penalties and makeup procedures are at the discretion of the instructor and department. A fee may apply.
- Attendance may be required in non-laboratory classes at the discretion of the instructor.

- Attendance is required in all clinical rotations.

Absence from Laboratory Classes

Students are required to make up all laboratory classes from which they have been absent, regardless of the reasons for such absence. The laboratory classes will be made up at a time designated by the instructor, and the student must pay a \$25 fee to the cashier's office for each such laboratory makeup. Prior to allowing the makeup laboratory, the instructor will require a cashier's receipt from the student as evidence of payment of this fee. Students who do not make up laboratory classes they have missed will receive a grade of "Incomplete." Failure to remedy the Incomplete within 42 days will result in the grade of "F." (See Incomplete Policy.)

Absence Due to Athletic Contests

The University maintains that students have the responsibility to attend classes regularly so as not to jeopardize their understanding of the material. The University also recognizes that athletes who compete in varsity sports on behalf of the institution provide recognition and value to the University community. In order for athletes to meet the requirements for contractually obligated athletic contests with other institutions, under NCAA Division II standards, they are afforded class release time. To obtain release time, athletes must provide the course instructor with written notification prior to the competition date. The course instructor has the right to require documentation (e.g., competition schedule, letter from the athletic director) before release time is granted.

The athletic director is available to answer questions and assist in the coordination and implementation of this policy.

Absence Due to Religious Observations

The University of the Sciences appreciates the religious and spiritual diversity of our campus community, and recognizes that upon specific occasions, reasonable efforts should be made to accommodate the religious observances of faculty, students, and staff.

University policy grants students excused absences from class for observance of religious holy days, unless the accommodation would create an undue hardship for the instructor. Faculty are asked to be responsive to requests when students contact them IN ADVANCE to request such an excused absence. Students are responsible for completing out-of-class assignments and assessments due during their absence, but should be given an opportunity to make up in-class assignments and assessments missed because of religious observance. (For the purposes of this policy, the term "in-class" means any regularly scheduled instructional time including the Tuesday 1-3 exam period, final exam and "out-of-class" includes any time during the semester that occurs outside of scheduled instructional time.)

Once a student has registered for a class, the student is expected to examine the course syllabus for potential conflicts with holy days and to notify the instructor (by the end of the third week of classes for assignments and assessments during the first 14 weeks of instruction and by the end of the eighth week of instruction for final exams) of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class or assessment, and to make arrangements in advance (with the faculty member) to make up any missed assignments or assessments within a reasonable amount of time.

Faculty should keep in mind that religion is a deeply personal and private matter and should make every attempt to respect the privacy of the student when making accommodations.

If a student and course instructor cannot agree on an accommodation, the student may bring the matter to the teaching department chair for a decision prior to the missed class.

Absence from and Makeup of Examinations

- Each instructor must include his/her makeup examination policy in his/her course syllabus. It is the discretion of the instructor to decide which makeup reasons are valid and when the makeup examination or assessment will take place.
- Post-semester makeup examination policy: As during final examinations, students with more than 3 post-semester makeup examinations scheduled within a 24-hour time period who desire a different time and date for one or more than one of the makeup examinations must contact the faculty administering the examination(s) at least one week prior to

the makeup examination date to request an alternative date and time.

- Faculty members are to schedule post-semester makeup examinations as per other examinations by requesting a room for a specific date and time. Faculty should place such a policy in their syllabus, which could include a date and time of examination if confirmed by the Registrar's Office. Faculty must provide their own proctor and examination copies/examination directions should be given directly to the proctor.
- Post-semester makeup examination rooms will not be scheduled during finals week.
- Faculty members are encouraged to utilize graduate students enrolled in programs administered in their college as proctors for their examinations. Colleges/programs without graduate students should contact the College of Graduate Studies for a list of potential proctors. Departments are encouraged to utilize group dates/times and common proctors.
- Incomplete grades must still be finalized within 42 calendar days of the end of the semester.

Implementation: fall 2010

Rules Governing Examinations and Graded Assessments

Rules governing the administration of examinations and graded assessments, as well as policies related thereto, are determined by course instructors, must include the elements below, and will be included in the course syllabus. For the purposes of this policy the term "graded assessment" includes examinations and other activities where students are assessed.

- **Graded Assessment Procedures (for in-class assessments or assessments occurring within the University Out-of-Class Examination Times):**
The course coordinator/course instructor or their designee who is able to make decisions regarding the graded assessment must be present at all examinations and must be free to move among rooms in multiroom examinations, and be accessible to students with assessment accommodations during the assessment exam period. The course coordinator/course instructor will inform the students of their designee's name prior to the examination.
- **Graded Assessment Disruptions (for in-class assessments or assessments occurring within the University Out-of-Class Examination Times):**
If an unexpected disruption occurs during a graded class assessment and students are asked by the instructor or proctor to leave the room, academic dishonesty Prohibited Conduct rules of the University remain in effect until such time as the instructor or proctor says otherwise. The instructor reserves the right to determine grading or nullification of the assessment that has been unexpectedly disrupted.
- **Course Materials:**
Graded assessments that are not returned to students will be available from the instructor, course coordinator, or department chair for student review for 45 calendar days starting the next day following the end of the term.

For off-cycle and condensed courses, graded assessments that are not returned to students will be available from the instructor, course coordinator, or department chair for student review for 45 calendar days following the final date for that course.

Implementation: fall semester 2012

Student Participation in Experiential Education

Students and the University must satisfy certain requirements imposed by training sites as a condition of student participation in experiential education. Additionally, prior to being permitted to begin or continue rotations at off-campus training sites, students may be required to:

- Provide a Social Security number.
- Provide a medical history including immunity to infectious diseases by documented history of infectious diseases (e.g., measles, rubella, hepatitis B) or vaccination including titers for certain agents.
- Have a negative PPD or chest x-ray if indicated.
- Complete a physical examination.
- Submit to a criminal background check with disclosure to site of any convictions consistent with their criteria.
- Submit to a drug screen with disclosure to site of any positive findings for drugs that are taken without medical supervision.
- Provide evidence of and maintain personal medical insurance coverage at all times while at off-campus training sites.
- Provide First Aid, CPR, and other clinical training certifications as required by site.

Depending on the requirements of the affiliation agreement between the site and the University, the documentation requested may be coordinated by or at the training site or facilitated by the University using campus-based programs or by an external agency. In all cases, the student is ultimately responsible for ensuring the requirements have been satisfied.

Doctor of pharmacy students are expected to agree and comply with the conditions of the Pharmacy Practice Professionalism Agreement during pharmacy practice experiential coursework. A student unable to comply with the agreement may be removed from a rotation, may fail a rotation, or may be administratively withdrawn from the doctor of pharmacy program.

Academic Standards and Academic Progress

For students in Catalog Years 2019 and earlier, please consult the appropriate edition of the Catalog based on the student's Catalog Year. Previous years' Catalogs are archived online at catalog.usciences.edu.

Definition of Full-time Status for Academic Purposes

For students in Catalog Years 2016 and later

Full-time status for undergraduate students for academic purposes is defined as 12 or more credits of registered coursework at the end of the drop/add period.

Exception: Doctor of pharmacy program students in the sixth year (P4) of the program are defined as full-time with a minimum of 10 credits of registered coursework at the end of the drop/add period.

Full-time status for graduate students for academic purposes is defined as 9 or more graduate credits of registered coursework at the end of the drop/add period.

General Information ^{^ TOP}

The information in this section presents only *university-wide* academic standards.

Students in graduate degree programs (MS, MBA, MPH, PhD) and those in graduate level-certificate programs should consult with their academic department for any information relevant to their discipline or the profession.

It is also important to note that individual colleges and many major programs have specific academic standards for academic standing, progression, graduation, etc. Please refer to the individual college or program sections of the *University Catalog* (catalog.usciences.edu) for information related to these standards. Academic departments may also have additional handbooks containing information relevant to the discipline or the profession; students should check with their academic departments.

The minimum passing grade in all undergraduate courses taken at the University is "D-." At the conclusion of each semester of study, students are expected to have a cumulative GPA of at least 2.00, unless a higher GPA is specified by their program. For the purposes of these academic regulations, "good academic standing" shall be defined as maintenance of a cumulative GPA of at least 2.00 and not more than one failing grade ("F") in the most recent semester, irrespective of cumulative GPA.

To progress into advanced or professional coursework, students must have completed and passed all required courses. Depending on curriculum, these may be first-, second-, or third-year courses. Students also must have achieved at least the minimum cumulative GPA required by their major.

All undergraduate students must achieve a minimum cumulative GPA of 2.00 by the end of the spring semester of their second year, unless a higher standard is specified by their program (see specific requirements in the *University Catalog*). The minimum cumulative GPA must be achieved by the end of the spring semester of the second year. A second-year undergraduate student who has achieved the minimum cumulative GPA as of the end of the spring semester but who has not completed or has failed a required course must satisfactorily complete the required course by the end of Summer Session II of the same year with the minimum cumulative GPA or above, in order to progress into the third year of a curriculum. Students in the doctor of pharmacy program must complete all required first- and second-year courses by the end of the spring semester of the second year.

The academic records of all second-year undergraduate students are evaluated by the corresponding program director/department

chairperson and the college dean responsible for their degree program. Those students who do not meet the criteria for progression into the third year (fourth year for doctor of physical therapy students) of the curriculum will be referred to the appropriate faculty college council.

The faculty college council may:

- Drop the student from the University rolls; or
- Provide the student an opportunity to attain the required GPA within a maximum of two additional semesters while assigned a full course load, including reassignment to courses in which a minimum final grade of "C" was not achieved (subject to policies on Repetition of a Course and Grade Replacement - see the Registration and Student Records section of the *University Catalog* for additional information).

Academic Probation

For students in Catalog Years 2014 and later

The college deans will review the scholastic progress of all students at the end of each semester. Students, **whether full-time or part-time**, who have not achieved the required minimum cumulative grade point average of 2.00, or who have received a failing grade ("F") in two or more courses in the most recent semester (**whether full-time or part-time**), will be placed on academic probation. A semester is a 15-week unit of instruction and assessment.

Students on academic probation are required to meet with academic advisor to develop and complete an Academic Improvement Plan (AIP). Students are required to develop this plan in consultation with their academic advisor and comply with the AIP. Please see the Academic Improvement Policy for further details.

No student will be permitted more than two semesters of academic probation, whether full-time or part-time.

Approved by Faculty Senate: November 4, 2014.

Academic Improvement Policy

Students who are not performing at a level of achievement that is consistent with success in their academic program at the end of a semester are placed on academic probation (see Academic Probation). Students placed on academic probation will complete an Academic Improvement Plan (AIP). The AIP is designed to help students increase their academic performance to achieve their academic goals.

- Students on academic probation are required to meet with their academic advisor. Students are expected to develop their AIP in consultation with their academic advisor who must sign-off on their plan. Students will be required to communicate with their academic advisor throughout the semester regarding the progress they are making with their personalized plan.
- Students are expected to implement their AIP immediately after earning academic probation. Students on academic probation after the fall 2016 semester must meet with their advisor no later than the end of the second week of classes of the spring 2017 semester. Students earning an academic probation during the spring 2017 semester are required to develop their AIP over the summer and must obtain their advisor's approval prior to June 15.

It is the student's responsibility to schedule and attend any meetings, workshops, tutoring, etc., associated with the development and implementation of this plan. The AIP includes utilizing resources in the Division of Student Affairs (Academic Advising, Academic Support Services, Tutoring, Counseling, Career Counseling, etc.) and other appropriate resources (e.g. their instructors, the Writing Center).

Students who do not complete and follow through with their AIP will have a dean's hold placed on their record preventing further registration activity until they meet with their academic dean and/or a dean of students. Students who do not develop or implement their AIP and earn a second academic probation may be administratively withdrawn from the University.

Student Comments and Complaints

Doctor of Pharmacy Program

The Accreditation Council for Pharmacy Education (ACPE) requires that colleges of pharmacy respond to any written complaints

by pharmacy students relating to adherence to the standards, policies, and procedures of ACPE. Students should submit a written comment or complaint to the Office of the Dean of Pharmacy (GH-216). All comments or complaints will be evaluated, and a written response will be provided. Students are also encouraged to visit the ACPE website at www.acpe-accredit.org.

Doctor of Physical Therapy Program

Doctor of physical therapy students have the right to lodge a formal complaint to the Commission on Accreditation in Physical Therapy Education (CAPTE) if the USciences physical therapy program is not in compliance with one or more of the evaluative criteria set by CAPTE.

Students need to identify the specific evaluative criteria that they feel is not being met by the USciences Department of Physical Therapy. In order for CAPTE to consider the complaint to be bona fide, the student MUST have exhausted all of the avenues for redress at the institution. The full policy on complaints to CAPTE can be found in the *Department of Physical Therapy Policy and Procedure Manual*. Students may also find information on filing CAPTE complaints on the USciences physical therapy webpage (www.usciences.edu/pt/) and through the American Physical Therapy Association (www.apta.org).

Residency and Length of Time to Complete Program of Study

In order to earn an undergraduate or first professional degree from USciences, a student must complete at least 30 in-residence credits at a USciences campus. At least half of these credits must be upper-division courses required by the major (i.e., 300 level or above). In-residence credits are defined as credits for courses offered by USciences academic departments or partnership institutions that can contribute to the student's degree requirements.

Individual USciences colleges and/or programs may impose additional residency and time to completion requirements. These policies are as follows:

Misher College of Arts and Sciences

In order to earn an undergraduate degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a USciences campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by USciences for which a student receives credit and a grade that can contribute to the student's calculated grade point average (GPA).

Philadelphia College of Pharmacy

Students admitted into the first professional year (P1) of the Doctor of Pharmacy Program must be enrolled for at least four years (i.e., 8 semesters of at least 12 credits/semester) in residency at PCP, regardless of the extent or nature of previous academic experience. Such students entering into P1 will receive transfer credit for those basic sciences and general education courses that are considered equivalent in content and semester credit to similar courses included in the pharmacy curriculum as long as they receive a grade of "C" or better.

To earn an undergraduate degree from PCP, a student must successfully complete at least 30 credits of eligible coursework offered by USciences. Eligible coursework results in a letter grade that contributes to a student's calculated USciences grade point average (GPA). At least 15 of the 30 credits must be upper-division courses required by the major (300 level or above). Catalog year for transfer students will be backdated to the Catalog Year when they would have started attending the University as a first-year student. (Please see Catalog Year for Degree Requirements found in the table of contents of the USciences Student Handbook).

The maximum amount of time to complete all requirements to earn a BS degree in PCP is six years from entry as a freshman to USciences. If residency exceeds 6 years to earn a BS degree in PCP, then a student's educational plan may be adjusted to reflect current University educational requirements. For the PharmD program, students have a maximum of six years from entry into the first professional year (P1) of the program to complete all degree requirements. Inability to complete all degree requirements in the allotted time frame will result in the student being withdrawn from the program. Approved leaves of absence are not counted as part of the maximum time to degree.

Health Science Program

All students enrolled in the BSHS in health science program must complete a minimum of 30 credits at USciences in order to graduate. A minimum of 120 approved credits is required to earn a bachelor's degree.

Occupational Therapy Program

Applications from other undergraduate majors or transfer students are welcome. The class level to which transfer students are assigned will depend on the prerequisites they have completed, but the minimum residency requirement is three years for the MOT and four years for the DrOT. All conditions regarding guaranteed admission into the professional curriculum also apply to transfer students admitted to the first or second year.

Satisfactory Academic Progress for Financial Aid

For financial aid purposes, there is a separate definition of satisfactory academic progress. A detailed description of the University's Satisfactory Academic Progress (SAP) policy is provided in the Financial Aid section of this Catalog.

Dean's List

Following the close of each semester, the dean's list is posted, recognizing those students who have achieved high scholastic distinction. Those named to the dean's list must have taken a full-time semester of coursework in that semester, completed and passed all courses with no grade below "C," and attained a semester grade point average of 3.40 or above. Students receiving grades of "PRG" at the conclusion of the semester will be eligible for retroactive assignment of dean's list upon course completion. Those students who prefer not to have their names posted should notify the office of the appropriate college dean.

Students with written reprimand for an academic violation or any conduct probation or higher sanction are not eligible for the dean's list.

English Proficiency Policy for International Students

In order to be admitted to USciences international students are required to demonstrate English Proficiency by accomplishing one of the following:

- Have completed 24 college-level credits at a regionally accredited institution in the United States and earned a grade of B or higher in two English Composition/Writing Intensive courses; or
- Have been studying at an English-speaking institution for at least four years; or
- Achieve an overall score of 90 or above in the TOEFL, provided, however, that no single section has a score below 20; or
- Achieve a score of 6.5 or above in the IELTS; or
- Achieve a score of 58 or above in the Pearson Test of English (PTE); or
- Have successfully completed an approved English language level at a partner English Language program. Conditional acceptance will be granted to students who then have 1 year to complete their English language training prior to matriculating.

Submitted by the Office of the Provost on April 5, 2019 – Approved by Faculty Senate on June 4, 2019. Revised Policy - Approved March 3, 2020

Requirements for Graduation

For students in Catalog Years 2019 and earlier, please consult the appropriate edition of the Catalog based on the student's Catalog Year. Previous years' Catalogs are archived online at catalog.usciences.edu.

To fulfill its obligation to the precepts of higher education, University of the Sciences has established standards of achievement that must be met before any student is recommended for graduation by the faculty. Every person upon whom a degree shall be conferred must have successfully completed the assigned curriculum and must have met the specific graduation requirements pertaining to the degree to be conferred.

A student must complete all graduation requirements by:

- The end of the fall, spring, or summer term, or
- The 1st day of the month of July or November.

Any student not meeting these deadlines will be delayed until the next graduation date.

To qualify for an earned degree, students must:

- Fulfill all of the requirements of the respective curriculum, including achieving at least the minimum academic requirements and passing all proficiencies required by the University and the major, as outlined in this Catalog and in the policies of the individual colleges and academic programs.
- Be in good academic standing, having satisfied all academic and program requirements, and be free of all conduct holds at the conclusion of the final semester of enrollment.
- File a Petition for Graduation at the start of the final semester of matriculation. To participate in the May Commencement Ceremony, the Petition for Graduation must be submitted by the end of the drop/add period of the spring semester.

Only those students who have fulfilled all requirements for graduation by the end of the spring semester (last day of final exams) will be permitted to participate in the commencement ceremony.

Students with financial and/or conduct holds will not receive a diploma and will not be able to obtain a copy of their transcript until the hold(s) is/are released. If a financial or conduct hold is in place, the University will not respond to requests for verification of graduation status on the graduate's behalf.

Implemented: January 2015

Bachelor Degrees for Students in Professional Programs

Effective with first-year (U1) students entering USciences in the fall 2008 (Catalog Year 2008) all students in professional programs (doctor of pharmacy, doctor of physical therapy, doctor of occupational therapy, and master of occupational therapy) will be granted a bachelor's degree upon successful completion of the work in the first four years of their curriculum. All of these curricula must satisfy the minimum requirements for a degree, including completion of the General Education requirements. Upon satisfactory completion of requirements, a bachelor's degree "in transit" to the eventual professional degree in their program of study will be awarded.

Students in the fall 2008 and later entering cohort (Catalog Year 2008 and later) who complete all requirements for a bachelor-level degree may be granted that degree and terminate their enrollment even if they are unsuccessful in completing the requirements for the professional degree.

Graduation Honors

Graduation Honors beginning with the Class of 2025

Undergraduate students who achieve outstanding academic records at the University may graduate with one of the honors listed below:

Cum Laude—GPA of 3.40

Magna Cum Laude—GPA of 3.60

Summa Cum Laude—GPA of 3.80

Honors are awarded based on the student's cumulative grade point average calculated using the total quality points and credits earned as shown on the student's University transcript. Honors are awarded only with the bachelor's degree, and all university and program requirements for the bachelor's degree must be met in order for an honor to be awarded. Once awarded, the honor becomes a permanent part of the student's record.

Students in the Occupational Therapy, Pharmacy, and Physical Therapy Professional Programs

Students in the occupational therapy, pharmacy, and physical therapy professional programs who achieve outstanding academic records at the University may graduate with the designation '**With Distinction**'. This designation is awarded to students in the top 20% of their class in their respective professional program. The qualifying cumulative grade point average for the top 20% of the class will be set at the end of the fall semester before graduation. The designation is based on the student's cumulative grade point average for all years of the professional program (P1, P2, P3 and for Pharmacy P4) calculated using the total quality points

and credits earned as shown on the student's University transcript. 'With Distinction' is awarded only with a professional master's or professional doctoral degree, and all university and program requirements for the degree must be met in order for the designation to be awarded. Once awarded, the designation becomes a permanent part of the student's record.

Graduation Honors - Students graduating before 2025

Students who have achieved outstanding academic records at the University may graduate with one of the following honors. The honors designations listed below are based on total quality points and credits earned and on the student's attaining the following minimum cumulative grade point average and completed all requirements for the bachelor/professional degree:

Cum Laude—GPA of 3.40

Magna Cum Laude—GPA of 3.60

Summa Cum Laude—GPA of 3.80

Students who earn a bachelor's degree from the University before entering a professional degree program may be awarded graduation honors based only on the student's professional program GPA.

Once awarded, these graduation honors become a permanent part of the student's record

The following information provides a brief overview of some of the requirements for obtaining the master of science degree. A complete, current description of these requirements is found in the policies and procedures manual available from the Office of Graduate Studies or at www.usciences.edu/graduate.

Master of Science — Thesis Option Research Advisor

Each student selects a research advisor from the members of the graduate faculty within the graduate program with the approval of the Program Director and Chair. The research advisor will guide the student in selecting courses, direct the student's research, and chair the student's Advisory Committee.

Advisory Committee

Each MS (thesis) student will select an Advisory Committee composed of their research advisor, at least one other member of the graduate faculty from the student's program, and at least one other qualified individual who has the credentials and expertise to contribute to the guidance of the student's research. Duties of the Advisory Committee are to:

- Recommend didactic requirements for the student above and beyond those established by the program.
- Mentor the student.
- Establish specific research goals/objectives of the student for the next semester at the end of each semester.
- Monitor the student's research progress by evaluating the research accomplishments against the established expectations at the end of each semester.
- Determine when the quality and quantity of research are sufficient to justify the student to prepare and defend a thesis.
- Advise the student in the preparation of both the research prospectus and thesis.
- Participate in the final oral examination of the student.

Credit Requirements

To qualify for the master of science degree, USciences requires that each student must earn not less than 20 credit hours of didactic work acceptable to earn the MS (thesis) degree and not less than 10 credit hours of research. While at least 10 credit hours of master's research are required to get the degree, the MS (thesis) student may have to continue to register for research credits beyond this minimum requirement to complete the research to the satisfaction of the Research Advisory Committee. Graduate students are expected to participate in all departmental and college seminar programs. Graduate students must achieve a minimum grade of "B-" in each course for which graduate credit is granted and must maintain a cumulative GPA of 3.00.

Each of the graduate programs has its own individual required courses and approved electives. Frequently, these programs may have course requirements that exceed the minimum requirements of the university; the student must complete all of the specified programmatic requirements before the student earns the MS (thesis) degree in that program of study.

Students may request transfer of credits earned outside of USciences upon matriculating into a graduate program; a maximum of 12 credits may be awarded due to transfer, advanced placement, and/or life experience. These credits must not have been used to fulfill the minimum degree requirements for an undergraduate/first professional degree. Transcript of transfer credits should be presented to the program director with a request for evaluation. If the courses are of suitable nature and grades equivalent to "B-" or better have been earned in them, the program director may recommend their acceptance for transfer to the dean.

Time Requirements

Students who are fully prepared for advanced study and who devote full-time to the academic program can usually earn the MS (thesis) degree in about 1 1/2 to three years. Candidates for the MS (thesis) degree must satisfy all degree requirements within five years of entering a graduate program.

Proficiency Examinations

During the weeks preceding registration, students commencing graduate studies may be required to take one or more proficiency examinations designed to evaluate their degree of preparation for advanced study. The program director or designee will administer and grade these examinations. The results of these examinations will be used to establish an initial program of study and may allow the program director to award advanced placement credit.

The nature of these proficiency examinations is determined by the departmental graduate faculty. If these examinations are to be required, information will be sent to incoming students by the program director shortly after the receipt of the student's acceptance of the offer of admission.

Research

At least two weeks prior to the first day of final examinations of each semester that the student is registered for research credits, the student will submit a brief written report to the program director and members of the Advisory Committee that outlines the progress that was made in meeting the specific research goals/objectives established by the Advisory Committee for that semester. The student, in consultation with his/her research advisor, also will suggest specific research goals/objectives for the next semester for consideration by the Research Advisory Committee.

The graduate faculty requires the submission of a formal thesis for this degree. An oral examination as a defense of this research is also required. It is expected that the MS (thesis) student will present his/her research work at a professional meeting outside of USciences prior to completing the degree.

Registration

Matriculated graduate students are required either to be registered for courses or *in absentia* (i.e., AB800) or to be on an approved leave of absence every semester until completion of their degree. (Note: students who plan to register *in absentia* should check with the University's Office of Graduate Education to understand how this might affect their enrollment status if they have extramural financial aid.) MS (thesis) must be registered for at least one credit during the terminal semester in which they will complete all of their degree requirements.

International students are required by the U.S. government to be registered as full-time students (i.e., at least nine credits) each fall and spring semester unless exempted by the Program Manager within the International Student & Scholar Services Office. With the Program Manager's permission, international students may register for less than nine credits but at least for one credit in their terminal semester in which they will complete all of their degree requirements.

Master of Science—Non-Thesis Option

The MS (non-thesis) degree is an option offered by some programs as a modification of the master of science degree requiring more didactic coursework, less research, and no formal thesis/defense. The degree is intended for students who, because of career or financial needs, choose to pursue graduate education on a part-time basis; who seek an advanced degree primarily to facilitate advancement or promotion; or who wish to attain the degree but are not likely to pursue further graduate education.

While many of the requirements for the MS (non-thesis) degree are the same as those for the MS (thesis) degree, some of the different requirements are listed below.

A minimum of 30 credit hours of didactic work is required by USciences for the MS (non-thesis) degree; individual programs may require more than this minimum. The program director will assign a member of the graduate faculty to serve as the student's

advisor. The MS (non-thesis) student will not have an Advisory Committee nor be required to write a thesis; however, most programs require a written project as part of a capstone course.

Registration

Matriculated graduate students are required either to be registered for courses or in absentia (i.e., AB800) or to be on an approved leave of absence every semester until completion of their degree. (Note: students who plan to register in absentia should check with the University's Office of Graduate Education to understand how this might affect their enrollment status if they have extramural financial aid.) MS (thesis) must be registered for at least one credit during the terminal semester in which they will complete all of their degree requirements.

International students are required by the U.S. government to be registered as full-time students (i.e., at least nine credits) each fall and spring semester unless exempted by the director of multicultural affairs. With the director of international students' permission, international students may register for less than nine credits but at least for one credit in their terminal semester in which they will complete all of their degree requirements.

Doctor of Philosophy

The following information provides a brief overview of some of the requirements for obtaining the doctor of philosophy degree. A complete, current description of these requirements is found in the policies and procedures manual available from the Office of Graduate Studies or at www.usciences.edu/graduate.

Research Advisor

Each student selects a research advisor from the members of the graduate faculty within the graduate program. The research advisor will guide the student in selecting courses, direct the student's research, and chair the student's Advisory Committee.

Advisory Committee

Each doctoral student will select an Advisory Committee composed of their research advisor, one other member of the graduate faculty from the student's graduate program, one member of the graduate faculty who is not from the student's graduate program and one other qualified individual from on or off campus; other qualified individuals may also serve on the Advisory Committee. Duties of the Advisory Committee are to:

- Recommend didactic requirements for the student above and beyond those established by the program.
- Mentor the student.
- Establish specific research goals/objectives of the student for the next semester at the end of each semester.
- Monitor the student's research progress by evaluating the research accomplishments against the established expectations at the end of each semester.
- Determine when the quality and quantity of research are sufficient to justify the student to prepare and defend a dissertation.
- Advise the student in the preparation of both the research prospectus and dissertation.
- Participate in the final oral examination of the student.

Credit Requirements

To qualify for the doctor of philosophy degree, USciences requires that each student must earn not less than 20 credit hours of graduate-level didactic work and not less than 20 credit hours of research. While at least 20 credit hours of doctoral research are required to earn the degree, the doctoral student may have to continue to register for research credits beyond this minimum requirement to complete the research to the satisfaction of the Research Advisory Committee. An academic plan will be developed for each student in consultation with the student's Advisory Committee and is subject to approval of the program director. This program must ensure that the student will attain a high degree of competence in a major area of study and provide a sound foundation in the underlying sciences. Graduate students must achieve a minimum grade of "B-" in each course for which graduate credit is granted and must maintain a minimum cumulative GPA of 3.00.

Each of the graduate programs has its own individual required courses and approved electives. Frequently, these programs may have course requirements that exceed the minimum requirements of the university; the student must complete all of the specified programmatic requirements before the student earns the PhD degree in that program of study.

Students may request transfer of credits earned outside of USciences upon matriculating into a graduate program; a maximum of 12 credits may be awarded due to transfer, advanced placement, and/or experience. These credits must not have been used to fulfill the minimum degree requirements for an undergraduate/first professional degree. Transcript of transfer credits should be presented to the program director with a request for evaluation. If the courses are of suitable nature and grades equivalent to "B-" or better have been earned in them, the program director may recommend their acceptance for transfer by the college dean.

Time Requirements

Students who are fully prepared for advanced study and who devote full-time to the academic program can usually earn the PhD degree in about four to six years. There is no residency requirement for the doctor of philosophy degree, though doctoral students should participate in all seminars and other programmatic activities whenever possible; this is especially important for the part-time doctoral candidate. Candidates for PhD degree must satisfy all degree requirements within eight years of entering a graduate program.

Proficiency Examinations

During the weeks preceding registration, students commencing graduate studies may be required to take one or more proficiency examinations designed to evaluate their degree of preparation for advanced study. The program director or designee will administer and grade these examinations. The results of these examinations will be used to establish an initial program of study and may allow the program director to award advanced placement credit.

The nature of these proficiency examinations is determined by the departmental graduate faculty. If these examinations are to be required, information will be sent to incoming students by the program director shortly after the receipt of the student's acceptance of the offer of admission.

Comprehensive Examinations

Graduate coursework is designed to expose the student to the fundamental body of knowledge in a discipline. A doctoral student should also have the ability to analyze this body of knowledge, including the current literature, integrate it, and creatively apply it to problems in the discipline. A series of comprehensive examinations is used to test the student's abilities in these areas. All doctoral students must successfully complete the comprehensive examination requirement.

The doctoral student will take written and oral examinations in specialty areas within the major field, as established by the department. The mechanism and the selection of authors of these examinations are determined by the graduate faculty in each program. Questions to be found on the written comprehensive examinations are of a nature such that students are expected to demonstrate a familiarity with the current literature in their major field and to answer questions with a breadth and depth of understanding beyond that considered satisfactory in normal course examinations. Information concerning the examinations may be obtained from the program director.

Admission to Candidacy

Upon the recommendation of the Advisory Committee and after the successful completion of all course requirements and comprehensive examinations and the submission of an approved research proposal, the program director will notify the student of his/her admittance to candidacy.

By granting such admission, the Advisory Committee indicates its approval of the candidate's record to date and its confidence in the student's ability to pursue to successful completion an appropriate research problem. Not less than two semesters must intervene between admission to the program and the awarding of the degree.

Doctoral Research

A major requirement for the doctoral degree is that the candidate demonstrates creativity and the ability to design and conduct research substantially on an independent basis, to critically analyze the results of his/her research, to translate the data obtained into sound and defensible conclusions, and to clearly articulate these results in the preparation of a research dissertation. The dissertation must represent a definitive contribution to scientific knowledge. A suitable research problem is selected by the candidate in consultation with the Advisory Committee. With the approval of the research advisor, the student may register for doctoral research in the appropriate department. The doctoral student must submit a research prospectus to the Advisory Committee for approval.

Each student engaged in doctoral research is required to present at least one oral progress report to the Advisory Committee per

year. The progress report should indicate how well the objectives of the research prospectus have been met, any modifications that have been made in these objectives, and what studies remain to be performed in order to achieve them.

The doctoral candidate must prepare at least one manuscript based on his/her dissertation research, which, after receiving approval from his/her research advisor, will be submitted to an appropriate scholarly publication recommended by his/her research advisor. It is also required that the doctoral candidate present, on average, at least one paper or poster on the student's doctoral research at a professional symposium or meeting for every two years that the student is matriculated in the doctoral program.

Dissertation and Abstract

Upon completion of the student's research to the satisfaction of the Advisory Committee, each candidate must prepare a dissertation and an abstract based upon his/her investigations. Detailed instructions for the preparation of dissertation and abstracts have been developed by the graduate faculty and are included in the graduate policies and procedures.

Registration

Matriculated graduate students are required either to be registered for courses or *in absentia* (i.e., AB800) or to be on an approved leave of absence every semester until completion of their degree. (Note: students who plan to register *in absentia* should check with the University's Office of Graduate Education to understand how this might affect their enrollment status if they have extramural financial aid.) MS (thesis) and PhD students must be registered for at least one credit during the semester in which they will complete all of their degree requirements.

International students are required by the U.S. government to be registered as full-time students (i.e., at least nine credits) each fall and spring semester unless exempted by the director of multicultural affairs. With the director of international students' permission, international students may register for fewer than nine credits but for at least one credit in their terminal semester in which they will complete all of their degree requirements.

Final Examination

Following the review of the dissertation by the members of the Advisory Committee and a reviewer selected by the college dean, the candidate must pass a final oral examination designed to establish the competency of the student in his/her major and related fields. The final examination of the student will be conducted by the Advisory Committee reviewers and chaired by the student's research advisor.

Publication and Microfilming

The graduate faculty considers publication of the essential components of the doctoral research, in a suitable scientific journal, to constitute an integral part of the dissertation requirements. In order to realize the full value of scholarly research, it must be made easily available to other scholars. Therefore, each doctoral dissertation is reproduced on microfilm, and a copy is kept on file in the Joseph W. England Library and in the Library of Congress. An abstract is reproduced and published in *Dissertation Abstracts*.

Grades

Students in graduate degree programs (MS, MBA, MPH, PhD), as well as graduate-level certificate programs, should refer to their academic department's handbook which contains information relevant to the discipline or profession.

Grades

The following grading system is used to indicate the quality of academic performance at University of the Sciences:

A- to A+	Excellent
B- to B+	Good
C to C+	Fair or satisfactory

D- to C- Unsatisfactory, but passing

F Failure

The quality point values assigned to these letter grades are:

A and A+ 4.00 points

A- 3.70 points

B+ 3.30 points

B 3.00 points

B- 2.70 points

C+ 2.30 points

C 2.00 points

C- 1.70 points

D+ 1.30 points

D 1.00 point

D- 0.70 point

F 0.00 point

Other grading indicators:

AU Audit

I Incomplete (see Incomplete Policy, below)

P Pass (Pass/Fail courses)

W Withdrawal

PRG Progress (see explanation below)

S Satisfactory

U Unsatisfactory

For courses taken on a pass/fail basis, the final course grade will be either "P" (for Pass, which has no point value and is not included in the calculation of a grade point average) or "F" (for Failure, which has a value of "0.00" but is included in the calculation of the grade point average).

Grade Point Average

A semester grade point average (GPA) is computed at the conclusion of each academic semester. Course grades are assigned quality point values. Grades of "F" (in a pass/fail course) are considered equivalent to a failing grade of "F" (0.00) and are included in the calculation of the GPA. Grades of "W," "I," "AU," "P," "S," "U," and "PRG" are not included in the calculation of

a GPA.

The following illustrates how a semester GPA is computed:

Note: For each course, the quality point value is multiplied by the number of course credits to obtain the course quality points.

	Course Grade	Quality Point Values	Course Credit	Course Quality Points
XX001	C+	2.30 x	5 =	11.50
XX002	B	3.00 x	3 =	9.00
XX003	W	0.00 x	3 =	0.00
XX004	B-	2.70 x	3 =	8.10
XX005	A	4.00 x	4 =	16.00
Total			18 - 3 (W) = 15	44.60

The semester GPA is calculated by dividing the total number of course quality points by the total number of course credits and rounded to two decimal points. In this, as noted above, , the 3 credits for XX003 are *not* counted because of the "W" grade; therefore the calculation is $44.60/15 = 2.97$.

The cumulative GPA (the average of grades from two or more semesters) equals the sum of the course quality points of all grades received at the University divided by the total number of course credits for courses receiving quality points.

Incomplete Policy

All course requirements must be completed prior to the end of the semester.

Students not fulfilling course requirements at the completion of the semester due to extenuating circumstances may be assigned an "Incomplete" or "I" designation on their transcript by the instructor. The instructor is required to replace this "Incomplete" designation with a final grade as soon as possible but no later than 42 calendar days from the end of the semester or the end of the drop/add period of the next semester, whichever comes first. If the instructor has not entered a final grade within the prescribed time limit, the Registrar will automatically enter a grade of "F" and inform the instructor and student. Extensions beyond 42 calendar days may be granted by the course instructor in consultation with the student's college Dean in exceptional cases.

Students will sign an "Incomplete" contract for each course for which an extension is approved. The instructor will determine what the student must do (e.g., take one or more examinations, perform laboratory work, turn in reports, turn in notebooks, perform library assignments) in order to meet contract requirements. Information regarding requirements to complete the course will be supplied to the student directly by the instructor. The student is responsible for completing the work in the time allotted.

When an "Incomplete" grade is converted to a letter grade, the GPA is recalculated retroactive to the end of the semester in which the course was originally taken. University/program academic policies and procedures governing probations, dismissal, etc., apply to GPA changes resulting from conversions of "Incomplete" grades. For example, should a converted "Incomplete" result in a GPA warranting dismissal from the University/program, the student's dismissal would be effective retroactive to the end of the semester in which the course was originally taken.

It is the student's responsibility to estimate and calculate the results of a converted "Incomplete" on the retroactive GPA. Should the dismissed student be registered for, and/or attending classes, taking exams, etc., in the semester or summer session subsequent to the semester in which the "Incomplete" was assigned, the courses for the subsequent session will be deleted from the student's record. No academic credit will be granted for the courses; refunds will be made according to the tuition refund schedule.

No Grade Submitted

Faculty may assign an "Incomplete" grade for incomplete coursework or if they are not able to evaluate a student. There is no

grade of "NG." If the faculty member leaves the student's grade blank or submits a grade of "NG," the Registrar will enter a grade of "I" for "Incomplete" and the rules governing "Incomplete" grades apply.

Effective: Fall 2009

Progress Grade Designation ("PRG")

Occasionally, a professional orientation or clinical experience course will need to span two semesters, and grading for both portions will be determined at the end of the second portion of the course. Prior approval as noted below is required. Courses are approved for the Progress "PRG" grade designation by the Faculty Senate Academic Affairs Curriculum Subcommittee.

Students receiving a grade of "PRG" in a pass/fail graded professional orientation or clinical experience course must complete all coursework prior to the end of the 15-week semester following the end of the semester where the "PRG" grade was assigned, or the course grade will convert to an F. When a "PRG" grade is converted to pass or fail, the GPA is recalculated retroactive to the end of the semester in which the course was originally taken. University or program academic policies and procedures governing probations, dismissal, etc., apply to GPA changes resulting from conversions of "PRG" grades. For example, should a converted "PRG" result in a GPA warranting dismissal from the University or program, the student's dismissal would be effective retroactive to the end of the semester in which the course was originally taken. It is the student's responsibility to estimate and calculate the results of a converted "PRG" on the retroactive GPA. Should the dismissed student be registered for, and/or attending classes, taking exams, etc., in the semester or summer session subsequent to the semester in which the "PRG" was assigned, the courses for the subsequent session will be deleted from the student's record. No academic credit will be granted for the courses; refunds will be made according to the tuition refund schedule.

Grade Change Policy

Course grade changes shall only be made by the instructor of record in the student information system currently employed by the University for up to six months after the end of the term in which the student was registered for the course. Changes in course grades originally assigned by an instructor who is no longer an employee of the University may be made by the chair of the department who has responsibility for teaching the course for up to six months after the end of the term in which the student was registered for the course. After six months, all grade changes must be approved by the instructor of record (if still employed by the University), and the chair and dean of the department and college that offers the course.

Students requesting changes in course grades must present to the instructor of record (or to the department chair if the instructor of record is no longer employed by the University) a copy of the course syllabus or other documents describing how final grades are determined, copies of all available graded materials, and a record of all communications between the student and the instructor regarding the course grade.

Transcripts

Student transcripts are maintained by the Registrar's Office and are covered by the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. Students may request that an official copy of their transcript be sent to a third party (e.g., another college/university or an employer); an unofficial copy may be requested for the student's personal use. An official transcript carries an authorized signature as well as the seal of University of the Sciences.

All requests for transcripts must be made in writing and signed by the student. There is a charge for each official transcript, which is subject to change. Unofficial transcripts are free to students. University of the Sciences does not release transcripts unless tuition, fees, and other obligations due the University have been satisfied. More information regarding transcript requests is available on the University website at <https://www.usciences.edu/academics/academic-resources/registrar/transcripts-enrollment-verification.html>

When a course is repeated/replaced, both courses will appear on the transcript. Replaced Courses are marked with the asterisk (*) symbol indicating the higher of the two grades has been used in the calculation of the GPA. Repeated Courses are marked with a pound or hashtag (#) symbol indicating all grades are included in the calculation of the GPA.

Students may view their official course grades and GPA information for each semester online through WebAdvisor after faculty members have submitted grades for the semester. Grades are not mailed to students.

Separation from the University

University of the Sciences and its faculty reserve the right to dismiss at any time any student who is deemed undesirable, either

on the grounds of conduct or of academic standing, and in this matter the faculty shall be the sole judge.

Dropped from the Rolls

Students will be dropped from the rolls if they:

- Complete any three semesters, whether full-time or part-time, with an academic record resulting in academic probation; or
- Fail the same course twice. This regulation applies whether the course is taken in regular sessions or in summer school, whether at the University or at another institution.

Students who do not meet the criteria for progression in their curriculum may be subject to being dropped from the rolls (refer to section on Academic Standards and Academic Progress).

Students who are dropped from programs for exceeding program probations will be dropped from the University rolls if they are not admitted to a program by the end of the drop/add period following the semester they were dropped from their program.

The college dean responsible for the student's major will officially notify the student of this action and notify pertinent University offices of the change in status. A student who is dropped from the rolls is not eligible to attend any courses at the University. (Refer to sections on Readmission to the University and Fresh Start Readmission for readmission policies.)

Leave of Absence

Short-Term Leave of Absence Policy (No more than 10 business days)

In the event of an immediate and significant health or family emergency* a student may request from his/her college dean, a Short-Term Leave of Absence (Short term LOA). A Short-Term Leave of Absence is intended to provide the student an opportunity to address the issue and then resume his/her academic course of study. If the student cannot resume his/her studies after 10 business days, the student may apply for a LOA for a longer period of time.

*Examples of a *significant health or family emergency* include accident, injury, or illness requiring hospitalization; or health and/or safety concern (i.e., risk to self or to others), or death of a parent, sibling, or significant other. A Short-Term LOA does not negate or preclude the administration of the conduct policy or the administrative withdrawal policy.

To request a Short-Term LOA, the student should first contact his/her college dean. The student may be asked to provide documentation to verify the circumstances. Upon approval of a Short-Term LOA, the college dean will notify the applicable chair, program director, course instructors, academic advisor, and Division of Student Affairs. Upon return to the academic program, the student is responsible for working with the instructors to complete the course requirements as specified in the course syllabus.

Personal Leave of Absence and Medical Leave of Absence

There are two additional types of leaves of absence, a Personal Leave of Absence and a Medical Leave of Absence.

A leave of absence affords students the opportunity to remain in academic standing with their department and not have to reapply for admission. A leave of absence form must be completed and submitted to the student's college dean for approval.

The leave of absence may have financial aid implications and the student should meet with Financial Aid prior to the leave of absence and at the time they return from the leave. To be in compliance with Title IV Financial Aid Programs, USciences reports the student as "Withdrawn" from USciences to the National Student Loan Data System (NSLDS) on the date the leave begins.

Reasons a student may be granted a personal leave of absence include but are not limited to personal or financial problems or military service. To be considered for a personal LOA, the student must:

- Submit a written request for the leave to his/her college dean and provide documentation to verify the circumstances cited in the request for the leave.
- Meet with his/her college dean, or designee, to review the request, including the precipitating circumstances and submitted documentation.

A medical leave of absence may be requested when a student's medical or psychological condition significantly impairs his/her ability to function successfully or safely in the academic environment. Requests for a medical leave of absence are coordinated through the Dean of Students' office. Before a medical leave of absence can be granted by the college dean's office, the Dean of

Students or his/her designee must recommend to the college dean's office that the student be considered for such a leave.

To be considered for a medical leave of absence, the student must take the following steps:

- Have a major mental or physical health issue that cannot be mitigated in a short period of time, such as an incident involving a major accident, injury, or significant illness requiring hospitalization or extended treatment. The condition may be the diagnosis of substance abuse or addiction (see the Student Handbook Substance Abuse Policy).
- Meet with the Dean of Students or his/her designee to review the precipitating health concerns.
- Provide documentation from a licensed health professional. The documentation must be typed and submitted on official letterhead and must include the name, address, office telephone number, license number, and signature of the health professional. The documentation should specify the length of time needed for the leave and the reason for the leave.

The college dean's office will make the final determination if a personal or medical leave of absence will be granted and will notify the student in writing.

Upon approval of a personal or medical leave of absence, the college dean will notify the applicable chair, program director, course instructors, academic advisor, Division of Student Affairs, Financial Aid and other pertinent USciences offices.

The college dean's office will also determine the status of the student's current coursework and whether or not the student should be withdrawn from courses. A grade of "W" may be assigned by the college dean to all registered coursework based on the effective date for the personal or medical leave of absence. The instructor for each course will have 10 working days from receipt of notice to reassign a course grade if appropriate.

If a medical leave of absence is granted, the Dean of Students will monitor the treatment with the student and licensed health professional. The Dean of Students may require additional documentation including medical evaluation, treatment plans, and evidence of compliance with treatment.

To return from a medical leave of absence, the student must submit medical documentation to the Dean of Students from a licensed health professional regarding his/her health status and ability to return to his/her studies. After reviewing the medical documentation, the Dean of Students will notify the college dean whether the student is permitted to return to resume his/her academic course of study.

To return from a personal or medical leave of absence, the student must report to the office of his/her college dean by the return date specified on the leave of absence form. The dean will then notify the pertinent USciences offices that the student has been placed on "active" status. If the student does not return by the return date specified on the leave of absence, the student will be administratively withdrawn from USciences by the student's college dean's office.

Approved by Faculty Senate April 4, 2017

Bereavement Policy

The University recognizes that students may suffer greatly from the loss of a loved one. Students suffering from bereavement should refer to the policies on Short-Term Leave of Absence, Leave of Absences, and Course Withdrawal for information on means to address this issue.

Advised to Withdraw

A student may be advised to withdraw either on the grounds of conduct or academic standing.

Voluntary Withdrawals from the University

An official withdrawal from the University must be authorized by the college dean responsible for the student's degree program. The college deans' offices are the only offices designated to accept withdrawals from the University. A student will be officially withdrawn from the University once the student contacts the office of the college dean responsible for the student's degree program and provides notification of intent to withdraw either verbally or in writing. This notification must include the student's name, current address, phone number, and student identification number or other acceptable information that establishes the identity of the student. The date the student notifies the dean's office of his/her withdrawal from the University will be the official effective date of withdrawal. If a student cannot directly contact the dean's office due to illness, accident, grievous personal loss, or other such circumstances beyond the student's control, another individual, acting on the student's behalf, can provide the notice of intent to withdraw. Once the dean's office verifies that the individual is authorized to act on the student's behalf, the date of withdrawal is effective as of the date of the initial notification.

A student who contacts the dean's office and only requests information on aspects of the withdrawal process, such as the potential

consequences of the withdrawal, would not be considered to be withdrawn. However, if the student indicates that he/she is requesting this information because he/she will cease to attend USciences, the student would be considered to have provided official notification of his/her withdrawal.

The dean's office may request that the student submit the withdrawal request in writing or have an interview with the dean, either in person or by phone, but this is strictly voluntary and not required for withdrawal. The student must not attend any academic function or classes after notifying the dean's office that he/she is withdrawing from the University. The college dean will notify the student and the pertinent University offices of the withdrawal.

When a withdrawal from the University is authorized by the college dean, a "W" grade will be assigned for all courses in which the student is currently registered, unless the student withdraws during the drop/add period or after the conclusion of a term. The instructor for each course will be notified by the college dean of the student's withdrawal and will have 10 working days from receipt of notice to reassign a course grade of "F" if appropriate.

Administrative Withdrawal

A student may be withdrawn from the University for major violations of University policy or for nonattendance. A typical reason for an administrative withdrawal includes noncompliance with University policy (e.g., nonpayment of debt or exceeding program time limits).

If a student who has ceased to attend the University did not begin the voluntary withdrawal process by contacting the college dean's office responsible for the student's degree program, the college dean will administratively withdraw the student. The date that the dean's office learns of the student's nonattendance will be the official effective date of withdrawal.

An administrative unit may initiate the administrative withdrawal action, but authority to withdraw a student for administrative reasons rests with the dean of the student's college. The student will be informed in writing by the dean of the action to withdraw and the criteria for readmission. The college dean will also notify pertinent University offices.

Admission to an Academic Program after being Dropped from a Program

There is no guarantee of admission to a particular program after a student has been dropped from his/her academic program(s) based on college or program academic standards. The faculty reserves the right to readmit a student to his/her previous program or to admit a student to a different program based on individual college and program policies, and in this matter the faculty shall be the sole judge. Students should review the academic standards of specific programs and any program-specific application deadlines found in the University Catalog.

A student who has been dropped from his/her program should follow the procedures for Changing Majors as outlined in the *Student Handbook* and *University Catalog*. Such students who do not change their major will be administratively placed in the Undeclared Transitional program. A student who has been dropped from his/her academic program(s) and who has earned a bachelor's degree will be dropped from the rolls, unless the student is accepted into another degree-granting program.

Those students who wish to remain enrolled in the University, but are unsure of which specific major they wish to enter, should refer to the section of the *Student Handbook* or *University Catalog* that discusses Declaring a Major and the Undeclared Programs.

Implementation: fall 2012

Readmission to the University

There is no guarantee of readmission following a separation from the University. The faculty reserves the right to readmit a student, and in this matter the faculty shall be the sole judge.

Students who voluntarily withdrew from the University or were dropped from the rolls of the University may file an application for consideration of readmission with the dean of the college in which they seek to re-enroll. To be considered for readmission, applications must be submitted by the following dates: no later than April 15 for the fall semester, no later than October 15 for the spring semester, and no later than February 15 for the summer session for those programs that accept summer admission. Application for readmission to the doctor of pharmacy program and the Philadelphia College of Pharmacy baccalaureate degree programs must be received by April 1 (all programs) for the fall semester and October 15 (all programs except pharmacy) for the spring semester.

Students who were dropped from the rolls of the University for either three semesters with an academic record resulting in academic probation or conduct expulsion will not be granted readmission for at least one calendar year from the date of separation from the University. Students who were dropped from the rolls of the University for failing the same course twice may immediately apply for readmission to a program in the University.

The application for readmission must provide evidence of the student's ability to complete his/her degree program. The application must be accompanied by any official transcripts of all course(s) taken at other accredited colleges or universities during the period of separation from University of the Sciences.

Readmission of Military Service Members

In accordance with the federal Higher Education Opportunity Act, students who leave the University to perform military service will be readmitted with their previous academic status intact, for an absence of up to five years in length. Students must provide advance notice of their intent to perform military service and must also provide notification of intent to re-enroll. This readmission policy, as well as the requirements for advance notice and notification to re-enroll, is subject to exceptions as noted in the law.

Fresh Start Readmission

A student may apply for readmission under the Fresh Start policy under the following circumstances: 1) the student has left the University after failing to achieve good academic standing, and 2) the student will have been absent from the University for at least one year between the date of withdrawal and the start date of the semester for which readmission is sought.

If a student is readmitted under the Fresh Start policy, his/her transcript will note all credits attempted and grades earned at University of the Sciences prior to readmission. However, grades previously earned will not contribute to the current grade point average calculations, and courses previously attempted will not be accepted toward fulfillment of the student's current degree requirements.

Acceptance of transfer credits from other institutions will be granted in accordance with current University policy.

After Fresh Start readmission, the student must comply with all current academic regulations required by the University and his/her degree program. No student will be readmitted under this policy more than one time. Once a student is re-enrolled under the Fresh Start policy, the decision to treat the academic record as described above is irrevocable.

Students will be informed of the Fresh Start policy upon exiting the University and upon application for readmission in accordance with current University policy.

The final decision regarding readmission, including readmission under this Fresh Start policy, rests with the University's faculty. The possible effect of the Fresh Start policy will be only one of the factors used in considering application for readmission.

Office of the Provost

The following institutional initiatives are associated with the Office of the Provost.

Honors Program

The Honors Program at University of the Sciences offers exceptional students the opportunity for specialized, intensive learning experiences both inside and outside the classroom. The program is open to students in all majors, though not everyone can be accepted into this small, highly motivated group of students. Highly qualified incoming new students are nominated by our University's admissions counselors and selected by the Honors Program Committee based on high school academic records, service, and activities. Depending on Honors Program enrollment, matriculated students may have the opportunity to apply to the program.

The curriculum of the Honors Program consists of at least 20 honors credits plus a research project, roughly 20% of a typical USciences undergraduate degree program. Approximately 60-75% of the 20 honors credits are taken as part of the University's General Education program. In addition to these requirements, the Honors Program emphasizes global learning, civic engagement, and leadership.

For more information contact:

Dr. Stephen T. Moelter

Director, Honors Program
E-mail: honors@uscience.edu

Study Abroad

USciences provides its undergraduates with the opportunity to participate in a study abroad program through an affiliation agreement with Rosemont College. The affiliated program was selected based on credentials, commitment to academic quality, health and safety practices, and reputation in the international education field.

Rosemont College's Annual Global Seminar is a short-term, summer, study abroad opportunity that allows students to earn University credits in an accelerated format. These seminars are designed to provide students with first-hand experience of the subject they are studying. Although the destinations change each year, in recent years' students have traveled to: England, Ireland, Italy, and Scotland.

A summer or short-term study abroad experience is a great alternative to semester programs – with just as many options. These programs are typically more affordable and flexible with durations ranging from two to six weeks.

We understand that student needs and interests change year by year. Students are encouraged to research other summer program offerings and petition for their approval. Once a student has identified a few programs of interest they should contact their academic advisor to discuss the petition process.

Students who are interested in studying abroad are encouraged to schedule an appointment with their academic advisor early in their academic career at the University.

Exchange Program with University of the Arts

USciences and University of the Arts (UArts) have an exchange agreement that allows USciences students to take a variety of courses at UArts. The list of available courses changes each semester. Courses are treated as USciences courses, and both credits and grades appear on the student's USciences transcript. Students do not pay additional tuition unless they take private lessons.

For more information, contact:
Dr. Kevin Murphy
Chair, Department of Humanities
E-mail: k.murphy@uscience.edu

Substance Use Disorders Institute (SUDI)

The Substance Use Disorders Institute (SUDI) at USciences translates science into policy and practice and improves substance use disorders care, and promotes effective long-term recovery strategies. We accomplish our mission through education, advocacy and research.

Educating healthcare professionals is central to SUDI's mission to improve care for patients and populations. We provide continuing education programs for healthcare professionals, hospital systems, medical and professional associations, and businesses to fill the gap in health education on substance use disorders throughout the field. SUDI offers educational resources to prepare pharmacists, physicians, physician assistants, occupational therapists, nurses/nurse practitioners, social workers, allied health professionals and others. Topics include:

- Screening, Brief Interventions, and Referral to Treatment (SBIRT)
- Naloxone for overdose prevention
- Medication treatment for opioid use disorders: buprenorphine, methadone, naltrexone
- Pain management and addiction
- Medical cannabis—education including PA DOH-approved certification courses for medical professionals, and training resources
- What is harm reduction education

The SUDI works on the frontlines to enact policy on the local, state, and national levels. Our faculty and staff:

- Serve on task forces and policy committees throughout the region
- Meet with policymakers, payers, and health system representative

- Support evidence-based decision-making with policy briefs
- Provide expert comments at legislative hearings
- Craft influential editorials
- Publish commentary and guidances

Lastly, for too long, substance use policy and treatment have been based on ineffective ideology and opinion ungrounded in data. SUDI's integrated faculty and staff address gaps in evidence by conducting and publishing preclinical, clinical, health policy, and public health research.

For more information, contact:

Dr. Andrew Peterson
Executive Director, Substance Use Disorders Institute
 E-mail: a.peterson@uscience.edu

ROTC Programs

Reserve Officer Training Corps (ROTC) programs are available to USciences students through cooperative arrangements with Saint Joseph's University for Air Force ROTC and with Drexel University for Army ROTC. Each of these universities offer military studies, leadership, and training courses. Courses are treated as USciences courses and both credits and grades appear on students' transcripts. Participating students may be exempted from the undergraduate physical education requirement. Students who are not recipients of ROTC scholarships may enroll in the first- and second-year ROTC courses without incurring any military obligation. University students enrolling in ROTC programs are eligible to compete for ROTC scholarships awarded by the Air Force or the Army.

For more information, contact:

Tricia Purcell
Director, Student Activities and Campus Recreation
 E-mail: t.purcell@uscience.edu

- **ARMY ROTC**

Students at USciences can participate in Army Reserve Officers' Training Corps (ROTC) through a partnership agreement with Drexel University. USciences' students who desire to participate in the Army ROTC program will complete all associated coursework and physical training on Drexel University's campus.

The Army ROTC program is designed to be completed in four years (eight semesters), taking one military science class and lab per semester, with a few exceptions. Students may complete all requirements within a two-year period through participation in a summer training session called the Cadet Initial Entry Training (CIET) or if he or she attend basic training and advanced individual training.

The ROTC program consists of two parts, the Basic and Advanced Courses. The first two-year portion of the program is the Basic Course, normally for freshmen and sophomores. Any student may take Basic Course classes without obligation of military service. The second two-year portion, normally for undergraduate juniors and seniors, is the Advanced Course, and it is designed to prepare students for commissioned service. The military science classes are elective courses that use a combination of academics and hands-on training to teach students leadership, responsibility, and teamwork. These classes add leadership training, practical experience, and personal growth opportunities to a student's university education.

In addition to the academic portion of the curricula, each cadet participates in a two-hour Leadership Laboratory (LLAB) and two hours of Physical Training (PT) each week. Program acceptance and ROTC scholarship eligibility may vary, depending on a student's academic performance, degree choice, and the personnel needs of the military branch.

Further information on the Army ROTC program at Drexel University can be found at <http://www.goarmy.com/rotc/schools/drexel-university/about.html>

- **AIR FORCE RESERVE OFFICER TRAINING CORPS (AFROTC)**

The AFROTC program offered through Detachment 750 at Saint Joseph's University offers college students a three- or four-year curriculum leading to a commission as a Second Lieutenant in the United States Air Force (USAF). USciences students participating in the AFROTC program complete all associated coursework and physical trainings on Saint Joseph's University's campus.

In the four-year option, a student (cadet) takes General Military Course (GMC) classes during their freshmen and sophomore years, attends a 4-week summer Field Training between their sophomore and junior years, and then takes Professional Officer Course (POC) classes during their junior and senior years. A cadet is under no contractual obligation with the USAF until entering the POC or accepting an AFROTC scholarship. The GMC curriculum focuses on the scope, structure, organization, and history of the USAF with an emphasis on the development of airpower and its relationship to current events. The POC curriculum concentrates on the concepts and practices of leadership and management, and the role of national security forces in American society.

In addition to the academic portion of the curricula, each cadet participates in a two-hour Leadership Laboratory (LLAB) and two hours of Physical Training (PT) each week. Both LLAB and PT utilize the cadet organization designed for the practice of leadership and management techniques.

Further information on the AFROTC program at Saint Joseph's University can be found at <https://sites.sju.edu/afrotc/>

Misher College of Arts and Sciences

Misher College of Arts and Sciences offers programs of study in the natural sciences, social sciences, and liberal arts, where students may explore the leading edges of evolving disciplines. Undergraduate and graduate programs in the college prepare students to contribute to the advancement of the sciences and arts by applying their knowledge and skills to problems confronting the world. Cross-disciplinary studies allow students to comprehend the interplay of the chemical, biological, and social sciences with the arts and humanities while appreciating the importance of all to the health sciences.

Undergraduate Programs

Misher College offers a rigorous curriculum of instruction to its students through close interactions between faculty and students. The college provides support and opportunities to its students through:

- Extensive advising
- Flexible curricula
- Articulation agreements with both internal and external professional schools
- Internships and other experiential learning opportunities

Misher College offers undergraduate majors in **biochemistry, biology, biomedical sciences, chemistry, data science, environmental science, medical humanities, medical laboratory science, microbiology, neuroscience, pharmaceutical chemistry, physics, and psychology**. These undergraduate programs prepare students for careers, for graduate programs, and for professional schools (e.g., medical, dental, veterinary, law). Opportunities for research foster close collaborations between undergraduates and faculty leading to the development of practical skills. Minor programs for undergraduates are offered by the departments of **behavioral and social sciences; biological sciences; chemistry and biochemistry; humanities; and mathematics, physics and statistics**.

Pre-med students may elect to major in **any** of the Misher undergraduate programs.

In addition, Misher College offers the **Misher Pre-Professional Studies** program to students in their first two years of college. This program helps students prepare to move to degree-granting programs in the sciences or health professions.

The college serves all the University's undergraduates by providing a broad general education in the sciences and arts, as well as by teaching the problem solving, communication and critical thinking skills necessary to function as educated members of society.

Graduate Programs

Misher College offers masters programs in **biochemistry, bioinformatics, cell biology and biotechnology, chemistry, health psychology, pharmacognosy, and physics**, and PhD programs in **biochemistry, cancer biology, cell and molecular biology, chemistry and pharmacognosy**. Certificates in **biomedical writing, biotechnology, brewing science, health education and communication, and biostatistical methods** are also offered. The faculty engages in research and scholarship at the forefront of their disciplines. Working closely with faculty in these research endeavors, graduate students produce a wide range of work to benefit society.

Undergraduate Residency Policy

In order to earn a degree from Misher College of Arts and Sciences, an undergraduate student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Biomedical Writing – Graduate Certificates

USciences offers 2 biomedical writing certificate programs. The certificate program in marketing writing focuses on publications; the certificate program in regulatory writing focuses on preparing documents for submission to regulatory authorities for initial and continuing approval of therapies.

These certificates are intended for people with graduate degrees who are either seeking senior career positions or further training and credentialing in the medical writing field. Each certificate program can be completed part-time in 8 months and requires a grade of B- or higher in courses totaling 12 credit hours. Most courses available are 3 credit hours; some are 1 or 2 credit hours. Certificate courses up to 12 credit hours may be applied toward the master of science degree.

Certificate in Medical Marketing Writing (12 credits)

Required Course

- BW 701 - Professional Writing in Science Credits: 3

Electives (Choose 3)

- Other electives by permission of program director
- BW 703 - Information Strategies for Biomedical Writers Credits: 3
- BW 709 - Promotion of Biomedical Products: Regulatory Considerations Credits: 3
- BW 733 - Health Journalism Documentation Credits: 3
- BW 750 - Continuing Medical Education Credits: 3
- BW 760 - Entrepreneurship in Biomedical Communication Credits: 3

Certificate in Regulatory Writing (12 credits)

Required Courses

- BW 704 - Regulatory Document Processes Credits: 3
- BW 705 - Biostatistics for Biomedical Writers Credits: 3
- BW 708 - Regulatory Writing: New Drug Applications Credits: 3

Elective Courses (Choose 1)

- Other electives by permission of program director
- BW 701 - Professional Writing in Science Credits: 3
- BW 703 - Information Strategies for Biomedical Writers Credits: 3
- BW 709 - Promotion of Biomedical Products: Regulatory Considerations Credits: 3
- BW 724 - Chemistry Manufacturing and Controls: Analytical and Manufacturing Processes in

Data Science - Major

Human activity is already generating petabytes of data each day and data are projected by some experts to increase by 2,000 percent by 2020. Society undeniably needs more professionals and researchers who are capable of managing and analyzing the influx of data that will be accumulated in the next decade and who are adept at communicating meaningful knowledge derived from the data to a wide spectrum of audiences.

The Bachelor of Science in Data Science is an interdisciplinary program that provides students with the knowledge, skills and technical foundations required to unlock the value of data and tackle complex multidisciplinary problems. The program is designed to provide students with the necessary breadth of knowledge in statistical, computational and mathematical thinking, as well as in-depth knowledge in a particular application domain chosen by the student. Students who graduate from this program will be well prepared to enter a career immediately if they choose or continue on to graduate degrees.

Students in this program complete a set of foundational and core courses in statistics, mathematics, computer science and data science, assuring a well-rounded exposure to the interdisciplinary nature of the field. Students then add breadth to their major and individually tailor their degree by taking elective courses from a multitude of disciplines and choosing an application domain of their interest. The student learning experience in the program culminates with either a two-semester capstone course or a one-semester internship plus a one-semester capstone.

General Education and Program Required Courses (53 Credits)

- General Education Humanities Requirement Credits: 3
- General Education Social Sciences Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- BS 109 - General Biology I Credits: 3 (a)
- BS 110 - General Biology I Lab Credits: 1 (a)
- BS 119 - General Biology II Credits: 3 (a)
- BS 120 - General Biology II Lab Credits: 1 (a)
- or
- CH 101 - General Chemistry I Credits: 3 (b)
- CH 103 - General Chemistry Lab I Credits: 1 (b)
- CH 102 - General Chemistry II Credits: 3 (b)
- CH 104 - General Chemistry Lab II Credits: 1 (b)
- or
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
- or
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- MA 107 - Precalculus Credits: 3 (or above)
- ST 310 - Biostatistics I Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3
- WR 302 - Scientific Writing Credits: 3
- or
- WR 303 - Professional Writing Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- or
- CO 204 - Public Speaking Credits: 3
- ET 303 - Ethics & Critical Thought Credits: 3

- PS 101 - Introduction to Psychology Credits: 3
or
- SO 101 - Introduction to Sociology Credits: 3
or
- SO 111 - Principles of Sociology Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1

Data Science Foundational Program Required Courses (32 credits)

- CS 201 - Computer Programming I Credits: 3
- CS 320 - Data Structures Credits: 3
- CS 324 - Database Design Credits: 3
- DS 301 - Data Science and Analytics Introduction I Credits: 3
- DS 401 - Introduction to Data Structure/Algorithms Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 316 - Linear Algebra Credits: 3
- ST 320 - Introduction to Probability Credits: 3
- ST 331 - Regression Analysis Credits: 3

Data Science Required Core Courses (9 credits)

- DS 101 - Data Science Orientation Credits: 1
- DS 201 - Introduction to Data Science I Credits: 3
- DS 202 - Introduction to Data Science II Credits: 3
- DS 496 - Data Science Capstone Credits: 1-2
or
- DS 400 - Data Science Internship Credits: 1-3 and
DS 496 - Data Science Capstone Credits: 1-2

Program Electives (12 credits)

- MA 4xx – Optimization Methods Credits: 3
- MA 4xx - Stochastic Methods (cross-listed as ST 4xx) Credits: 3
- BI 465 - Microarray Technology Credits: 3
- BI 475 - Proteomics Credits: 3
- CH 420 - Applications of Computational Chemistry Credits: 2
- CH 448 - Computer-Aided Drug Design Credits: 3
- CS 202 - Computer Programming II Credits: 3
- CS 385 - Web-Based Computing Credits: 3
- CS 410 - Network Computing Credits: 3
- DS 403 - Applied Machine Learning Credits: 3
- MA 222 - Calculus III Credits: 4
- MA 310 - Mathematical Foundations of Neuroscience Credits: 3
- MA 314 - Discrete Mathematics Credits: 3
- MA 340 - Introduction to Graph Theory Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- MA 422 - Mathematical Modeling Credits: 3
- ST 332 - Design and Analysis of Experiments Credits: 3
- ST 333 - Categorical Data Analysis Credits: 3
- ST 334 - Applied Multivariate Analysis Credits: 3

- ST 335 - Statistics for Clinical Trials Credits: 3
- ST 336 - Survival Analysis Credits: 3
- ST 340 - SAS Programming and Data Analysis Credits: 3
- ST 345 - Advanced SAS Programming Credits: 3

Application Domain (15 credits)

Analytics & SAS Programming Application Domain

- DS 403 - Applied Machine Learning Credits: 3
- ST 332 - Design and Analysis of Experiments Credits: 3
- ST 335 - Statistics for Clinical Trials Credits: 3
- ST 340 - SAS Programming and Data Analysis Credits: 3
- ST 345 - Advanced SAS Programming Credits: 3

Bioinformatics/Genomics Application Domain

- BI 291 - Primer for Computational Biology I Credits: 3
- BI 292 - Primer for Computational Biology II Credits: 3
- BI 425 - Bioinformatic Computing Credits: 3
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 451 - Bioinformatics II Credits: 3

Individualized Application Domain

- Students must complete a minimum of 15 credits in a specific Application Domain (courses need to be 2XX level or above) approved by the academic advisor.

Free Elective (3 credits)

Sample Data Science Curriculum (Analytics & SAS Programming Application Domain)

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3 (a)
- BS 110 - General Biology I Lab Credits: 1 (a)
- CH 101 - General Chemistry I Credits: 3 (b)
- CH 103 - General Chemistry Lab I Credits: 1 (b)
- DS 101 - Data Science Orientation Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 119 - General Biology II Credits: 3
(a)
- BS 120 - General Biology II Lab Credits: 1 (a)
- CH 102 - General Chemistry II Credits: 3 (b)
- CH 104 - General Chemistry Lab II Credits: 1 (b)
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- CO 101 - Introduction to Communication Credits: 3
or
- CO 204 - Public Speaking Credits: 3
- CS 201 - Computer Programming I Credits: 3
- DS 201 - Introduction to Data Science I Credits: 3
- MA 221 - Calculus II Credits: 4
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Spring Semester

- DS 202 - Introduction to Data Science II Credits: 3
- MA 316 - Linear Algebra Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
or
- SO 111 - Principles of Sociology Credits: 3
or
- PS 101 - Introduction to Psychology Credits: 3
- ST 320 - Introduction to Probability Credits: 3
- ST 340 - SAS Programming and Data Analysis Credits: 3

Credits/Semester: 15

Third Year

Fall Semester

- Multidisciplinary Inquiry Requirement: 3 Credits
- DS 301 - Data Science and Analytics Introduction I Credits: 3
- ET 303 - Ethics & Critical Thought Credits: 3
- ST 332 - Design and Analysis of Experiments Credits: 3
- ST 335 - Statistics for Clinical Trials Credits: 3
- ST 345 - Advanced SAS Programming Credits: 3

Credits/Semester: 18

Spring Semester

- Program Elective Credits: 3
- General Education Humanities or Social Sciences Discipline Requirement Credits: 3
- CS 324 - Database Design Credits: 3
- ST 331 - Regression Analysis Credits: 3
- WR 302 - Scientific Writing Credits: 3
- or
- WR 303 - Professional Writing Credits: 1

Credits/Semester: 15

Fourth Year

Fall Semester

- Program Elective Credits: 6
- General Education Humanities or Social Sciences Discipline Requirement Credits: 3
- CS 320 - Data Structures Credits: 3
- DS 401 - Introduction to Data Structure/Algorithms Credits: 3
- DS 400 - Data Science Internship Credits: 1-3
- or
- DS 496 - Data Science Capstone Credits: 1-2

Credits/Semester: 16

Spring Semester

- Program Elective Credits: 3
- Free Elective Credits: 3
- Multidisciplinary Inquiry Credits: 3
- DS 403 - Applied Machine Learning Credits: 3
- DS 496 - Data Science Capstone Credits: 1-2

Credits/Semester: 13

Total Minimum Credits: 124

Sample Data Science Curriculum (Bioinformatics/Genomics Application Domain)

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3 (a)

- BS 110 - General Biology I Lab Credits: 1 (a)
- CH 101 - General Chemistry I Credits: 3 (b)
- CH 103 - General Chemistry Lab I Credits: 1 (b)
- DS 101 - Data Science Orientation Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 119 - General Biology II Credits: 3 (a)
- BS 120 - General Biology II Lab Credits: 1 (a)
- CH 102 - General Chemistry II Credits: 3 (b)
- CH 104 - General Chemistry Lab II Credits: 1 (b)
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- BI 291 - Primer for Computational Biology I Credits: 3
- DS 201 - Introduction to Data Science I Credits: 3
- CS 201 - Computer Programming I Credits: 3
- MA 221 - Calculus II Credits: 4
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BI 292 - Primer for Computational Biology II Credits: 3
- DS 202 - Introduction to Data Science II Credits: 3
- MA 316 - Linear Algebra Credits: 3
- ST 320 - Introduction to Probability Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
- or
- SO 111 - Principles of Sociology Credits: 3
- or
- PS 101 - Introduction to Psychology Credits: 3

Credits/Semester: 18

Third Year

Fall Semester

- BI 450 - Bioinformatics I: Genomics Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- or
- CO 204 - Public Speaking Credits: 3
- CS 320 - Data Structures Credits: 3
- DS 301 - Data Science and Analytics Introduction I Credits: 3
- ET 303 - Ethics & Critical Thought Credits: 3

Credits/Semester: 15

Spring Semester

- Program Elective Credits: 3
- General Education Humanities or Social Sciences Discipline Requirement Credits: 3
- CS 324 - Database Design Credits: 3
- ST 331 - Regression Analysis Credits: 3
- WR 302 - Scientific Writing Credits: 3
- or
- WR 303 - Professional Writing Credits: 1

Credits/Semester: 15

Fourth Year

Fall Semester

- Program Elective Credits: 6
- General Education Humanities or Social Sciences Discipline Requirement Credits: 3
- BI 425 - Bioinformatic Computing Credits: 3
- DS 401 - Introduction to Data Structure/Algorithms Credits: 3
- DS 400 - Data Science Internship Credits: 1-3
- or
- DS 496 - Data Science Capstone Credits: 1-2

Credits/Semester: 16

Spring Semester

- Program Elective Credits: 3
- Free Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- DS 496 - Data Science Capstone Credits: 1-2

Credits/Semester: 13

Total Minimum Credits: 124

Sample Data Science Curriculum (Individualized Application Domain)

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3 (a)
- BS 110 - General Biology I Lab Credits: 1 (a)
- CH 101 - General Chemistry I Credits: 3 (b)
- CH 103 - General Chemistry Lab I Credits: 1 (b)
- DS 101 - Data Science Orientation Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 119 - General Biology II Credits: 3 (a)
- BS 120 - General Biology II Lab Credits: 1 (a)
- CH 102 - General Chemistry II Credits: 3 (b)
- CH 104 - General Chemistry Lab II Credits: 1 (b)
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Program Elective or Required Application Domain Credits: 3-4
- CS 201 - Computer Programming I Credits: 3
- DS 201 - Introduction to Data Science I Credits: 3
- MA 221 - Calculus II Credits: 4
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16-17

Spring Semester

- Program Elective or Required Application Domain Credits: 3-4
- DS 202 - Introduction to Data Science II Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
or
- SO 111 - Principles of Sociology Credits: 3

or

- PS 101 - Introduction to Psychology Credits: 3
- MA 316 - Linear Algebra Credits: 3
- ST 320 - Introduction to Probability Credits: 3

Credits/Semester: 15-16

Third Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
 - Program Elective or Required Application Domain Credits: 3-8
 - CO 101 - Introduction to Communication Credits: 3
- or
- CO 204 - Public Speaking Credits: 3
 - DS 301 - Data Science and Analytics Introduction I Credits: 3
 - ET 303 - Ethics & Critical Thought Credits: 3

Credits/Semester: 15-20

Spring Semester

- Program Elective or Required Application Domain Credits: 3-4
 - General Education Humanities or Social Sciences Requirement Credits: 3
 - ST 331 - Regression Analysis Credits: 3
 - CS 324 - Database Design Credits: 3
 - WR 302 - Scientific Writing Credits: 3
- or
- WR 303 - Professional Writing Credits: 1

Credits/Semester: 15-16

Fourth Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
 - Program Elective or Required Application Domain Credits: 6-8
 - CS 320 - Data Structures Credits: 3
 - DS 401 - Introduction to Data Structure/Algorithms Credits: 3
 - DS 496 - Data Science Capstone Credits: 1-2
- or
- DS 400 - Data Science Internship Credits: 1-3

Credits/Semester: 16-18

Spring Semester

- Program Elective or Required Application Domain Credits: 9-11
- Free Electives Credits: 3

- General Education Humanities or Social Sciences Requirement Credits: 3
- DS 496 - Data Science Capstone Credits: 1-2

Credits/Semester: 13-18

Total Minimum Credits: 124

Notes:

- (a) Qualified students may substitute BS 132/BS 134 and BS 133/BS 135 for BS 109/BS 110 and BS 119/120
- (b) Qualified students may substitute CH 111/CH 113 and CH 112/CH 114 for CH 101/CH 103 and CH 102/CH 104

Data Science - Minor

The ability to extract meaningful information from large volumes of data is becoming an essential skill in every job, every industry, and virtually every decision. The demand is high and the possibilities are endless for professionals who can interpret data to produce new and potentially useful knowledge in their own field of work.

This interdisciplinary minor program will equip students with the statistical, mathematical and computational tools required to sift through terabytes of information to identify new trends, patterns, connections and structures.

Requirements

Students must complete 18 credits for the minor. Of those 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

Interested students should apply to the minor early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

Required Courses (12 credits)

- DS 201 - Introduction to Data Science I Credits: 3
- DS 202 - Introduction to Data Science II Credits: 3
- Any two of the following DS courses (the course not taken may be taken as an elective):
- DS 301 - Data Science and Analytics Introduction I Credits: 3
- DS 401 - Introduction to Data Structure/Algorithms Credits: 3
- DS 403 - Applied Machine Learning Credits: 3

Elective Courses (6 credits)

Note: Other courses may be used to satisfy the elective requirements with approval by the minor program director.

- BI 425 - Bioinformatic Computing Credits: 3
- CH 448 - Computer-Aided Drug Design Credits: 3
- CS 320 - Data Structures Credits: 3
- CS 324 - Database Design Credits: 3
- MA 314 - Discrete Mathematics Credits: 3
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- MA 422 - Mathematical Modeling Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- ST 310 - Biostatistics I Credits: 3

- ST 320 - Introduction to Probability Credits: 3
- ST 331 - Regression Analysis Credits: 3
- ST 340 - SAS Programming and Data Analysis Credits: 3

Information Science

Mission

The Information Science program is committed to:

Education

- Maintaining an active program of instructing students in the access, evaluation, and use of information.
- Providing print, electronic, and audiovisual materials to support the undergraduate and graduate curricula.

Research

- Acquiring materials and information to support faculty research initiatives.
- Advancing knowledge in the application of information science.

Service

- Providing information to alumni and other health professionals.
- Sharing this collection with the libraries of other institutions.

Faculty

Kevin Murphy

BA (Towson University); MA, PhD (University of Maryland)
Associate Professor of Information Science
Program Director, Information Science Program

Mignon S. Adams

BS (Eastern Illinois University); MSLS (University of Illinois)
Professor Emeritus of Information Science

Leslie Ann Bowman

BA (Pomona College); AMLS (University of Michigan)
Associate Professor of Information Science
Coordinator, Instructional Resources

Cheryl S. Collins

BA (Millersville University); MSLS (Clarion University)
Assistant Professor of Information Science
Collection Management and Metadata Librarian

Jennifer Hasse

BA (University of Pittsburgh); MSLS (Drexel University)
Assistant Professor of Information Science
Student Success and Outreach Librarian

Matthew Grey

BA (University of Central Oklahoma); MIS (Rutgers, the State University of New Jersey)
Instructor of Information Science

Misher Pre-Professional/Undeclared Studies

The Misher Pre-Professional/Undeclared Studies program provides students with a strong foundation of science and general education courses in preparation for degrees that lead to a variety of careers in medical, health, and science fields. Students in the Misher Pre-Professional/Undeclared Studies program explore pathways through higher education with the benefit of individual advising, supportive mentors, and unique opportunities.

The Misher Pre-Professional/Undeclared Studies program has two pathways:

- Pre-Professional, for students interested in a health profession program at USciences (medical laboratory science, occupational therapy, pharmacy, physical therapy, physician assistant) or elsewhere (e.g., medicine, veterinary medicine, dentistry, podiatry, optometry).
- Undeclared, for students who love science and/or health and wish to explore their passions and interests before committing to a discipline. In addition to health professions, students can transition into bachelor's degree programs in data science, neuroscience, psychology, biology, biomedical sciences, environmental science, medical laboratory science, microbiology, biochemistry, chemistry, pharmaceutical chemistry, medical humanities, physics, pharmaceutical sciences, pharmacology and toxicology, exercise physiology, and health science.

The Misher Pre-Professional/Undeclared Studies program provides an opportunity for students to learn about the University and its programs but does not offer a degree itself. Acceptance into the Misher Pre-Professional/Undeclared Studies program does not guarantee admittance into one of the University's degree-granting programs. This determination is based primarily upon academic qualifications and space availability in the academic program. In order to be considered for a degree program at University of the Sciences, students must meet the progression or entrance requirements of the desired program. Information on the requirements for each degree program is included in the program description elsewhere in this catalog. The application process usually requires submission of documents and an interview. All students in the program must move to a degree-granting program by the end of their second year at the University.

For more information about Misher Pre-Professional/Undeclared Studies contact:

Jessica Sautter

Program Director, Misher Pre-Professional Studies/Undeclared and Pre-Pharmacy Early Assurance and Interim Associate Dean, Misher College of Arts and Sciences

Associate Professor of Medical Sociology

Phone: 215.895.1155

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Pre-Professional Pathway

Students in the Pre-Professional pathway have a clear health care professions goal. Their first two years focus on pre-requisite coursework, developing application materials, and working to meet milestones required to earn a seat in a professional program. Students can apply to USciences' professional programs in by the end of the second year, enjoying a seamless transition to professional studies. These include accelerated programs in occupational therapy, pharmacy, and physical therapy; 3+1 program in medical laboratory sciences; and the accelerated or traditional undergraduate pre-professional physician assistant program.

A bachelor's degree is usually required for entrance into medical, dental, and other health profession schools and non-accelerated programs. Pre-Professional pathway students may choose to pursue any BS program at the University, as all USciences BS programs provide excellent preparation for health professions training. Through the University's degree programs in data science, neuroscience, psychology, biology, biomedical sciences, environmental science, medical laboratory science, microbiology, biochemistry, chemistry, pharmaceutical chemistry, medical humanities, physics, pharmaceutical sciences, pharmacology and toxicology, exercise physiology, and health science, students can prepare themselves for admission to professional schools, as well as earn a bachelor of science degree. These degree programs have served as a firm foundation for many of our graduates to earn post-baccalaureate degrees in medicine, veterinary medicine, dentistry, podiatry, optometry, and counseling, as well as other professions.

Pre-Professional pathway students take coursework appropriate to enter one of the University's health professions or other degree programs. Students select their courses in consultation with the student's academic advisor. In addition, students are encouraged to consult a pre-health professions advisor to develop plans for becoming strong candidates for their chosen fields. During their first year, students are required to complete the two-semester orientation course sequence (MI 101 and MI 110), which presents

information on health professions, career options, the majors offered by the University, and strategies for succeeding in college.

More information about Pre-Med and Pre-Health Professions at USciences is available in this catalog.

Undeclared Pathway

Students in the Undeclared pathway are open to exploring majors, minors, research opportunities, and future careers. This exploration is structured by their orientation class MI 101. They complete general education coursework and gain exposure to unique research and interdisciplinary learning at USciences. Students can apply to any of our degree-granting programs and graduate on time. Available majors are: data science, neuroscience, psychology, biology, biomedical sciences, environmental science, medical laboratory science, microbiology, biochemistry, chemistry, pharmaceutical chemistry, medical humanities, physics, pharmaceutical sciences, pharmacology and toxicology, exercise physiology, and health science. Students who started in the USciences Undeclared pathway have been successful in obtaining degrees in all degree-granting programs at USciences, afterwards pursuing a wide variety of scientific, clinical, and administrative careers. Many students take advantage of the unique program combinations, certificates, and research opportunities available at USciences due to our small college atmosphere and large university resources.

The Undeclared pathway is designed to prepare students to move to programs that award degrees and does not award a degree itself. No later than the spring of their second year, students choose an educational path to attain their career goals. This path can lead to any of the USciences majors, followed by pursuing employment, graduate, or professional school. Acceptance into a degree program at USciences is contingent upon the availability of space in the program and the student's academic success in the completion of course requirements, communication skills, and knowledge of and motivation for the profession.

Sample Misher Pre-Professional/Undeclared Studies Pre-Health Option Curriculum

A Pre-Professional or Undeclared student's curriculum is designed by the student with the help of advisors. The curriculum is based on individual academic and career goals, so it may differ significantly from this sample curriculum. However, the majority of students at USciences take the following foundational courses in their first year.

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
(See Footnote 1 Below)
- BS 110 - General Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 2 Below)
- MA 107 - Precalculus Credits: 3
- MI 101 - Misher Studies Orientation Credits: 1
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 119 - General Biology II Credits: 3
(See Footnote 1 Below)

- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- MA 110 - General Calculus Credits: 3
- MI 110 - Intro Health/Medical Profs Credits: 1
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Footnotes:

1. Students may elect BS 132/133 and BS 134/135 or BS 136/137.
2. Students may elect CH 111 /113 and CH 112 /114.

Neuroscience - Major

This degree program provides students with interdisciplinary experience in the field of neuroscience and excellent training for those seeking to be a healthcare provider, a research scientist, or a biomedical scientist. Neuroscience is a field that spans several disciplines. Therefore, this major exposes students to the variety within the field while allowing them to tailor their degree towards their specific interests.

Students complete a set of core neuroscience courses that provide a deep understanding of how the components of the nervous system work together to coordinate physiological and cognitive functions and how changes in regulation can impact thought and action. Students add breadth to their major by exploring electives within multiple fields of study that extend beyond disciplinary boundaries and provide opportunities to explore areas of interest. A series of introductory and advanced research colloquia seminars and research experiences "cap" the program, enabling students to demonstrate expertise.

Students individually tailor the degree by choosing 9 credits of neuroscience core electives, which offer an in-depth study of the nervous system from a specific disciplinary approach. Students also choose 18 credits of more broadly applicable elective courses across three Neuroscience-related tracks: Molecular & Medicinal Neuroscience, Clinical Health Neuroscience, and Theoretical Neuroscience. To ensure students receive a well-rounded exposure to the interdisciplinary nature of the field, students must take at least one course in each elective track.

General Education and Required Science Courses (69-72 credits)

- General Education Humanities Requirement Credits: 6
- General Education Social Science Requirement Courses: 3 [not NS 260 or NS 261]
- Multidisciplinary Inquiry Requirement Credits: 6
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1

- CH 201 - Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- CH 340 - Survey of Biochemistry Credits: 3
- or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- or
- CH 346 - Biochemistry Credits: 4
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Required Core Program Courses (12 Credits)

- Directed Research or Independent Study Credits (approved by the program director): 2
- NS 101 - Neuroscience Orientation Credits: 1
- NS 260 - Intro to Neuroscience Credits: 1
- NS 261 - Intro to Neuroscience II Credits: 1
- NS 263 - Neuroscience Colloquium Credits: 1
- NS 495 - Seminar in Neuroscience Credits: 1
- NS 496 - Neuroscience Capstone Credits: 1

Program Elective Courses (9 Credits)

- BS 430 - Molecular Basis of Neurological Disorders Credits: 3
- NS 415 - Biophysics of the Brain Credits: 1
- NS 422 - Neurodevelopmental Disorders Credits: 1
- or
- NS 424 - Developmental Cognitive Neuroscience Credits: 1
- NS 428 - Neuropsychology Credits: 1
- NS 460 - Neurobiology Credits: 1
- PC 340 - Introduction to Neuropsychopharmacology Credits: 3

Program Track Electives (18 Credits)

The list of track electives is not exhaustive. New courses may be added as they become available. Deviations require advisor and program director approval.

Molecular and Medicinal Track (choose at least one)

- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 318 - The Biology of Aging Credits: 3
- BS 412 - Human Physiology Credits: 4 or BS 310 Anatomy & Physiology I or BS 205 Human Structure and

Function I

- BS 461 - Cell Biology Credits: 4
- BS 430 - Molecular Basis of Neurological Disorders Credits: 3
- PC 822 - Drug Discovery for Neurodegenerative Disorders Credits: 3
- PS 498 - Directed Research in Psychology Credits: 3

Clinical Health Track (choose at least one)

- PS 305 - Learning & Behavior Credits: 3
- PS 309 - Personality Theory Credits: 3
- PS 318 - Health Psychology Credits: 3
- PS 327 - Behavior Modification Credits: 3
- PS 329 - Cognitive Psychology Credits: 3
- BS 425 - Neuroscience Credits: 3
- PS 498 - Directed Research in Psychology Credits: 3

Theoretical Track (choose at least one)

- PY 340 - Biophysics I Credits: 3
- PY 380 - Electronics Credits: 3
- CS 201 - Computer Programming I Credits: 3
- MA 310 - Mathematical Foundations of Neuroscience Credits: 3
- PS 498 - Directed Research in Psychology Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1

Free Elective Courses (17-18 Credits)

Suggested electives include:

- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 466 - Genetics Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 320 - Differential Equations Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- ST 310 - Biostatistics I Credits: 3

Sample Neuroscience Curriculum Plan

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- or
- BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1

- MA 107 - Precalculus Credits: 3
- NS 101 - Neuroscience Orientation Credits: 1
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- or
- BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18-19

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- NS 260 - Intro to Neuroscience Credits: 1
- PY 201 - Introductory Physics I Credits: 4

Credits/Semester: 17

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1
- NS 261 - Intro to Neuroscience II Credits: 1
- NS 263 - Neuroscience Colloquium Credits: 1
- PY 202 - Introductory Physics II Credits: 4

Credits/Semester: 15

Third Year

Fall Semester

- General Education Humanities or Social Science Discipline Requirement Credits: 3
- Neuroscience Core Course Credits: 3
- Neuroscience Track Elective Credits: 6-8
- CH 340 - Survey of Biochemistry Credits: 3
- or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- or
- CH 346 - Biochemistry Credits: 4

Credits/Semester: 15-18

Spring Semester

- Directed Research or Independent Study Credits: 2
- General Education Humanities Elective Credits: 3
- Neuroscience Core Course Credits: 3
- Neuroscience Track Elective Credits: 6-8

Credits/Semester: 14-16

Fourth Year

Fall Semester

- Free Elective Credits: 6-8
- Neuroscience Core Course Credits: 3
- Neuroscience Track Elective Credits: 3-4
- NS 495 - Seminar in Neuroscience Credits: 1

Credits/Semester: 13-16

Spring Semester

- Free Elective Credits: 6-8
- General Education Humanities or Social Science Discipline Requirement Credits: 3
- Neuroscience Elective Credits: 3-4
- NS 496 - Neuroscience Capstone Credits: 1

Credits/Semester: 13-16

Total Minimum Credits: 125

Pre-Med and Pre-Health Professions

Pre-med and pre-health professions education at the University is based on the belief that a sound preparation in science and mathematics, supported by liberal arts courses in the humanities and social sciences, is the best foundation for success in medical and other health professions schools.

Through the University's degree programs in **biochemistry, biology, biomedical sciences, chemistry, environmental science, medical humanities, microbiology, pharmaceutical chemistry, pharmaceutical sciences, pharmacology and toxicology,** and

psychology, students can prepare themselves for admission to medical and other health professions schools while earning a bachelor of science degree. These degree programs have served as a firm foundation for many of our graduates to earn post-baccalaureate degrees in medicine, dentistry, veterinary medicine, podiatry, and optometry.

A program of individualized counseling helps students prepare for admission to medical and other health professions schools. The pre-health professions advisors counsel students so that courses required for admission are taken; assist students in the selection of courses to meet their personal interests, abilities, and career objectives; and help with the various application procedures of medical and health professions schools.

The basic requirements/recommended courses for admission to medical and most other health professions schools include:

- General biology – 2 semesters with laboratory
- General chemistry – 2 semesters with laboratory
- Organic chemistry – 2 semesters with laboratory
- Biochemistry – 1 semester
- General physics – 2 semesters with laboratory
- Mathematics – 2 semesters
- Behavioral and social sciences – 2 semesters
- Writing/English – 2 semesters
- Statistics – 1 semester

These courses generally are taken within the first three years of study. Students then have the flexibility to select additional coursework meeting their individual goals.

Our exceptional academic reputation enables us to offer a number of dual degree programs guaranteeing interviews for USciences students who meet certain academic criteria. Students in our dual degree programs complete a BS degree from USciences as well as the desired medical or health professional degree.

To see application timelines and requirements for our Partner Programs, click here: <https://www.usciences.edu/misher-college-of-arts-and-sciences/pre-med-program/partnerships.html>. Additional information regarding the pre-health professions programs is available by contacting:

Grace Farber, PhD
Interim Associate Dean, Misher College of Arts and Sciences
Director, Pre-Health Professions Programs
Phone: 267.295.3157
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Judy Chun, MEd
Coordinator, Pre-Health Advising
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Pre-Pharmacy Early Assurance

The Pre-Pharmacy Early Assurance program provides reserved seats in the PharmD program at USciences, provided students meet all of the progression criteria. Students in this program will be able to earn both the Bachelor of Science (BS) and Doctor of Pharmacy (PharmD) degrees in as little as six years after graduation from high school. Eligible U1 students will spend their first two to four years in Misher College of Arts and Sciences (MCAS) and then transfer to Philadelphia College of Pharmacy (PCP) for the four professional years of the PharmD program. Pre-Pharmacy Early Assurance program students who do not move to the PharmD program after two years must move to a degree-granting program in MCAS or PCP before the start of their third year.

These students may apply to the PharmD program during their U3 and U4 years. Upon successful completion of all requirements of the PharmD or other degree-granting program, students will receive their degree.

For more information about Pre-Pharmacy Early Assurance, contact:

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Associate Professor of Medical Sociology

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Sample Pre-Pharmacy Early Assurance Curriculum

First Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- MI 190 - Pre-Pharmacy Orientation Credits: 1
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 18

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- or
- CO 204 - Public Speaking Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- EC 201 - Introduction to Microeconomics Credits: 3

Credits/Semester: 18

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1
- PY 201 - Introductory Physics I Credits: 4
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 18

Notes:

1. Students may elect BS 132 /133 and BS 134 /135.
2. Students may elect CH 111 /113 and CH 112 /114 and CH 211 /212 and CH 213 /214.
3. Students may elect MA 122.

Writing Programs

Writing Programs consist of the first-year writing program, courses in professional and scientific writing, and the Writing Center. Writing programs also support an extensive writing assessment and academic assistance system, which includes directed self-placement, integrated in-course assessment, and portfolio assessment.

First-year writing includes an organized group of interdisciplinary, expository writing courses beginning with WR 101 – Writing and Rhetoric I and WR 102 – Writing and Rhetoric II . WR 101 focuses on critical reading and rhetorical analysis. In WR 102 students learn research methods and how to write research reports and arguments. In these courses, first-year students focus on developing audience-aware, purposeful writing for a variety of academic and professional situations that students will encounter both in school and the world at large. More advanced courses focus on extending the source-based writing tasks undertaken in the first year and more specifically address the types of writing associated with upper-division and professional expectations. Writing Programs support multilingual learners by offering English as Second Language (ESL) courses in reading, writing, and speaking.

When students are admitted to the University, they are invited to participate in directed self-placement, which guides the students through the process of selecting the appropriate first-semester course for their ability levels. Students are assessed regularly throughout their first-year writing experience, and those in need of additional assistance are referred to group study conducted by the Writing Center. Students may be required to participate in Writing Center groups at the discretion of their instructor.

The Writing Center

The Writing Center, located in Alumni Hall – Room 108, provides free one-on-one writing assistance, group tutoring sessions, and online tutoring. The Writing Center serves students of all abilities and in all disciplines and assists with any writing needs. Peer tutors and faculty members are available to work with students at any stage of a writing project—including brainstorming, researching, drafting, and polishing. Tutors can assist students with writing for any course or discipline, including essays for the first-year writing sequence (WR 100, WR 101, and WR 102), lab reports, business/scientific writing, research papers and graduate school applications. For more information or to schedule an appointment, visit www.usciences.edu/writing/.

Faculty

Justin Everett

BA (Oklahoma State University); MA, PhD (University of Oklahoma)
Associate Professor of Rhetoric and Composition
Director, Writing Programs

Patricia Egbert

BA (Rutgers University); MS (Texas A&M University); EdD (Rowan University)
Assistant Professor of Rhetoric and Composition
Coordinator, Writing Center

Cristina Hanganu-Bresch

BS, MA (University of Bucharest, Romania); MA (James Madison University); PhD (University of Minnesota)
Associate Professor of Rhetoric and Composition
Assistant Director, Writing Programs

Behavioral and Social Sciences

Mission

The mission of the Department of Behavioral and Social Sciences is to provide our students with perspectives and tools to understand themselves and the society in which they live.

Education

Our goals in education are these:

- To provide the best possible training for our psychology majors and graduate students.
- To offer minor concentrations in communication, economics, medical anthropology, psychology, sociology, and social science for students pursuing majors from other departments.
- To teach fundamental and interdisciplinary courses in anthropology, communication, economics, psychology, and sociology, as well as social science methods, perspectives, and global issues for all undergraduates.

Our students are taught to understand qualitative and quantitative research design, data collection techniques, and the means to analyze, evaluate, and interpret cognitive, behavioral, cultural, and social data. We also emphasize the concepts and skills required to communicate effectively in professional healthcare, community, and multicultural settings.

Faculty

Elizabeth Amy Janke

BA (Villanova University); MSEd (University of Pennsylvania); PhD (Ohio University)
Associate Professor of Psychology
Interim Chair, Department of Behavioral and Social Sciences and Director, Health Psychology Graduate Program

Ashley Brooke de Marchena

BA (Tufts University); MA, PhD (University of Connecticut)
Assistant Professor of Psychology and Neuroscience

Rebecca Costantini

BA, MA (William Paterson University of New Jersey); PhD (Texas A&M University)
Assistant Professor of Psychology and Neuroscience

Kenneth Leibowitz

BA (Rutgers University); MA (West Virginia University)
Assistant Professor of Communication

Alysson E. Light

BA (Sarah Lawrence College); MA, PhD (University of Chicago)
Associate Professor of Psychology

Stephen T. Moelter

BS (Pennsylvania State University); MS, PhD (Drexel University)
Associate Professor of Psychology
Director, Undergraduate Program in Psychology and Director, Honors Program

Cathleen T. Moore

BA (Rutgers University); MEd, EdD (Temple University)
Professor Emeritus of Psychology

Pamela Zubow Poe

BM (Syracuse University); MA (American University); MM (Westminster Choir College of Rider University); MPH (West Chester University); PhD (Temple University)
Visiting Assistant Professor
Director, Graduate Certificate in Health Education and Communication

Vinaya Rajan

BS (College of New Jersey); MS, PhD (Virginia Polytechnic Institute)
Associate Professor of Anthropology

Michelle L. Ramirez

BS (San Francisco State University); MPH (Portland State University); MA, PhD (University of Iowa)
Associate Professor of Anthropology

Joseph W. Ruane

BA (St. Charles Borromeo Seminary); MA (Temple University); PhD (University of Delaware)
Professor Emeritus of Sociology and of Health Policy and Public Health

Jessica M. Sautter

BA (College of New Jersey); MA, PhD (Duke University)
Associate Professor of Medical Sociology

Health Communication – Minor

The Minor in Health Communication provides foundational competencies in communication with advanced studies and practical strategies for applied work in health-focused fields. Students who complete the minor are prepared to address health communication issues in a variety of careers including patient service, clinic management, population health messaging, and communication for health organizations.

The minor consists of 18 credits of coursework beyond the prerequisite course, including 12 elective credits with a common health communication focus approved by your minor advisor. A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Interested students should apply to the health communication minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course

- CO 101 - Introduction to Communication Credits: 3

Required Courses

- CO 399 - Independent Study in Communication Credits: 3
(must complete 3 credits total)
or
- CO 498 - Directed Research in Communication Credits: 3

A course in research methods or statistical analysis such as:

- OT 650 - Introduction to Applied Research Methods Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
and
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- SS 400 - Qualitative Methods in Social Science Credits: 3

Health Education and Communication - Graduate Certificate

Effective health education and health communication practices save lives by conveying vital information, increasing effectiveness of patient-provider interactions, and educating patients and prospective clients. The World Health Organization, the Institute of Medicine, the U.S. Surgeon General's Office and U.S. Department of Health and Human Services, as well as many other leading public health and medical authorities, have identified health education, health communication, and health literacy as critical to improving national and international public health and patient care.

University of the Sciences offers a 15-credit certificate program to address key competencies in health education and communication, including constructing health education interventions, improving patient-provider communication, addressing health literacy issues, and creating social media for health awareness and behavioral change. Through a combination of training and practical experience, this program helps students thrive in careers in healthcare, health policy, public health, biomedical writing, and other health-related business areas.

Certificate students are required to take the three core graduate courses listed below, and will select two additional elective courses from a wide selection of possibilities in health research and practice that most closely relate to individual career goals. Following the three required courses, a sampling of possible electives for the remaining two courses is listed below.

Required Courses (9 Credits)

- CO 700 - Health Communication and Education: Communicating to Inform Credits: 3
- CO 711 - Health Literacy Credits: 3
- CO 720 - Behavior Change Communication Credits: 3

Elective Courses (6 Credits)

Choose two courses (6 credits) from the following list or other classes at the 300+ level approved by the program director and/or department chair.

- CO 730 - Health Care Communication Credits: 3
or
- CO 740 - Social Media for Health and Nonprofit Organizations Credits: 3
- PS 723 - Graduate Statistics and Experimental Design I Credits: 3
- PS 804 - Health Psychology Credits: 3
- SS 764 - Qualitative Methods for Health Research Credits: 3
- PS 885 - Independent Study in Health Psychology Credits: 6
- PS 726 - Graduate Statistics and Experimental Design II Credits: 3

Notes:

- Policies and procedures are articulated in the Graduate Student Handbook. This is an important resource for requirements, deadlines, and procedures.
- Students can only "double count" 12 credits from one program for another program. Since 15 credits are required for this certificate, that means one additional 3 credit course beyond the requirements for another graduate degree must be added.

Total Credits: 15

Health Psychology – Master of Science (Thesis and Non-Thesis)

The objective of the health psychology master of science program is to prepare students for successful application to doctoral programs in clinical and health psychology. We recognize that full professional functioning as a licensed psychologist requires the doctoral degree. Many students who obtain undergraduate degrees in psychology, or other social sciences, do not have the prerequisite grades and skills to be accepted into a doctoral program in psychology immediately upon graduation. USciences' health psychology MS program offers many of the scientific requirements of the first two years of a doctoral psychology program. Other students, however, may not want to pursue the doctoral degree but do want to work in psychology and the healthcare field. For these students, obtaining the master's degree provides the basic set of qualifications to begin work in research settings.

Specifically, the health psychology MS program prepares students for careers in

- Managing research projects within the fields of
 - Mental health (such as studies on the treatment of depression).
 - Physical health (such as determining the psychosocial risk factors for cancer or determining what are the best methods for helping people to change their behavior and reduce their risk of contracting AIDS).
- Research and evaluation of health care interventions.
- Directing and managing program evaluation studies that examine the different ways of providing healthcare so that the best method can be chosen and used in the future.
- Conducting psychological and neuropsychological assessments of medical patients in hospital settings, under the direction of a licensed psychologists, to determine whether patients are suitable for certain types of surgery and to help the medical treatment team develop better treatment plans.

Through a combination of coursework and research experiences, students acquire a thorough background in the psychological theory of mental and physical health, research methods, legal and ethical issues, psychological assessment, neuropsychological assessment, cognitive-behavior therapy, the psychological and social bases of physical illness, and appropriate professional behavior in the field of health psychology. Courses emphasize current issues and state-of-the-art research.

Students in the health psychology MS program will:

- Demonstrate familiarity with the major concepts, theoretical perspectives, and empirical findings in clinical and health psychology.
- Understand and use empirically sound diagnostic and assessment methods in clinical and health psychology.
- Understand empirically based psychological interventions for the prevention and amelioration of health and mental health problems.
- Understand and apply current research methods and statistical analyses used in clinical and health psychology.
- Understand and apply the principles of ethical conduct in all aspects of professional work in clinical and health psychology.
- Respect and use critical and creative thinking, skeptical inquiry, and the scientific approach to solve problems related to behavior and mental processes for the betterment of clients and social institutions.
- Emerge from the program with realistic ideas about how to implement their psychological knowledge, skills, and values in occupational pursuits in a variety of healthcare and research settings.

The MS program in health psychology offers both the thesis and non-thesis tracks. The thesis track is intended for students who will pursue a doctoral degree (PhD or PsyD) or want to pursue a career as a research coordinator, and the non-thesis track is designed for students aiming to apply to medical school or public health or other health-related programs. The non-thesis track requires 36 credits of coursework for graduation, and the thesis track requires 40 credits of coursework for graduation. The thesis track differs from the non-thesis track by requiring 10 thesis credits, writing and defending an empirical thesis.

Note:

In the Commonwealth of Pennsylvania, licensure at the master's level requires 60 credit hours and specific coursework. Our program is specialized in health psychology and offers a maximum of 40 credit hours; therefore, the MS program's curriculum is not sufficient for licensure at the master's level. Students wishing to pursue licensure would need to complete coursework at another institution.

Required Courses (18 credits)

- PS 703 - Neuropsychology Credits: 3
- PS 723 - Graduate Statistics and Experimental Design I Credits: 3
- PS 802 - Fundamentals of Clinical Research Credits: 3
- PS 804 - Health Psychology Credits: 3
- PS 812 - Psychopathology Credits: 3
- Statistics Elective, 3 credits fulfilled by one of the following courses:
- PS 726 - Graduate Statistics and Experimental Design II Credits: 3
- ST 704 - Statistics for Research Credits: 3
- ST 715 - Statistics for Clinical Trials Credits: 3
- ST 720 - Regression Analysis Credits: 3

Elective Courses (18 credits)

Potential electives include:

- CO 700 - Health Communication and Education: Communicating to Inform Credits: 3
- CO 711 - Health Literacy Credits: 3
- CO 720 - Behavior Change Communication Credits: 3
- CO 730 - Health Care Communication Credits: 3
- CO 740 - Social Media for Health and Nonprofit Organizations Credits: 3
- PS 701 - Assessment I: Psychometric Theory and Health Psychology Assessment Methods Credits: 3
- PS 706 - Health Psychology Treatment Interventions I Credits: 3
- PS 708 - Cognitive and Intellectual Assessment Credits: 3
- PS 709 - Neuropsychological Assessment Credits: 3
- PS 722 - Neurodevelopmental Disorders Credits: 3
- PS 726 - Graduate Statistics and Experimental Design II Credits: 3
- PS 733 - Ethics and Legal Issues Credits: 3
- PS 803 - Health Psych Interventions II Credits: 3
- PS 829 - Health Psychology Treatment Interventions III Credits: 3
- PS 830 - Health Psychology Professional Seminar Credits: 3
- ST 701 - Design and Analysis of Experiments Credits: 3
- ST 710 - Biostatistical Methods Credits: 3
- ST 711 - SAS Programming & Data Analysis Credits: 3
- ST 715 - Statistics for Clinical Trials Credits: 3
- ST 720 - Regression Analysis Credits: 3
- ST 736 - Survival Analysis Credits: 3
- ST 745 - Advanced SAS Programming Credits: 3

Other elective courses may be selected with consent of Program Director/Graduate Advisor

Health Psychology – Master of Science (Non-Thesis) Sample Curriculum Plan

Fall Semester

- PS 723 - Graduate Statistics and Experimental Design I Credits: 3
- PS 802 - Fundamentals of Clinical Research Credits: 3
- PS 804 - Health Psychology Credits: 3

Credits/Semester: 9

Spring Semester

- Elective Credits: 3
- PS 7XX or ST 7XX - Statistics Elective Credits: 3
- PS 812 - Psychopathology Credits: 3

Credits/Semester: 9

Summer Semester

- Students must be registered in absentia or for PS 885

Credits/Semester: 0-6

Second Year

Fall Semester

- Elective Credits: 6
- PS 703 - Neuropsychology Credits: 3

Credits/Semester: 9

Spring Semester

- Elective Credits: 9

Credits/Semester: 9

Total Credits: 36

Health Psychology – Master of Science (Thesis) Curriculum

Required Courses (28 credits)

- PS 799 - Master's Research Credits: 12
- PS 802 - Fundamentals of Clinical Research Credits: 3
- PS 804 - Health Psychology Credits: 3
- PS 812 - Psychopathology Credits: 3
- Statistics Elective, 3 credits fulfilled by one of the following courses:
- PS 726 - Graduate Statistics and Experimental Design II Credits: 3
- ST 704 - Statistics for Research Credits: 3
- ST 715 - Statistics for Clinical Trials Credits: 3
- ST 720 - Regression Analysis Credits: 3

Elective Courses (12 credits)

- CO 700 - Health Communication and Education: Communicating to Inform Credits: 3
- CO 711 - Health Literacy Credits: 3

- CO 720 - Behavior Change Communication Credits: 3
- CO 730 - Health Care Communication Credits: 3
- CO 740 - Social Media for Health and Nonprofit Organizations Credits: 3
- PS 701 - Assessment I: Psychometric Theory and Health Psychology Assessment Methods Credits: 3
- PS 706 - Health Psychology Treatment Interventions I Credits: 3
- PS 708 - Cognitive and Intellectual Assessment Credits: 3
- PS 709 - Neuropsychological Assessment Credits: 3
- PS 722 - Neurodevelopmental Disorders Credits: 3
- PS 726 - Graduate Statistics and Experimental Design II Credits: 3
- PS 733 - Ethics and Legal Issues Credits: 3
- PS 803 - Health Psych Interventions II Credits: 3
- PS 829 - Health Psychology Treatment Interventions III Credits: 3
- PS 830 - Health Psychology Professional Seminar Credits: 3
- ST 701 - Design and Analysis of Experiments Credits: 3
- ST 704 - Statistics for Research Credits: 3
- ST 710 - Biostatistical Methods Credits: 3
- ST 711 - SAS Programming & Data Analysis Credits: 3
- ST 715 - Statistics for Clinical Trials Credits: 3
- ST 720 - Regresssion Analysis Credits: 3
- ST 736 - Survival Analysis Credits: 3
- ST 745 - Advanced SAS Programming Credits: 3

Other elective courses may be selected with consent of Program Director/Graduate Advisor

Total Credits: 40

Health Psychology – Master of Science (Thesis) Sample Curriculum Plan

First Year

Fall Semester

- PS 802 - Fundamentals of Clinical Research Credits: 3
- PS 804 - Health Psychology Credits: 3

Credits/Semester: 12

Spring Semester

- Elective Credits: 3
- PS 7XX or ST 7XX - Statistics Elective Credits: 3
- PS 812 - Psychopathology Credits: 3

Credits/Semester: 9

Summer Semester

- PS 799 - Master's Research Credits: 12

Credits/Semester: 1

Second Year

Fall Semester

- Elective Credits: 3-6
- PS 799 - Master's Research Credits: 12

Credits/Semester: 9

Spring Semester

- Elective Credits: 3-6
- PS 799 - Master's Research Credits: 12

Credits/Semester: 9

Total Credits: 40

Psychology – Major

Psychology is the study of how people think, act, react, and interact. Psychology is concerned with all aspects of behavior, thought, feeling, and motivation. Grounded in the conviction that mind, emotions, and behavior must be studied using statistical and scientific methods, psychology is a respected and socially useful discipline. As a psychology student, you will investigate topics such as the biological bases of behavior, links between physical health and mental well-being, the efficacy of psychological interventions, theories of cognitive function and intelligence, symptoms, and the effects of psychoactive drugs.

The psychology major combines traditional classroom learning about scientific and statistical approaches with research experience, so that you can apply what you are learning well before graduation. Because of our smaller student population, we offer many opportunities to do primary investigative research early in your undergraduate program, research that leads to publications and presentations at local and national meetings. Faculty will encourage these efforts and work closely with you on your projects.

The undergraduate program in psychology is committed to excellence in undergraduate education in psychology and the mission of University of the Sciences. Our program uses as benchmarks the *Guidelines for the Undergraduate Psychology Major* (American Psychological Association, 2006), *Principles for Quality Undergraduate Education in Psychology* (American Psychological Association, 2011), and the missions of the department and University.

The *Principles for Quality Undergraduate Education in Psychology* indicate that:

- Students are responsible for monitoring and enhancing their own learning.
- The faculty strives to become scientist-educators who are knowledgeable about and use the principles of the science of learning.
- Psychology departments and programs create a coherent curriculum.
- Academic administrators support and encourage quality practices in teaching and learning.
- Policymakers and the general public understand why psychological literacy is necessary for informed citizens and an effective workforce.

American Psychological Association Task Force on Undergraduate Psychology Major Competencies (2000) as Adopted by USciences Psychology Program Knowledge, Skills, and Values Consistent with the Science and Application of Psychology

- Students will demonstrate familiarity with the major concepts, theoretical perspective, empirical findings, and historical trends in psychology.
- Students will understand and apply basic research methods in psychology, including research design, data analysis, and interpretation.
- Students will respect and use critical and creative thinking, skeptical inquiry, and, when possible, the scientific approach to solve problems related to behavior and mental processes.
- Students will understand and apply psychological principles to personal, social, and organizational issues.
- Students will be able to weigh evidence, tolerate ambiguity, act ethically, and reflect other values that are the underpinnings of psychology as a discipline.
- Students will develop insight into their own and others' behavior and mental processes and apply effective strategies for self-management and self-improvement.
- Students will emerge from the major with realistic ideas about how to implement their Psychological knowledge, skills, and values in occupational pursuits in a variety of settings.

Knowledge, Skills, and Values Consistent with Both a Science and Liberal Arts Education That Are Further Developed in Psychology

A. Liberal Arts

- Students will demonstrate information competence and the ability to use computers and other technology for many purposes.
- Students will be able to communicate effectively in a variety of formats.
- Students will recognize, understand, and respect the complexity of sociocultural and international diversity.

B. Science

- Students will understand and apply biological principles to fundamental problems in psychology and larger social issues.
- Students will understand and apply mathematical principles to fundamental problems in psychology and larger societal issues.
- Students will understand and apply principles of physics, chemistry, or other natural sciences to fundamental problems in psychology and larger societal issues.

Psychology Degree Requirements

To qualify for the bachelor's of science in psychology, a minimum of 123 credit hours of approved courses is required. Included in these 123 credits must be PS 111 (or approved equivalent introductory course) and PS 100 – Health Psychology Orientation or other approved orientation experience*.

At least 6 credits of PS 340 or coursework numbered ≥ 400 with the psychology (PS) prefix is required. A grade of "B-" or higher is required for the 4 credits assigned as the Capstone experience.

Psychology courses that are applied to the Core or Advanced Program Requirements must be passed with a grade of "C-" or better to count toward the minimum psychology credits required for graduation. Credit hours earned in a course of a psychological nature offered by a department other than the Department of Behavioral and Social Sciences may only be used to meet the minimum credits required to qualify for a bachelor of science in psychology with written approval*.

Psychology Curriculum

The psychology curriculum is designed to enhance opportunities for students to take a multidisciplinary and inquiry-based approach to learning about psychology. The courses in the first year and early in the second year expose students to broad areas of knowledge in the humanities, mathematics, writing, and sciences. *Foundational* psychology courses and our orientation course focus on establishing a knowledge base upon which the student can begin to build an inquiry-based experience. Advisors work with students to initiate the *psychology portfolio* and explain the *research and capstone experiences* required of all students in the major.

In the second year, students begin to develop applied research experience during our 8-credit course sequence in research design

and statistics. Throughout the second and third years, students are exposed to the *core* disciplines of psychology and may *choose* to focus their major curriculum by developing an academic *concentration* area or *minor* and research skills. The student works with his/her faculty advisor to develop the minor or concentration area, selecting from approved University minor programs or suggested program concentration areas. Students are not required to develop a concentration area or minor.

The inquiry-based approach is emphasized in the third and fourth years. In consultation with a faculty advisor, students select psychology and elective courses that best satisfy personal interests and career goals. By the end of year three (i.e., the sixth semester), the capstone project must be approved and may be initiated as early as the spring semester of the third year. In year four, the capstone project is completed and advanced program electives embrace and build upon core disciplines of psychology and related areas introduced in the first three years. All fourth-year students participate in a fourth-year senior seminar that includes review, analysis, discussion, and formal oral presentation of the capstone projects.

General Education Requirements (41 credits)

- General Education Behavioral and Social Sciences Discipline Requirement Credits: 6
- General Education Communication Discipline Requirement Credits: 9
- General Education Humanities Discipline Requirement Credits: 6
- General Education Mathematics or Statistics Discipline Requirement Credits: 6
- General Education Natural Science Discipline Requirement Credits: 6
- General Education Natural Science Laboratory Discipline Requirement Credits: 1
- Multidisciplinary Inquiry Requirement Credits: 6
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1

Open (Non-Program) Electives (15 credits)

Psychology Core Requirements (33 credits)

- PS 100 - Health Psych Orientation Credits: 1
- PS 111 - Principles of Psychology Credits: 3
- PS 200 - Psychology of Human Development Credits: 3
- PS 301 - Social Psychology Credits: 3
- PS 305 - Learning & Behavior Credits: 3
- PS 309 - Personality Theory Credits: 3
- PS 329 - Cognitive Psychology Credits: 3
- PS 347 - Abnormal Psychology Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- PS 261 - Intro to Neuroscience II Credits: 3
- or
- NS 260 - Intro to Neuroscience Credits: 1
- or
- PS 310 - Biological Psychology Credits: 3

Core Program Electives (9 Credits)

Select three three-credit courses numbered ≥ 200 with the psychology (PS) prefix

Advanced Program Requirements (12 credits)

At least 6 credits of PS 340 or coursework numbered ≥ 400 with the psychology (PS) prefix.

Advanced coursework from other areas may be approved provided that the content offers an interdisciplinary perspective that includes concepts of relevance to psychology.

Advanced Electives (9 credits)

Choose 9 credits of courses at or above the 300 level. These courses may be from any discipline at the University.

Psychology Capstone Requirement (4 credits)

Psychology majors must complete 4 credits of approved capstone experiences during the senior year. Capstone projects must be proposed in writing, and both the proposal and final project must be approved by at least two full-time psychology faculty members, including the psychology advisor and undergraduate psychology program director.

Capstone projects must include an APA-formatted written paper that may be either a research manuscript or scholarly review of the area. Capstone projects will be publically announced and orally presented during PS 493 - Psychology Seminar.

- PS 493 - Psychology Seminar Credits: 1 (required of all 4th year students)
and at least one of the following:
- PS 399 - Independent Study in Psychology Credits: 3
or
- PS 400 - Internship in Psychology Credits: 3
or
- PS 498 - Directed Research in Psychology Credits: 3

Sample Psychology Curriculum Plan

First Year

- General Education Communication Requirement Credits: 6
- General Education Humanities Requirement Credits: 3
- General Education Mathematics Requirement Credits: 6
- General Education Natural Science Requirement Credits: 7
- Principles of Psychology Credits: 3
- Psychology Core Requirement Credits: 3
- Psychology Orientation Credits: 1

- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1

Credits/Fall Semester: 14; Credits/Spring Semester: 16; First Year Total Credits: 30

Second Year

- Free Elective Credits: 3
- General Education Behavioral & Social Sciences Requirement Credits: 3
- General Education Humanities Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- Psychology Core Elective Credits: 3
- Psychology Core Requirement Credits: 6
- Research Design & Statistical Analysis Credits: 8

Credits/Fall Semester: 16; Credits/Spring Semester: 16; First Year Total Credits: 32

Third Year

- Advanced Program Elective Credits: 3
- Free Elective Credits: 12
- General Education Behavioral & Social Sciences Requirement Credits: 3
- General Education Communication Requirement Credits: 3
- Psychology Core Requirement Credits: 6
- Psychology Core Elective Credits: 3

Credits/Fall Semester: 15; Credits/Spring Semester: 15; First Year Total Credits: 30

Fourth Year

- Advanced Elective Credits: 9
- Advanced Program Elective Credits: 9
- Capstone Requirement Credits: 3
- Psychology Core Requirement Credits: 9
- Senior Seminar Credits: 1

Credits/Fall Semester: 15; Credits/Spring Semester: 16; First Year Total Credits: 31

Minimum Total Credit Hours for BS in Psychology: 123

Psychology – Minor

The psychology minor is designed for students who want to add a specialization in psychology to their major field emphasis.

Specific Description

Despite the brevity of the minor program, it is designed to provide students with an in-depth experience in psychology. At USciences, the study of psychology begins with PS 101 - Introduction to Psychology. This course provides a broad survey of the contents and methodologies that constitute psychology. To be eligible for the psychology minor program, students must have earned a minimum grade of “C” in PS 101.

The psychology minor consists of 20 credits in the foundational and substantive areas of psychology. Students choose four courses (12 credit hours) in foundational topics, such as human development, cognition, biological psychology, neuropsychology, learning theory, tests and measures, personality theory, and abnormal psychology. Students choose these courses to meet their interest and career goals with the advice of their minor advisor. A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of “C” or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

The capstone experience of the psychology minor program is the SS 221/222 sequence in psychology as a quantitative and empirical science for eight credit hours of work. This is a yearlong capstone experience where students pursuing a psychology

minor learn the nucleus of work skills involved in psychology. The experience consists of lecture, group work, and laboratory practice. The central focus of the capstone experience is experiential. Students participate in research groups to conduct an original research project. To graduate from the psychology minor program, students must earn a minimum of a “C” average in the capstone sequence.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisites (3 credits)

- PS 101 - Introduction to Psychology Credits: 3

Fundamental Areas of Psychology (12 credits)

Choose any two psychology courses (6 credits) with course numbers greater than 200 and any two psychology courses (6 credits) with course numbers greater than 300. Students should select courses after discussing the minor program with their advisor.

Substantive Area: Psychology Capstone Course Sequence (8 credits)

- SS 221 - Research Design & Statistical Analysis I Credits: 4
- SS 222 - Research Design & Statistical Analysis II Credits: 4

Racism and Health - Undergraduate Certificate

The impact of racism on health outcomes is at the forefront of public conversation. Reducing race-based health disparities is an important public health goal. Future health care providers and researchers interested in this goal require an education in the social and behavioral sciences in order to critically examine the causes and consequences of race and health disparities. There are a range of manifestations of racism in our current health system, including, but not limited to: direct racism (e.g., using slurs), implicit racial bias (e.g., having different expectations or making different assumptions about someone due to their race), lack of representation, and systemic connections to socioeconomic status. The myriad forms of racism currently at play in our society will be explored in this certificate program, housed in the Behavioral and Social Sciences Department, which will provide the disciplinary expertise to understand how racism and health intersect. Anthropology examines how societies culturally construct race and health. Psychology examines how individual thoughts and behaviors are influenced by groups. Sociology examines how social institutions and inequalities influence measures of health for individuals and racial groups. Taken together, a selection of courses will teach the students to identify and critically evaluate measures, causes, and consequences of racial health disparities, which have a long and problematic history in our healthcare system. Thus, a new generation of leaders is needed to make significant changes in not only the delivery of culturally competent health care but also improving health equity for all Americans.

Prerequisite Course

Any one of the following introductory courses offered in the Department of Behavioral and Social Sciences:

- AN 103 - Introduction to Anthropology Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
- SO 111 - Principles of Sociology Credits: 3
- PS 101 - Introduction to Psychology Credits: 3
- PS 111 - Principles of Psychology Credits: 3

Elective Courses (12 credits)

Choose 4 courses (12 credits) from the following list:

- AN 201 - Health and Societies Credits: 3
 - AN 301 - Medical Anthropology Credits: 3
 - PS 301 - Social Psychology Credits: 3
 - PS 318 - Health Psychology Credits: 3
 - SO 422 - Race, Culture and Ethnicity Credits: 3
 - SS 300 - Social Epidemiology Credits: 3
 - SS 321 - Intercultural Health Communication Credits: 3
 - SS 400 - Qualitative Methods in Social Science Credits: 3
 - PL 330 - Philosophy of Race, Class, and Gender Credits: 3
- Other classes at the 200+ level as approved by the program director and/or department chair.

Societies and Health – Minor

A Minor in Societies and Health provides a unique opportunity for students to critically examine how culture and society intersect with health and illness. In this multidisciplinary program, students will learn diverse theoretical perspectives and research methods in anthropology, communication, psychology, and sociology. Students will then integrate and apply their knowledge through independent study or directed research.

The minor consists of 18 credits of coursework beyond the prerequisite course in an area of interest, including 12 elective credits with a common intellectual bond approved by the minor advisor. A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course

One of the following introductory social sciences courses:

- AN 103 - Introduction to Anthropology Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- EC 101 - Introduction to Macroeconomics Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
- SO 111 - Principles of Sociology Credits: 3

Required Courses

200+ Level AN/CO/PS/SO/SS Courses (12 Credits)

One of the following independent study or directed research courses:

- Independent Study (AN 399, CO 399, EC 399, or SS 399; must complete 3 credits total)
- AN 498 - Directed Research in Anthropology Credits: 3
- CO 498 - Directed Research in Communication Credits: 3
- EC 498 - Directed Research in Economics Credits: 3
- SO 498 - Directed Research in Sociology Credits: 3
- SS 498 - Directed Research in Social Sciences Credits: 3

A course in research methods or statistical analysis such as:

- OT 650 - Introduction to Applied Research Methods Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
and
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- SS 400 - Qualitative Methods in Social Science Credits: 3
- ST 310 - Biostatistics I Credits: 3

Biological Sciences

Vision

Our department will be a leader in STEM education through our inclusive, supportive, and collaborative community that is dedicated to teaching, research, and service. We will provide excellent preparation for current and future scientists and health-care practitioners. We will be a leader in biological sciences education across core concepts by embracing innovative and interdisciplinary teaching methods and technologies.

Mission

By focusing on inquiry-based learning and research, students develop as scientists by doing science. Students experience individualized mentorship in a supportive and inclusive environment that empowers them to achieve their goals and serve society.

Goals

- The Department of Biological Sciences will be a model for innovative, evidence-based, and learning-centered interdisciplinary instruction.
- The Department of Biological Sciences will foster research and scholarship, including dissemination of scientific information, positively impacting students and preparing them for a data-driven society.
- The Department of Biological Sciences will provide excellent leadership and service to students, the department, the college, the university, the community, and the profession.

Overview

The Department of Biological Sciences provides the academic, intellectual, and practical foundation upon which all USciences students develop the skills and knowledge necessary to establish a strong biological sciences career.

Through basic biology courses and laboratory experiences, all students at USciences:

- Learn fundamental concepts in biological sciences.
- Learn to apply scientific reasoning.
- Appreciate their discipline from a biological perspective.

The department educates undergraduate majors in advanced biology, biomedical sciences, environmental science, medical laboratory science, and microbiology. Graduates with a major in the biological sciences will:

- Demonstrate proficiency in state-of-the-art methods and techniques used in analytical and problem-solving approaches to current problems, concerns, and questions that must be addressed through scientific inquiry.
- Interpret primary source scientific publications in the biological sciences, integrating fundamental concepts of chemistry, physics, and mathematics.
- Incorporate scientific information into well-constructed, valid written documents and oral presentations.
- Recognize relevant sociological and ethical perspectives in the context of the biological sciences through a strong and balanced general education experience.

The department provides students with research experience as a framework for the study of biological sciences. All undergraduate majors in the Department of Biological Sciences in good academic standing who express a desire to perform investigative research can do so through coursework or in faculty laboratories, where space is available. These opportunities allow students to:

- Gain experience in the use of modern laboratory techniques and equipment.

- Construct valid experimental designs.
- Demonstrate familiarity in analytical and problem-solving approaches to hypothesis testing.
- Write scientific communications for presentation in public forums or publication.

USciences has articulation agreements with several local colleges to facilitate earning BS degrees in biology, biomedical sciences and microbiology after two years of study at the other school. In addition, articulations exist to facilitate USciences students to earn degrees in medicine, dentistry, optometry, physician assistant, audiology, and veterinary sciences at selected schools. Further information can be obtained from the Department of Biological Sciences or from the dean of Misher College of Arts and Sciences.

Additional Degree Options

Students with majors in the biological sciences may choose to specialize within their field by pursuing the BS/MS program.

BS/MS Program

Students who complete the requirements of the BS degree in biology, biomedical sciences, environmental science, or microbiology may finish a non-thesis MS degree with one additional calendar year of full-time study. The specific prerequisites of this program are successful completion of BS 243, BS 244, CH 341, BS 461, and BS 466. To be eligible to apply for this program, students should have maintained a 3.25 overall GPA and a 3.0 GPA in all biological science courses at the 200 level and higher. Credits earned in addition to the minimum 127 required for BS graduation may be eligible for transfer to the MS program. Students may apply to this program during the spring semester of the third year.

Faculty

Peter B. Berget

BS, PhD (University of Minnesota)
Professor of Biology
Interim Chair, Biological Sciences

Wasim Anwar

BS (Foreman Christian University, Pakistan) MBBS (Allama Iqbal Medical College, Pakistan)
Assistant Professor of Biology

Jill M. Baren

BS (Brown University); MS (University of Pennsylvania); MBA (Brandeis University); MD (University of Pittsburgh)
Professor of Biological Sciences and Humanities
Provost and Vice President, Academic Affairs

Ara DerMarderosian

BS, MS (Massachusetts College of Pharmacy); PhD (Rhode Island)
Professor Emeritus of Biology

Grace Farber

BS (Rider University); PhD (University of Pittsburgh)
Associate Professor of Biology and Neuroscience
Associate Dean, Misher College of Arts and Sciences
Director, Pre-Health and Co-Director, Neuroscience Program

Matthew J. Farber

BS (Seton Hall University); PhD (University of Pittsburgh)
Assistant Professor of Biology
Director, Brewing Science Program

Jason E. Heindl

BA (Amherst College); PhD (Harvard University)
Assistant Professor of Biology

Christopher Janetopoulos

BS (Augustana College); PhD (Texas A & M University)
Associate Professor of Biology

Michelle L. Kanther

BS (Dickinson College); PhD (University of North Carolina at Chapel Hill)
Assistant Professor of Biology

Margaret R. Kasschau

BA (University of Rochester); MS, PhD (University of South Carolina)
Professor Emeritus of Biology

Sudha Moorthy

BS (University of Delhi); MS (The MS University of Baroda); PhD (Indian Institute of Science)
Visiting Assistant Professor of Biology

Alison M. Mostrom

AB (Mount Holyoke College); PhD (University of Pennsylvania)
Associate Professor of Biology

Suzanne K. Murphy

BA (Rosemont College); PhD (Hahnemann University)
Professor of Biology

Kenneth Myers

BS (Philadelphia University); PhD (Drexel University)
Associate Professor of Biology and Neuroscience
Co-Director, Cell Biology and Biotechnology Graduate Programs

Dana A. Pape-Zambito

BA (University of Delaware); PhD (Pennsylvania State University)
Associate Professor of Biology
Co-Assistant Chair, Biological Sciences and Director, Biological Sciences and Microbiology Program

Margaret M.P. Pearce

BS (Le Moyne College); PhD (SUNY Upstate Medical University)
Assistant Professor of Biology and Neuroscience

Lois H. Peck

BS, MEd (West Chester University); EdD (Temple University)
Professor Emeritus of Biology

Bela Peethambaran

BTech (St. Xavier's, India); MS (Gujarat University, India); PhD (Mississippi State University)
Associate Professor of Biology
Co-Director, Cell Biology and Biotechnology Graduate Programs

Catherine Purzycki

BS (Philadelphia College of Pharmacy and Science); MS (Rutgers University)
Senior Lecturer in Biology

Shivendra Sahi

BS (Gorakhpur University, India); PhD (North Carolina State University)
Professor of Biology

Margaret A. Reinhart

BS (Millersville University); MMA (Pennsylvania State University); MS (Villanova University)
Senior Lecturer in Biology

C. Nicole Sunnen

BS (University of Guelph, Canada); PhD (Baylor College of Medicine)
Assistant Professor of Biology and Neuroscience

Diane Valentin

BS (University of the Sciences); MS (Rutgers University)
Instructor of Medical Laboratory Science
Director, Medical Laboratory Science Program

Lisa Warden

BS, MS (Rutgers, The State University of New Jersey); PhD (Utrecht University)
Visiting Assistant Professor of Biology

Kevin C. Wolbach

BS (Muhlenberg College); MS (Lehigh University)
Senior Lecturer of Biology
Co-Assistant Chair, Biological Sciences and Director, Biomedical Sciences and Environmental Science Programs

Adjunct Faculty**Jule Anne D. Henstenburg, RD; LDN; FAND**

PhD (University of the Sciences)
Adjunct Instructor in Nutrition

David C. Kurland

BS, MS, JD (University of Pennsylvania)
Adjunct Instructor in Environmental Law

Matthew Lanza

BS, VMD (University of Pennsylvania)
Adjunct Instructor in Comparative Animal Physiology

Joseph J. Lisa

BA (Dickinson College); JD, LLM (George Washington University)
Adjunct Instructor in Environmental Law

Ronald MacGillivray

BS (Northeastern University); MS (Rutgers University); PhD (University of Massachusetts, Boston)
Adjunct Instructor in Biology

Cristina Ramaciotti

BS (University of California, Los Angeles); MS (Duke University)
Adjunct Instructor in Environmental Geology

Francis C. Ramaciotti

BS (University of Scranton); MEM (Duke University)
Adjunct Instructor in Environmental Risk Assessment

John Siefert

BS (Penn State University); MS (University of Maryland)
Adjunct Instructor in Biology

Biology – Major

Biology is concerned with the life and behavior of all organisms. Biology encompasses more than 25 major fields and over 300 recognized specialty areas.

Careers for biologists exist in academic, clinical, industrial, educational, and governmental settings. Biology majors are well prepared to pursue opportunities in the workforce or in graduate or professional schools. Graduates who major in biology typically pursue advanced degrees in medicine or biology or are employed in health, pharmaceutical, biotechnological, environmental, industrial, and teaching professions.

The biology curriculum is flexible. The courses in the first two years introduce students to basic biological concepts and provide a foundation in the natural and physical sciences, humanities, and social sciences. Individualization characterizes the third and

fourth years. In consultation with a faculty advisor, students select courses that best satisfy their interests and career goals. Electives embrace all areas of biology—animal biology, cellular/subcellular biology, clinical biology, plant biology, population biology, and interdisciplinary biology. Students may also receive academic credit for independent study, internships, and directed research.

Biology Degree Requirements

To qualify for the bachelor of science in biology, a minimum of 127 credit hours of approved courses is required. Included in these 127 credits must be all general education and the fundamental course requirements. At least 36 credit hours (excluding BS 101 and BS 204) must represent courses in the biological sciences. Biology majors may choose only one 200- or 300-level anatomy and physiology sequence to count toward graduation (i.e. BS 205 and 206 OR BS 310 and 311). No more than 2 credits of anatomy and physiology lab (i.e., BS 207 and 208) may count toward graduation. A minimum of 9 credits must be at or above the 400 level (excluding BS 400 and BS 499). Of these 9 credits, the student must earn a grade of "P" (pass) in each of the two seminar courses (BS 493 and BS 494) and a grade of "C-" or higher in at least 7 credits at the 400 level or higher. At the 200 level and above, only those biology credits for which a student has earned a grade of "C-" or better will count toward the minimum biology credits required for graduation.

Credit hours earned in a course of a biological nature offered by a department other than the Department of Biological Sciences may only be used to meet the minimum credits required to qualify for a bachelor of science in biology with the written approval of the chair of the Department of Biological Sciences. *

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Note:

*All exceptions or waivers of individual course requirements are at the discretion of the department chairperson.

Biology Fundamental Requirements

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II Credits: 2
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1
- BS 493 - Biological Sciences Seminar I Credits: 1
- BS 494 - Biological Sciences Seminar II Credits: 1

Biology Distribution Requirements and Electives

Coursework used to meet the minimum credit requirement for biological sciences courses (36 cr) must include the following:

Biology Distribution Requirements: One course must be taken from each of the three following categories: animal biology, plant biology, and population biology (see below). A course from any of the following lists may not substitute for credits in another list as specified distribution requirements without the permission of the department chair and the instructor responsible for the course in question.

Biology Electives: Choose from the following listings with a minimum of 9 total biology credits at/or above the 400 level (excluding BS 400 and BS 499).

Animal Biology

- BS 200 - Animal Diversity and Morphology Credits: 3
- BS 205 - Human Structure and Function I Credits: 3 *
- BS 206 - Human Structure and Function II Credits: 3 *
- BS 280 - Comparative Animal Phys Credits: 3
- BS 310 - Anatomy and Physiology I Credits: 3 *
- BS 311 - Anatomy and Physiology II Credits: 3 *
- BS 412 - Human Physiology Credits: 4

Plant Biology

- BS 220 - Plant Diversity-Morphology Credits: 3
- BS 336 - Pharmacognosy Credits: 2
- BS 420 - Ethnobotany Credits: 2

Population Biology

- BS 270 - Evolutionary Biology Credits: 3
- BS 276 - Introduction to Environmental Science Credits: 3
- BS 305 - Animal Behavior Credits: 4
- BS 372 - Aquatic Biology Credits: 4
- BS 377 - Ecology Credits: 4
- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 474 - Emerging Biological Threats and Global Sustainability Credits: 3

Clinical Biology

- BS 218 - Hematology Credits: 3
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4
- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 **

Cellular/Subcellular Biology

- BS 343 - Microbial Genetics Credits: 4
- BS 350 - Trends in Applied Microbiology Credits: 3
- BS 375 - Environmental Microbiology Credits: 3
- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 455 - Infection and Immunity Credits: 3 **
- BS 456 - Immunobiology Credits: 4 **
- BS 461 - Cell Biology Credits: 4
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2

Interdisciplinary Biology

- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 219 - Basic Nutrition Credits: 3
- BS 260 - Intro to Neuroscience Credits: 3
- BS 277 - Introduction to Environmental Science Lab Credits: 1
- BS 291 - Special Topics in Bio Credits: 3
- BS 304 - Toxic Natural Products Credits: 2
- BS 318 - The Biology of Aging Credits: 3
- BS 391 - Special Topics in Bio Credits: 3
- BS 399 - Independent Study in Biological Sciences Credits: 3
- BS 400 - Biology Internship Credits: 3
- BS 425 - Neuroscience Credits: 3
- BS 428 - Neuropsychology Credits: 3
- BS 431 - Genes and Brains Credits: 3
- BS 440 - Environmental Toxicology Credits: 3
- BS 460 - Neurobiology Credits: 3
- BS 464 - Topics in Biotechnology Credits: 3
- BS 470 - Molecular Pharmacognosy Credits: 3
- BS 471 - Environmental Law Credits: 3
- BS 472 - Principles of Environmental Risk Assessment Credits: 3
- BS 490 - Special Topics in Biology Credits: 3
- BS 495 - Seminar in Neuroscience Credits: 1
- BS 499 - Directed Research in Biological Sciences Credits: 3

* Students may earn credit for BS 205 OR BS 310 and BS 206 OR BS 311.

** Students may receive credit towards the biology major for only one of BS 358 (Principles and Applications of Immunology), BS 455 (Infection and Immunity), or BS 456 (Immunobiology).

Additional Curricular Requirements

- General Education Social Science Discipline Requirement Credits: 6
- General Education Humanities Discipline Requirement Credits: 6
- Multidisciplinary Inquiry Requirements Credit: 6
- CH 101, CH 102, CH 103 and CH 104 - General Chemistry I and II Lecture and Laboratory Credits: 8 total
(See Footnote 1 Below)
- CH 201, CH 202, CH 203 and CH 204 - Organic Chemistry I and II Lecture and Laboratory Credits: 8 total
(See Footnote 2 Below)
- CO 101 - Introduction to Communication or CO 204 - Public Speaking Credits: 3
- MA 107 - Precalculus and MA 110 - General Calculus Credits: 6 total
- Natural Science Elective - Students must pass a 300-level or higher natural science course (designated BS, CH, PY, BI, or GL). Courses considered to be Seminar, Independent Study, or Directed Research cannot be used for this elective.
- CH 340 - Survey of Biochemistry or CH 341 - Molecular Structure in Biochemistry or CH 346 - Biochemistry Credits: 3-4
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PY 201 and PY 202 - Introductory Physics I and II Credits: 8 total
(See Footnote 3 Below)
- Quantitative Science Requirement (one course): Students may choose from:
CH 321 - Physical Chemistry I, CH 361 - Analytical Chemistry,
CH 366 - Principles of Analytical Chemistry, ST 310 - Introduction to Biostatistics,
or
SS 222 – Research Design & Statistical Analysis II, Credits: 3–4
- WR 101 and WR 102 - Writing and Rhetoric I and II Credits: 6 total

Footnotes:

1. Qualified students may substitute CH 111–114.
2. Qualified students may substitute CH 211–214.
3. Qualified students may substitute PY 211/212

Sample Biology Curriculum Plan

First Year

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15-16

Second Year

Fall Semester

- General Education Social Science Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 203 - Organic Chemistry Lab I Credits: 1

(See Footnote 2 Below)

- PY 201 - Introductory Physics I Credits: 4
(See Footnote 3 Below)

Credits/Semester: 18

Spring Semester

- Biology Elective Credits: 3–4
(See Footnote 4 Below)
- General Education Social Science Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 204 - Biological Sciences Colloquium Credits: 1
- CH 202 - Organic Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- PY 202 - Introductory Physics II Credits: 4
(See Footnote 3 Below)

Credits/Semester: 18–19

Third Year

Fall Semester

- Quantitative Science Requirement Credits: 3–4
(See Footnote 5 Below)
- Biology Elective Credits: 3–4
(See Footnote 4 Below)
- General Education Humanities Requirement Credits: 3
- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- CO 101 - Introduction to Communication Credits: 3
or
- CO 204 - Public Speaking Credits: 3

Credits/Semester: 15-17

Spring Semester

- Biology Elective Credits: 3–4
(See Footnote 4 Below)
- Free Elective Credits: 3
- General Education Humanities Discipline Requirements Credits: 3
- Natural Science Elective Credits: 3-5
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1

Credits/Semester: 16-19

Fourth Year

Fall Semester

- Free Elective Credits: 3–6
- Biology Elective(s) Credits: 3–6
(See Footnote 4 Below)
- BS 493 - Biological Sciences Seminar I Credits: 1
(See Footnote 7 Below)

Credits/Semester: 7-13

Spring Semester

- Biology Elective(s) Credits: 3–9
(See Footnote 4 Below)
- Free Electives Credits 3–9
(See Footnote 6 Below)
- BS 494 - Biological Sciences Seminar II Credits: 1
(See Footnote 7 Below)

Credits/Semester: 7–19

Total Minimum Credits: 127

Footnotes:

1. Qualified students may substitute CH 111/113 and CH 112/114 for CH 101/103 and CH 102/104.
2. Qualified students may substitute CH 211/213 and CH 212/214 for CH 201/203 and CH 202/204.
3. Qualified students may substitute PY 211 and PY 212 for PY 201 and PY 202.
4. Students must complete 36 credits in biology (excluding BS 101 and BS 204), which must include one from each of plant, animal, and population biology and a minimum of 9 biology credits at the 400 level (excluding BS 400 and BS 499). Biology majors may elect no more than six lecture credits, from one of the following Anatomy and Physiology series, to count toward graduation:
 - BS 205 and 206
 - BS 310 and 311No more than 2 credits of lab (BS 207 and 208) may count toward graduation.
5. Quantitative science requirement: Select one of the following:
 - CH 321 - Physical Chemistry I
 - CH 361 - Analytical Chemistry
 - CH 366 - Principles of Analytical Chemistry
 - SS 222 - Research Design & Statistical Analysis II
 - ST 310 - Introduction to Biostatistics
6. Students must complete enough credit hours in addition to those required by the General Education Curriculum and the Department of Biological Sciences to reach a minimum total of 127.
7. Students planning to graduate in January of final year need to complete Seminar sequence in their third year.

Biology – Minor

Careers for biologists exist in academic, clinical, industrial, and governmental settings. Students with a minor in biology are well prepared to pursue opportunities in the workforce or in graduate or professional schools. Many students get advanced degrees in medicine or biology, while others seek employment in the health, pharmaceutical, or biotechnological professions. Students must complete 18 credits above the introductory level for a minor in biology. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Courses

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- or
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II

Required Courses

- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 466 - Genetics Credits: 4

Elective Courses

10 required hours that may be taken from any category or categories.

Animal Biology

- BS 200 - Animal Diversity and Morphology Credits: 3
- BS 205 - Human Structure and Function I Credits: 3 *
- BS 206 - Human Structure and Function II Credits: 3 *
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 280 - Comparative Animal Phys Credits: 3 *
- BS 310 - Anatomy and Physiology I Credits: 3 *
- BS 311 - Anatomy and Physiology II Credits: 3 *
- BS 412 - Human Physiology Credits: 4

Plant Biology

- BS 220 - Plant Diversity-Morphology Credits: 3
- BS 336 - Pharmacognosy Credits: 2
- BS 420 - Ethnobotany Credits: 2

- BS 470 - Molecular Pharmacognosy Credits: 3

Population Biology

- BS 270 - Evolutionary Biology Credits: 3
- BS 276 - Introduction to Environmental Science Credits: 3
- BS 305 - Animal Behavior Credits: 4
- BS 372 - Aquatic Biology Credits: 4
- BS 377 - Ecology Credits: 4
- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 474 - Emerging Biological Threats and Global Sustainability Credits: 3

Clinical Biology

- BS 218 - Hematology Credits: 3
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4
- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 **

Cellular/Subcellular Biology

- BS 343 - Microbial Genetics Credits: 4
- BS 350 - Trends in Applied Microbiology Credits: 3
- BS 375 - Environmental Microbiology Credits: 3
- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 455 - Infection and Immunity Credits: 3 **
- BS 456 - Immunobiology Credits: 4 **
- BS 461 - Cell Biology Credits: 4
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2

Interdisciplinary Biology

- BS 219 - Basic Nutrition Credits: 3
- BS 260 - Intro to Neuroscience Credits: 3
- BS 277 - Introduction to Environmental Science Lab Credits: 1
- BS 291 - Special Topics in Bio Credits: 3
- BS 304 - Toxic Natural Products Credits: 2
- BS 318 - The Biology of Aging Credits: 3
- BS 391 - Special Topics in Bio Credits: 3
- BS 399 - Independent Study in Biological Sciences Credits: 3
- BS 410 - Principles of Forensic Pathology Credits: 2
- BS 425 - Neuroscience Credits: 3
- BS 428 - Neuropsychology Credits: 3
- BS 440 - Environmental Toxicology Credits: 3
- BS 455 - Infection and Immunity Credits: 3
- BS 460 - Neurobiology Credits: 3
- BS 490 - Special Topics in Biology Credits: 3
- BS 499 - Directed Research in Biological Sciences Credits: 3

* Students may use no more than 7 credits of Anatomy and Physiology lecture courses at the 200-300 level to count toward the minor.

** Students may receive credit towards the biology minor for only one of BS 358 (Principles and Applications of Immunology), BS 455 (Infection and Immunity), or BS 456 (Immunobiology).

Biomedical Sciences – Major

This degree program allows students to choose from a variety of tracks of study to prepare for positions within the wider healthcare industry. Examples of these positions are physician, physician assistant, audiologist, optometrist, podiatrist, nurse practitioner, clinical research technician, dentist, veterinarian, or laboratory research technician. This degree offers a flexible but rigorous program of study taking into account the prerequisites of the above types of positions in the healthcare field.

This program provides flexibility in course selection within the sciences. Examples of curricular flexibility leading to potential tracks of specialization in neuroscience, clinical science, plant science, or biotechnology are shown below.

Biomedical Sciences Degree Requirements

To qualify for the bachelor of science in biomedical sciences, a minimum of 127 credit hours of approved courses is required. Included in these 127 credits must be all the general education and fundamental course requirements. The student must complete 36 credits in science electives (excluding BS 101 and BS 204). The student must take at least one course with a clinical focus (see list below). Students are required to complete either BS 205 and 206 or BS 310 and 311, but no more than six lecture credits from these 200 and 300 level anatomy and physiology courses can count toward graduation. No more than 2 credits of anatomy and physiology lab (i.e. BS 207 and BS 208) may count toward graduation. The student must also take a minimum of 9 credits at or above the 400 level (excluding BS 400 and BS 499). Of these 9 credits, the student must earn a grade of "P" (pass) in each of the two seminar courses (BS 493 and BS 494) and a grade of "C-" or higher in at least 7 credits at the 400 level or higher. At the 200 level and above, only those biological sciences (BS) credits for which a student has earned a grade of "C-" or better will count toward the minimum biological sciences (BS) credits required for graduation.

Credit hours earned in a course of a biological nature offered by a department other than the Department of Biological Sciences may only be used to meet the minimum credits required to qualify for a bachelor of science in biomedical sciences with the written approval of the chair of the Department of Biological Sciences.*

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Note:

*All exceptions or waivers of individual course requirements are at the discretion of the department chairperson.

Biomedical Sciences Fundamental Requirements

- BS 101 - Biology Orientation I Credits: 1
- BS 109 - General Biology I Credits: 3 or BS 132 - Introductory Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1 or BS 134 - Introductory Biology Lab I Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- BS 119 - General Biology II Credits: 3 or BS 133 - Introductory Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1 or BS 135 - Introductory Biology Lab Credits 1 or BS 136 - Phage Hunters I Credits: 2
- BS 204 - Biological Sciences Colloquium Credits: 1

- BS 205 - Human Structure and Function I Credits: 3 or BS 310 - Anatomy and Physiology I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3 or BS 311 - Anatomy and Physiology II Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1
- BS 493 - Biological Sciences Seminar I Credits: 1
- BS 494 - Biological Sciences Seminar II Credits: 1

One clinical elective course – Pick one of the following:

- BS 218 - Hematology Credits: 3
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4
- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3
(see footnote 3 below)

Three credits of Biological Sciences courses at the 400-level

Science Elective Requirements

Students must complete 4-6 additional credits of science electives (excluding BS 101 and BS 204) to complete 36 credits of fundamental requirements. Students may choose from clinical biology courses (see above) or the science electives listed below.

Science Elective Courses

- BS 200 - Animal Diversity and Morphology Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 219 - Basic Nutrition Credits: 3
- BS 220 - Plant Diversity-Morphology Credits: 3
- BS 260 - Intro to Neuroscience Credits: 3
- BS 270 - Evolutionary Biology Credits: 3
- BS 276 - Introduction to Environmental Science Credits: 3
- BS 277 - Introduction to Environmental Science Lab Credits: 1
- BS 280 - Comparative Animal Phys Credits: 3
- BS 291 - Special Topics in Bio Credits: 3
- BS 301 - Ethical Issues in Biological Sciences Credits: 2
- BS 304 - Toxic Natural Products Credits: 2
- BS 305 - Animal Behavior Credits: 4
- BS 318 - The Biology of Aging Credits: 3
- BS 343 - Microbial Genetics Credits: 4
- BS 350 - Trends in Applied Microbiology Credits: 3
- BS 336 - Pharmacognosy Credits: 2
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 377 - Ecology Credits: 4
- BS 391 - Special Topics in Bio Credits: 3
- BS 399 - Independent Study in Biological Sciences Credits: 3

- BS 400 - Biology Internship Credits: 3
- BS 410 - Principles of Forensic Pathology Credits: 2
- BS 412 - Human Physiology Credits: 4
- BS 420 - Ethnobotany Credits: 2
- BS 425 - Neuroscience Credits: 3
- BS 428 - Neuropsychology Credits: 3
- BS 431 - Genes and Brains Credits: 3
- BS 440 - Environmental Toxicology Credits: 3
- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 455 - Infection and Immunity Credits: 3
(see footnote 3 below)
- BS 456 - Immunobiology Credits: 4
(see footnote 3 below)
- BS 460 - Neurobiology Credits: 3
- BS 461 - Cell Biology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3
- BS 470 - Molecular Pharmacognosy Credits: 3
- BS 471 - Environmental Law Credits: 3
- BS 472 - Principles of Environmental Risk Assessment Credits: 3
- BS 474 - Emerging Biological Threats and Global Sustainability Credits: 3
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2
- BS 490 - Special Topics in Biology Credits: 3
- BS 495 - Seminar in Neuroscience Credits: 1
- BS 499 - Directed Research in Biological Sciences Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3
This course may be used as a science elective or to fulfill the biochemistry requirement, but it may not be used for both.
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 346 - Biochemistry Credits: 4
This course may be used as a science elective or to fulfill the biochemistry requirement, but it may not be used for both.
- CH 356 - Molecular Biology and Genetics Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
- PHA 303 - Introduction to Pharmacology Credits: 3

Additional Curricular Requirements

- General Education Social Science Discipline Requirement Credits: 6
- General Education Humanities Discipline Requirement Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 202 - Organic Chemistry II Credits: 3

(See Footnote 2 Below)

- CH 203 - Organic Chemistry Lab I Credits: 1
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- CO 101 - Introduction to Communication Credits: 3 or CO 204 - Public Speaking Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- MI 110 - Intro Health/Medical Profs Credits: 1
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- SS 222 - Research Design & Statistical Analysis II Credits: 4 or ST 310 - Introduction to Biostatistics Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Biochemistry

Choose one of the following depending on career goal:

- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
This course may be used to fulfill the biochemistry requirement or as a science elective, but it may not be used for both.
or
- CH 346 - Biochemistry Credits: 4
This course may be used to fulfill the biochemistry requirement or as a science elective, but it may not be used for both.

Physics

Choose one of the following physics options depending on career goal:

- PY 200 - Survey of Physics Credits: 4
or
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
or
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4

Footnotes:

1. Qualified students may substitute CH 111–114 for CH 101-104.
2. Qualified students may substitute CH 211–214 for CH 201-204.
3. Students may receive credit towards the BMS major for only one of BS 358 (Principles and Applications of Immunology), BS 455 (Infection and Immunity), or BS 456 (Immunobiology).

Potential Tracks of Specialization

Students have the freedom to shape customized degree tracks based on their interests.

Choices for possible tracks could include:

Neuroscience Track

- BS 260 - Intro to Neuroscience Credits: 3
- BS 318 - The Biology of Aging Credits: 3
- BS 425 - Neuroscience Credits: 3
- BS 428 - Neuropsychology Credits: 3
- BS 456 - Immunobiology Credits: 4
- BS 460 - Neurobiology Credits: 3
- BS 461 - Cell Biology Credits: 4
- BS 495 - Seminar in Neuroscience Credits: 1
- BS 716 - Neuromuscular Physiology Credits: 3

Clinical Science Track

- BS 218 - Hematology Credits: 3
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4
- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 450 - Human Virology Credits: 3
- BS 461 - Cell Biology Credits: 4

Biotechnology Track

- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 461 - Cell Biology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2

Sample Biomedical Sciences Curriculum (Full year of Physics and full year of Anatomy and Physiology with optional lab)

First Year

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 109 - General Biology I Credits: 3 or BS 132 - Introductory Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1 or BS 134 - Introductory Biology I Laboratory Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- BS 119 - General Biology II Credits: 3 or BS 133 - Introductory Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1 or BS 135 - Introductory Biology II Laboratory Credits: 1 or BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- MA 110 - General Calculus Credits: 3
- MI 110 - Intro Health/Medical Profs Credits: 1
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16-17

Second Year

Fall Semester

- General Education Social Science Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 203 - Organic Chemistry Lab I Credits: 1
(See Footnote 2 Below)
- PY 201 - Introductory Physics I Credits: 4
(See Footnote 3 Below)

Credits/Semester: 18

Spring Semester

- Free Elective or Science Elective Credits: 3
- General Education Social Science Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 204 - Biological Sciences Colloquium Credits: 1
- CH 202 - Organic Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- PY 202 - Introductory Physics II Credits: 4
(See Footnote 3 Below)

Credits/Semester: 18

Third Year

Fall Semester

- Clinical Biology elective or Free elective Credits: 3–4
- General Education Humanities Discipline Requirement Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
or
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1 (optional)
- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- CO 101 - Introduction to Communication Credits: 3
or
- CO 204 - Public Speaking Credits: 3

Credits/Semester: 16-18

Spring Semester

- Clinical Biology elective or Free Electives Credits: 3-4
- General Education Humanities Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
or
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 208 - Human Structure and Function II Laboratory Credits: 1 (optional)
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1
- ST 310 - Biostatistics I Credits: 3
(see footnote 5 below)

Credits/Semester: 17-18

Fourth Year

Fall Semester

- Science Elective Credits: 3-4
- Free Electives Credits: 10
- BS 493 - Biological Sciences Seminar I Credits: 1
(See Footnote 4 Below)

Credits/Semester: 14-15

Spring Semester

- Free Electives Credits: 7
- Biological Sciences Elective Credits: 3-4
- BS 494 - Biological Sciences Seminar II Credits: 1
(See Footnote 4 Below)

Credits/Semester: 11-12

Total Minimum Credits: 127

Footnotes:

1. Qualified students may substitute CH 111/CH 113 and CH 112/CH 114 for CH 101/ CH103 and CH 102/CH 104.
2. Qualified students may substitute CH 211/CH 213 and CH 212/CH 214 for CH 201/CH 203 and CH 202/CH 204.
3. Qualified students may substitute PY 211 and PY 212 for PY 201 and PY 202.
4. Students planning to graduate in January of final year need to complete Seminar sequence in their third year.
5. Students may substitute SS 222 for ST 310.

Biotechnology – Graduate Certificate

A certificate in biotechnology has been developed to prepare students for positions in the pharmaceutical and biotechnology industries. The certificate requires completion of 15 credits. Admission into the certificate program requires a bachelor's degree and completion of organic chemistry.

The objectives of the certificate in biotechnology program are to provide each student with the opportunity to:

- Develop knowledge and skill sets in the tools of molecular biology and biotechnology.
- Apply these skill sets in obtaining employment within the biotechnology or pharmaceutical industries.

The students in the certificate in biotechnology program are expected to complete:

- BS 466 - Genetics Credits: 4
- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Laboratory Credits: 2
- CH 341 - Molecular Structure in Biochemistry Credits: 3
(See Footnote Below)
- Elective(s) Credits: 3

Footnote:

Students who have completed a comparable course will be required to substitute one or more electives with credits that total at least 15 total credits.

Brewing Science - Graduate Certificate

The Brewing Science Certificate program is a post-baccalaureate, 18-credit certificate which trains students for employment in the craft brewing industry. Through a team-teaching model in which students are instructed by Experts at USciences and Professionals in the Brewing Industry, students combine class room theory and practical applications to further develop their understanding and troubleshooting of the brewing process. In addition, through our Pilot Brewing Laboratory and our hands-on Quality Control and Microbiology labs students train and practice essential techniques that are directly translatable to the brewery and today's emphasis on consistency and quality.

Program-level learning outcomes: By the end of the program, students will:

- Be prepared for entry level employment in the brewing industry.
- Describe the science of brewing, including raw materials, malting, mashing, microbiology, fermentation, yeast management, quality control, conditioning, packaging and basic brewery engineering.
- Practice essential manufacturing, quality control, and microbiology methods during the production of a fermented beverage.
- Develop critical thinking and problem solving skills through inquiry-based projects and utilization of the pilot brewing lab.
- Establish industry connections through personal interactions with brewery professionals.
- Gain experience and interpersonal communication skills in real world settings through an internship and an experimental pilot brewing lab.
- Gain experience in topics of personal interest through student-selected projects.

Pre-requisites

- Bachelor's degree, highly recommended in biology, chemistry, physics, or engineering
 - Alternate degrees and significant brewing or analytical experience will be considered on a case-by-case basis
- College-level competency (B- or better) in at least two of the following: pre-calculus, general biology, general chemistry, or general physics
- Practical brewing experience is advantageous but not required for admission

Required Courses

- BS 770 - Fundamentals of Brewing Sciences Credits: 3
- BS 771 - Brewery Engineering Credits: 3
- BS 773 - Microbiology of Beer Credits: 2
- BS 774 - Quality Control Lab Credits: 2
- BS 775 - Project in Brewing Science Credits: 3
- BS 776 - Brewing Science Internship Credits: 3
- BS 872 - Current Topics in Zymurgy Credits: 2

Cancer Biology – Doctor of Philosophy (PhD)

(Joint program between USciences and The Wistar Institute)

This research training program is designed to train students for a successful academic or industrial career in cancer biology and therapy. This training will be achieved through a comprehensive, integrated graduate curriculum that leverages existing scientific excellence in basic and translational cancer research at The Wistar Institute and University of the Sciences (USciences).

The program is designed to fill a regional gap in specific training in cancer biology, including cutting-edge strategies in translational aspects, as well as hands-on training to emphasize the understanding of the process of drug discovery and therapy. The program will integrate the long tradition of multidisciplinary academic achievements in cancer biology at The Wistar Institute with the focus on drug discovery and industrial partnership of researchers at USciences.

The didactic program comprises core courses that will provide essential background in cell and molecular biology, biochemistry, and biotechnology as well as advanced graduate courses focusing on the basic mechanisms of cancer biology as well as drug discovery. Together, the approach integrates a learning platform combining up-to-date basic mechanistic understanding of cancer pathways with more translational, disease-relevant topics in cancer therapy and drug discovery. The curriculum is designed to equip students to succeed in a multidisciplinary environment as both hypothesis-driven academic cancer researchers and industrial or academic discoverers.

The degree requires completion of 27 didactic credits and at least 20 credits of research.

Program Requirements

All or most of the didactic coursework is completed within the first two years.

Core Courses (18 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2
- BS 767 - Cell Biology Methods Lab Credits: 2
- BS 786 - Research Ethics Credits: 1
- BS 801 - Scientific Discourse Credits: 1
- BS 861 - Cell and Molecular Biology Credits: 3
- BS 887 - PhD Colloquium Credits: 1
- BS 897 - Scientific Proposals Credits: 2
- CH 728 - Advanced Biochemistry Credits: 3

Advanced Courses (7 credits)

- CB 815 - Cancer Biology Credits: 3
- CB 880 - Molecular Screening Credits: 2
- CB 890 - Journal Club Credits: 2

Electives (2 credits)

Courses for other programs may be elected with permission of the program director. It is the responsibility of the student to fulfill course prerequisites. Approved 700/800 level courses can be taken to fulfill graduate elective credits. Program electives include:

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CB 880 - Molecular Screening Credits: 2
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Research Courses (20 credits)

- CB 785 - Introduction to Research Credits: 4
- CB 899 - Doctoral Research Credits: 9
(20 minimum)

Cell and Molecular Biology – DO/PhD

USciences has partnered with the Philadelphia College of Osteopathic Medicine (PCOM) to offer a combined doctor of osteopathic medicine (DO)/PhD cell and molecular biology degree. The degree is designed to train physician scientists to perform fundamental research on human health issues, speed translational research to clinical practice, or develop related

approaches. The degree consists of a 2-3-2 model of education, combining two years of medical education, three years of research in the cell and molecular biology PhD program resulting in a body of novel and significant research that is defensible as a completed dissertation, and two years of clinical experiential education; students in this degree program must complete the PhD degree requirements before proceeding to the clinical experience. Students may choose a mentor from among the graduate faculty members of the Department of Biological Sciences or affiliated faculty members at PCOM. Applicants for this program must apply directly to PCOM for the DO program, respond to the invitation for additional application materials and will be evaluated simultaneously for the DO degree and the PhD degree tracks. An applicant must be judged to be acceptable for DO education in order to be admitted to the combined DO/PhD degree track.

The degree requires completion of 20 didactic credits and at least 20 credits of research.

Core Courses (17 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2
- BS 767 - Cell Biology Methods Lab Credits: 2
- BS 861 - Cell and Molecular Biology Credits: 3
Note: Credit for BS 861 is typically transferred from coursework completed at PCOM
- BS 887 - PhD Colloquium Credits: 1
- BS 897 - Scientific Proposals Credits: 2
- BS 801 - Scientific Discourse Credits: 1
- ST 704 - Statistics for Research Credits: 3
Note: Credit for ST 704 may be transferred from coursework completed at PCOM

Electives (3 credits)

Elective credits for this program are typically transferred from coursework completed at PCOM.

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

Program electives include:

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CB 815 - Cancer Biology Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Research Courses (20 credits)

- BS 785 - Introduction to Research Credits: 4
Note: Required at the discretion of the program director.
- BS 899 - Doctoral Research Credits: 9

Cell and Molecular Biology – Doctor of Philosophy (PhD)

The department offers a PhD degree option in cell and molecular biology. The degree is a research-focused degree in which the student completes a body of novel and significant research that will result in a written dissertation that is defended before the program faculty. In addition, PhD students are expected to present the results of the research efforts in professional meetings and through publication. The objectives of the PhD program are to provide opportunities for each student to:

- Develop skill and knowledge in the fields of cell biology, biotechnology, molecular biology, and related disciplines of bioinformatics, developmental biology, microbiology, or biophysics.
- Initiate, conduct, and complete a research project that makes use of the knowledge and skills relevant to the program.
- Demonstrate an improving set of oral and written presentation skills for communication of research results.
- Develop competence and proficiency in acquisition and interpretation of the scientific literature relevant to the program disciplines.
- Become skilled in the process of grantsmanship through courses and the faculty mentor opportunities and interaction.

The degree requires completion of 20 didactic credits and at least 20 credits of research.

- ST 704 - Statistics for Research Credits: 3

Electives (2 credits)

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CB 815 - Cancer Biology Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Research Courses (20 credits)

- BS 785 - Introduction to Research Credits: 4
Note: Required at the discretion of the program director.
- BS 899 - Doctoral Research Credits: 9

Cell Biology and Biotechnology – Master of Science (Non-Thesis)

MS (Non-Thesis)

The MS non-thesis option is a coursework-based degree in which the student completes a minimum of 30 credits. The objectives of the MS non-thesis option program are to provide opportunities for each student to:

- Develop skill and knowledge in the fields of cell biology, biotechnology, molecular biology, and related disciplines of bioinformatics, developmental biology, microbiology, or biophysics.
- Demonstrate an improving set of oral and written presentation skills for communication of research results.
- Develop competence in acquisition and interpretation of the scientific literature relevant to the program discipline.

This degree requires completion of 30 didactic credits.

- ST 702 - Statistical Principles in Bioassay Credits: 3

or

- ST 704 - Statistics for Research Credits: 3

Electives (12 credits)

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

In addition to the program core outlined above, the MS non-thesis student may elect:

The electives for the MS non-thesis option may be chosen to enhance the student's career objectives or to allow exploration of additional areas of interest.

- BS 785 - Introduction to Research Credits: 4
Notes: For the student who is contemplating a change to the MS thesis option or those interested in exploring research as a future direction and may be taken up to two times for credit.
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
Note: May be taken up to two times for credit.

Cell Biology and Biotechnology – Master of Science (Non-Thesis) with Certificate in Biomedical Writing

The student who desires to pursue the certificate in biomedical writing must secure the written approval of the biomedical writing program director to pursue this option.

The objectives of the MS non-thesis option with certificate in biomedical writing are to provide each student with the opportunities to:

- Develop skill and knowledge in the fields of cell biology, biotechnology, molecular biology, and biomedical writing.
- Demonstrate an improving set of oral and written presentation skills for communication of research results and material relevant to regulatory and similar writing.
- Develop competence and proficiency in acquisition and interpretation of the scientific literature relevant to the program disciplines.

This degree requires completion of 40 didactic credits.

Core Courses (18 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2
- BS 767 - Cell Biology Methods Lab Credits: 2
- BS 786 - Research Ethics Credits: 1
- BS 801 - Scientific Discourse Credits: 1
- BS 861 - Cell and Molecular Biology Credits: 3
- BS 887 - PhD Colloquium Credits: 1

- BS 897 - Scientific Proposals Credits: 2
- ST 704 - Statistics for Research Credits: 3

Electives (12 credits)

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Certificate in Biomedical Writing (10 credits)

Note: Additional biomedical writing courses may be taken to fulfill certificate credits with the permission of the program director.

- BW 701 - Professional Writing in Science Credits: 3
- BW 704 - Regulatory Document Processes Credits: 3
- BW 708 - Regulatory Writing: New Drug Applications Credits: 3
- BW 780 - Special Topics in Biomedical Communication Credits: 3

Cell Biology and Biotechnology – Master of Science (Professional)

The objectives of the MS professional degree option are to provide each student with opportunities to:

- Develop skill and knowledge in the fundamentals and practice of cell biology, biotechnology, and molecular biology.
- Develop knowledge and skills in the principles of management and business practice within the biotechnology and pharmaceutical industries.
- Demonstrate an improving set of oral and written presentation skills for communication of research results and material relevant to business and management practice.
- Develop competence and proficiency in acquisition and interpretation of the literature relevant to the program disciplines.

This degree requires completion of 46 didactic credits.

Core Courses (18 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2
- BS 767 - Cell Biology Methods Lab Credits: 2
- BS 786 - Research Ethics Credits: 1
- BS 801 - Scientific Discourse Credits: 1
- BS 861 - Cell and Molecular Biology Credits: 3
- BS 887 - PhD Colloquium Credits: 1

- BS 897 - Scientific Proposals Credits: 2
- ST 702 - Statistical Principles in Bioassay Credits: 3
or
- ST 704 - Statistics for Research Credits: 3

Electives (12 credits)

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Professional/MBA Courses (16 credits)

- PB 711 - Managerial and Financial Accounting Credits: 2
- PB 721 - Managerial Finance Credits: 2
- PB 731 - Business Statistics Credits: 2
- PB 741 - Team Dynamics-Human Resources Management Credits: 2
- PB 742 - Leadership and Development Credits: 2
- PB 761 - Competitive Analysis and Strategic Business Planning Credits: 2
- PB 762 - Pharmaceutical Research and Development Management Credits: 2
- PB 774 - Ethical Issues in Pharmaceutical Business Credits: 2

Cell Biology and Biotechnology – Master of Science (Thesis)

The MS thesis option is a research-focused degree in which the student completes a research project under the mentorship of one of the program faculty members and defends that thesis to the program faculty. The objectives of the MS thesis option program are to provide opportunities for each student to:

- Develop skill and knowledge in the fields of cell biology, biotechnology, molecular biology, and related disciplines of bioinformatics, developmental biology, microbiology, or biophysics.
- Initiate, conduct and complete a research project that makes use of the knowledge and skills relevant to the program.
- Demonstrate an improving set of oral and written presentation skills for communication of research results.
- Develop competence in acquisition and interpretation of the scientific literature relevant to the program disciplines.

This degree requires completion of 20 didactic credits and at least 10 research credits.

Core Courses (18 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2
- BS 767 - Cell Biology Methods Lab Credits: 2
- BS 786 - Research Ethics Credits: 1

- BS 801 - Scientific Discourse Credits: 1
- BS 861 - Cell and Molecular Biology Credits: 3
- BS 887 - PhD Colloquium Credits: 1
- BS 897 - Scientific Proposals Credits: 2
- ST 704 - Statistics for Research Credits: 3

Electives (2 credits)

Note: Additional 700/800 level courses may be taken to fulfill graduate elective credits with the permission of the program director.

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 750 - Virology Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 790 - Project in Cell Biology and Biotechnology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3

Research Courses (10 credits)

- BS 785 - Introduction to Research Credits: 4
Note: Required at the discretion of the program director.
- BS 799 - Master's Research Credits: 9

Environmental Science – Major

Environmental science is an exciting field that combines the natural sciences of biology, chemistry, geology, and mathematics with the social science fields of economics, sociology, and law. This broad major applies these disciplines to the study of industrialization and other man-made disturbances, both past and present, on ecosystem and public health. There continues to be a growing need for individuals who want to attain and maintain a clean and healthy environment through the 21st century. Environmental scientists work in a field that is becoming increasingly technical and requires that students understand the application of scientific and social principles to environmental issues and sustainability.

The degree in environmental science will prepare students, through an interdisciplinary approach, for entry-level positions in private industry and in governmental agencies where problems dealing with environmental and sustainability issues are addressed. Graduates of the program will also be well prepared to pursue further academic training in environmental health, environmental law, environmental management, sustainability, and ecological and environmental sciences.

The environmental science curriculum is designed to give students a strong scientific background with a foundation in humanities and social sciences. Students are encouraged to participate in independent study and/or directed research. In addition, all students are expected to have completed an environment-related summer internship or job before their fourth year in the program.

Environmental Science Degree Requirements

To qualify for the degree of bachelor of science in environmental science, a minimum of 127 credit hours of approved courses is required, of which at least 50 credit hours must represent courses in the biological sciences. At the 200 level and above, only those credits for which a student has earned a grade of "C-" or better will count toward the minimum biology credits required for graduation.

Credit hours earned in a course of a biological nature given by a department other than the Department of Biological Sciences may only be used to meet the minimum credits required to qualify for a bachelor of science in environmental science with the written approval of the chair of the Department of Biological Sciences.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Environmental Science Fundamental Requirements (50 credit hours)

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- or
- BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1
- or
- BS 137 - Phage Hunters II Credits: 2
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 276 - Introduction to Environmental Science Credits: 3
- BS 277 - Introduction to Environmental Science Lab Credits: 1
- BS 280 - Comparative Animal Phys Credits: 3
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 377 - Ecology Credits: 4
- BS 440 - Environmental Toxicology Credits: 3
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1
- BS 471 - Environmental Law Credits: 3
- BS 472 - Principles of Environmental Risk Assessment Credits: 3
- BS 493 - Biological Sciences Seminar I Credits: 1
- BS 494 - Biological Sciences Seminar II Credits: 1
- GL 275 - Environmental Geology Credits: 3

Environmental Science Program Electives (minimum of 3 credits required)

Choose from any additional courses offered by the Department of Biological Sciences.

Additional Curricular Requirements

- Analytical Chemistry:
CH 361 - Analytical Chemistry and
CH 363 - Analytical Chemistry Laboratory Credits: 4 total
- CH 101–104 - General Chemistry I and II Lecture and Laboratory Credits: 8 total
(See Footnote 1 Below)
- CH 201–204 - Organic Chemistry I and II Lecture and Lab Credits: 8 total
(See Footnote 2 Below)
- CH 340 - Survey of Biochemistry or CH 341 - Molecular Structure in Biochemistry or CH 346 - Biochemistry Credits:

3-4

- MA 107 Precalculus Credits: 3
- MA 110 General Calculus Credits: 3
- PY 201/202 - Introductory Physics I and II Credits: 8 total
(See Footnote 3 Below)
- ST 310 - Introduction to Biostatistics Credits: 3

Footnotes:

1. Qualified students may substitute CH 111-114.
2. Qualified students may substitute CH 211-214.
3. Qualified students may substitute PY 211/212

Sample Environmental Science Curriculum Plan

First Year

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15-16

Second Year

Fall Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 203 - Organic Chemistry Lab I Credits: 1
(See Footnote 2 Below)
- PY 201 - Introductory Physics I Credits: 4
(See Footnote 2 Below)

Credits/Semester: 18

Spring Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 276 - Introduction to Environmental Science Credits: 3
- BS 277 - Introduction to Environmental Science Lab Credits: 1
- CH 202 - Organic Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- PY 202 - Introductory Physics II Credits: 4
(See Footnote 3 Below)

Credits/Semester: 19

Third Year

Fall Semester

- General Education Humanities Requirement Credits: 3
- General Education Communication Requirement Credits: 3
- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- GL 275 - Environmental Geology Credits: 3

Credits/Semester: 15-17

Spring Semester

- BS 280 - Comparative Animal Phys Credits: 3
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1

- BS 377 - Ecology Credits: 4
- CH 361 - Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 17-18

Fourth Year

Fall Semester

- Biology Electives Credits: 1-3
- General Education Humanities Requirement Credits: 3
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 471 - Environmental Law Credits: 3
- BS 493 - Biological Sciences Seminar I Credits: 1

Credits/Semester: 15-17

Spring Semester

- Environmental Science Electives Credits: 6-7
- BS 440 - Environmental Toxicology Credits: 3
- BS 472 - Principles of Environmental Risk Assessment Credits: 3
- BS 494 - Biological Sciences Seminar II Credits: 1

Credits/Semester: 13-14

Total Minimum Credits: 127

Footnotes:

1. Qualified students may substitute CH 111/113 and CH 112/114.
2. Qualified students may substitute CH 211/213 and CH 212/214.
3. Qualified students may substitute PY 211 and PY 212.
4. Students planning to graduate in January of final year need to complete Seminar sequence in their third year.

Environmental Science – Minor

Careers for environmental scientists exist in academic, nonprofit, industrial, governmental, and public health settings. Students with a minor in environmental science are well prepared to pursue opportunities in the workforce or in graduate or professional schools. Many students get advanced degrees in biology, ecology, or environmental science, while other seek employment in the public health or environmental management professions. Students must complete 18 credits above the introductory level for a minor in environmental science. Of the 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Courses

- BS 109 - General Biology I Credits: 3
or
- BS 132 - Introductory Biology I Credits: 3
- BS 119 - General Biology II Credits: 3
or
- BS 133 - Introductory Biology II Credits: 3
- BS 110 - General Biology I Lab Credits: 1
or
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- BS 120 - General Biology II Lab Credits: 1
or
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2

Required Courses

- BS 276 - Introduction to Environmental Science Credits: 3

Elective Courses

15 required hours that may be taken from the courses listed below:

- BS 277 - Introduction to Environmental Science Lab Credits: 1
- BS 280 - Comparative Animal Phys Credits: 3
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 377 - Ecology Credits: 4
- BS 440 - Environmental Toxicology Credits: 3
- BS 471 - Environmental Law Credits: 3
- BS 472 - Principles of Environmental Risk Assessment Credits: 3
- BS 474 - Emerging Biological Threats and Global Sustainability Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- CH 366 - Principles of Analytical Chemistry Credits: 3
- GL 275 - Environmental Geology Credits: 3
- HE 730 - Fundamentals of Epidemiology Credits: 3
- HE 740 - Environment and Human Health Credits: 3
- HS 430 - Survey of Public Health Credits: 3
- SS 422 - Globalization and International Health Credits: 3

Medical Laboratory Science – Major

Description of the MLS Field

Medical laboratory science (MLS) professionals, also known as clinical laboratory scientists (CLS) or medical technologists (MT), develop, perform, and evaluate clinical laboratory procedures. They also evaluate, correlate, and assure the validity of

patient results and laboratory information essential to diagnosing disease and determine maintenance of health (NAACLS, 2019). In addition to being necessary and respected members of the healthcare team, medical laboratory scientists make vital contributions in many other areas of the laboratory sciences. These include:

- Epidemiology
- Veterinary medicine
- Sales & marketing & instrumentation
- Laboratory supervision and management
- Education
- Public health
- Food technology
- Toxicology
- Medical, industrial and pharmaceutical research
- Molecular and genetic testing
- Forensic determinations

A huge demand for medical laboratory scientists currently exists, medical laboratory science is a rapidly growing and changing field and provides a varied and interesting profession for someone interested in the sciences and in medicine.

Program Overview

The goal of the MLS program at USciences is to produce competent, highly qualified clinical laboratory professionals according to NAACLS Standards and ASCLS Core Values. This is achieved by providing a program taught by faculty who are committed to the student experience, who excel in their respective academic disciplines, including those who are actively working in the field of healthcare, and who are committed to their continual proficiency of the field. Faculty will facilitate the student's development of scientific competence and their ability to perform specific tests and experiments leading to the diagnosis of human disease. Our faculty also aim to foster pride in and excitement of entering the MLS field.

Students who successfully complete the curriculum will be able to:

- Understand the biological, physiological, and pathological basis of disease.
- Have knowledge of and be able to relate normal biological processes to disease situations, as well as have a basic knowledge in broad biological areas.
- Prior to U4 year, demonstrate competency in the laboratory portion of biology and chemistry laboratories; demonstrate knowledge of skills, expectations, current trends, and professional aspects of the field of medical laboratory science.
- Possess and demonstrate entry-level skills, competencies, and proficiencies in medical laboratory science, as determined by NAACLS requirements, as well as theoretical background in aspects of disease diagnosis.
- Understand the "case study" concept and process and be able to successfully solve case studies and communicate these results.
- Understand and perform quantitative aspects of medical laboratory science such as graphs, charts, laboratory value units, and statistical analysis. Recognize limitations of scientific plans and approaches.
- Be aware of social, political, and community impact of laboratory medicine and some aspects of healthcare in general. Learn to work well in group settings and interact with other healthcare professionals.
- Acquire an awareness and sensitivity of patient-related issues and the importance of patient confidentiality.
- Demonstrate the ability to read and analyze scientific literature.
- Demonstrate the ability to read, follow, and compose clinical laboratory procedure manuals, patient reports, and charts.
- Understand how each laboratory test affects patient diagnosis.
- Become lifelong learners and maintain certification status through continuing education in the realm of MLS.

Program Mechanics

The MLS program at USciences provides the student with a solid background in biology, chemistry, mathematics, communication, and MLS concepts. The program is a hospital-based 3+1 program where students are enrolled full-time at USciences for three academic years (U1 – U3), earning at least 97 credits, then continue their education during their fourth year (U4) at an affiliated and NACCLS-approved hospital medical laboratory science/medical technology (MLS/MT) program. This is where students gain practical hands-on in-depth learning of specific diagnostic skills within at least seven clinical laboratory disciplines.

During the U4 year, at the hospital MLS/MT program, the student will earn an additional 32-43 credits. These credits will be

transferred to the student's USciences transcript, quality points assigned, and factored into their final GPA. If the student satisfactorily obtains the minimum letter grade and required credits from the hospital MLS/MT program and USciences courses, they will earn a Certificate of Completion from the hospital MLS/MT program of attendance and will also be conferred a Bachelor of Science degree in Medical Laboratory Science from USciences. The graduate will then be eligible to apply for the national certification examination given by the Board of Certification of the American Society for Clinical Pathology (BOC ASCP). Those who pass will earn 1) the professional designation MLS(ASCP) which can be used after their names and 2) the professional recognition of competence to work in the clinical laboratory.

Number grades assigned by the hospital MLS/MT program site will be received by the USciences MLS program director, rounded to the nearest whole number and converted to the USciences MLS program grading scheme. Students earning a failing grade will not be eligible for graduation until the course is repeated and a passing grade is earned. The ability to repeat the failing course will be determined by the hospital MLS/MT program director. If the student fails the hospital MLS/MT program, the student will be dropped from the USciences MLS program and should refer to the "Admission to an Academic Program after Being Dropped from a Program," "University Dropped from the Rolls," and "Changing Majors" policies for possible outcomes located in the student handbook.

Most hospital MLS/MT programs start in the late summer between U3 and U4 years and end early-midsummer of their U4 year. This means the student is eligible to walk during May graduation but will not receive their diploma until their grades have successfully transferred from the hospital program to their USciences transcript.

To round out their educational experience during their time at USciences (U1-U3 years), students can, and are encouraged, to take part in the myriad student-lead organizations, university-wide research labs, physical fitness, and emotional and academic support programs. Students are still enrolled at USciences during their U4 year and therefore they still have access to the above resources, however, any laboratory research will be terminated due to time constraints of the hospital MLS/MT program.

Hospital Program Eligibility and Application Process

Students apply to the hospital MLS/MT program during the summer following completion of their U2 year. A cumulative grade point average of 2.90 in required science courses (see below) is mandatory to submit an application and thus progress from U2 to U3. (This GPA is currently based on requirements of the hospital affiliates and is subject to change based on the hospital requirements.) If the student does not achieve the minimum required GPA at the end of U2, the student could be dropped from the program and should refer to the "Admission to an Academic Program after Being Dropped from a Program," "University Dropped from the Rolls," and "Changing Majors" policies located in the student handbook. Students should consult with their advisor to ascertain if they may be eligible to change majors and reapply to the medical laboratory science program at a later date.

The following courses are required to gain admission into a hospital MLS/MT program:

- Biology Courses (16 semester hours) including Microbiology, Immunology, Anatomy & Physiology, Genetics/Molecular Biology
- Chemistry Courses (16 semester hours) including Organic Chemistry/Biochemistry
- Calculus (Pre-calculus is satisfactory) and Statistics

Acceptance into a hospital MLS/MT program is not guaranteed and is solely based on the discretion of the hospital MLS/MT program director. Hospital MLS/MT program directors base their decisions on grades, recommendations, and an on-site interview. If the student does not obtain acceptance into a hospital MLS/MT program, the student will be dropped from the USciences MLS program and should refer to the "Admission to an Academic Program after Being Dropped from a Program," "University Dropped from the Rolls," and "Changing Majors" policies for possible outcomes located in the student handbook.

Hospital MLS/MT Internship Program Overview

The purpose of the hospital MLS/MT program is to further educate, train, and prepare the student as an entry-level employee in a clinical laboratory. In addition, the program will prepare the student for the national certification examination given by ASCP. Information about the exam can be found at the ASCP Get Credentialed website. It is highly encouraged that students take the exam as soon as possible after their completion of the hospital MLS/MT program.

National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). The affiliates are hospitals that have kept pace with technological developments, possess the newest instrumentation, and have established excellent medical and surgical services.

Hospital MLS/MT programs charge tuition and are not necessarily located in the Philadelphia area; therefore, students may need to relocate for their U4 year. Some of these hospitals provide tuition reimbursement, provided the students work for its healthcare

system after graduation. Detailed information about this option will be discussed at the time of the interview. The University assists students in applying to an approved hospital MLS/MT program and holds formal affiliations with the schools of medical technology or medical laboratory science (hospital MLS/MT programs) at the following hospitals:

- Berkshire Medical Center, Pittsfield, MA
- Cleveland Clinic, Cleveland OH
- Jersey Shore University Medical Center/Meridian Health, Neptune, NJ
- New York-Presbyterian Brooklyn Methodist Hospital, Brooklyn, NY
- Pennsylvania College of Health Sciences, Lancaster, PA
- Pennsylvania Hospital, Philadelphia, PA
- Reading Hospital School of Medical Laboratory Science, Reading, PA
- St. Christopher's Hospital for Children, Philadelphia, PA
- UPMC Chautauqua Medical Laboratory Science Program, Jamestown, NY
- Vanderbilt University Medical Center, Nashville, TN

Each hospital MLS/MT internship program will have their own start and end date and will run between 10 - 12 months. The dynamics of each individual program are unique to one another, however they will all cover education in the following clinical laboratory departments, as per NAACLS standards:

1. **Clinical hematology/coagulation** analyzes the type, quality, and quantity of the cellular blood components (red cells, white cells, and platelets) and assists in the diagnosis of the disorders associated with these cells and the blood-forming tissues.
2. **Clinical immunohematology** utilizes immunological reactions to perform blood typing and crossmatching techniques and prepares blood components for transfusion.
3. **Clinical Microbiology** involves the study of the causative agents of infection (bacteria, viruses, fungi, and parasites) and explores possible treatment options; assists with hospital and community infectious disease surveillance and control.
4. **Clinical immunology/serology** identifies infectious and non-infectious diseases and identifies and quantifies antibodies by utilizing the principles of immunological reactions. This department is useful in the screening, detection and diagnosis of many non-culturable or slow-growing viral and bacterial agents causing infection, as well as autoimmune conditions and diseases.
5. In **clinical chemistry**, qualitative and quantitative chemical reactions are used to assess minute amounts of analytes in the body. This department is the workhorse of the clinical laboratory where hundreds to thousands of tests are run per day.
6. The **molecular diagnostics** department is where nucleic acid analysis and molecular techniques are performed to identify and quantitate agents of infectious disease. In addition, this department may scrutinize a human gene sequence for pharmacogenomic interpretation, typing malignant neoplasms, or recommending specific chemotherapeutic treatment. The technology used in this department is on the leading edge of clinical lab science.
7. **Phlebotomy** is the practice of drawing blood using venipuncture. This is the main way blood is obtained for laboratory analysis. The venipuncture process as well as tubes used vs. test ordered and the order in which the tubes are drawn are part of the phlebotomy training.
8. **Other areas of study** are endocrinology, urinalysis, cytogenetics, pathology, instrumentation, quality control, cell biology, flow cytometry, laboratory management, and laboratory information systems.

A Note on State Licensure

The following states require MLS personnel licensure to practice: California, Florida, Hawaii, Louisiana, Montana, Nevada, New York, North Dakota, Puerto Rico, Tennessee, and West Virginia. Some states allow ASCP MLS certification to be used in place of the state licensure exam. The following states prescribe to this allowance: FL, HI, LA, MT, NV, ND, PR., TN, WV. USciences MLS curriculum does not support the exam requirements for California and New York. More information can be found at <https://ascls.org/advocacy-issues/licensure>. Pennsylvania does not require MLS personnel licensure at this time.

Because USciences' MLS Program holds an affiliation with 2 New York State hospital MLS/MT programs, the following information is provided: New York state requires an MLS licensee to be gainfully employed in clinical laboratories. Additional courses: biochemistry laboratory or analytical chemistry with laboratory, are required to apply for the exam. Because of the compressed nature of USciences' MLS program, neither biochemistry laboratory nor an analytical chemistry course is part of the required course curriculum. If you are interested in gaining licensure in NY state, you are welcome to fulfill these courses at an alternate institution. More information can be found at the New York State Board of Education Office of Professions website.

In order to earn a degree from USciences Mishler College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average. Students must also complete general education discipline and skills requirements. These degree requirements are built into the MLS curriculum and is easily achieved if entering the program as a U1 (freshman) student.

Transfer Students

Due to the compressed nature of the program, transfer students are encouraged to contact the USciences MLS program director for more information about approximate year placement prior to submitting an application. Transfer students' qualifications and approximate year placement will be assessed on a case-by-case basis.

Earning a Dual Degree

If a student wishes to earn a dual degree while enrolled in the MLS program, the MLS program is extended by at least 1 year, converting it from a 3+1 to a 4+1 program, or longer. The latest a student may choose to enroll in an additional degree program is by the end of their MLS U2 year. Credit requirements for both degrees must be met in order to earn both degrees. More information can be found in the student handbook. Common dual degree choices are: BS MLS + BS BMS, BS MLS + BS Biology, BS MLS + BS Microbiology. Other dual degree programs outside of these three most common choices may take longer than 5 years to complete.

Medical Laboratory Science Major Requirements

Medical Laboratory Science Requirements

- BS 101 - Biology Orientation I Credits: 1
- MT 102 - Medical Technology Orientation II Credits: 1
- MT 201 - Medical Technology Seminar II Credits: 1
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4

Electives

- Free Elective Credits: 3

- BS 218 - Hematology Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4

Molecular Biology/Genetics Requirements

The Molecular Biology requirement can be satisfied by one of the following:

- BS 306 - Human Molec & Cell Bio Credits: 3
 - BS 475 - Molecular Biology Credits: 3
- Or additional courses as approved by the program director.
- BS 462 - Genetics Credits: 3
 - BS 463 - Genetics Laboratory Credits: 1

Immunology Requirement

- BS 358 - Principles and Applications of Immunology Credits: 3

Biological Sciences Requirements

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3

Chemistry Requirements

- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- CH 340 - Survey of Biochemistry Credits: 3

Mathematics Requirements

- MA 107 - Precalculus Credits: 3
- ST 310 - Biostatistics I Credits: 3

Internship

(See Footnote 1 below)

- MT 490 - Clinical Hem-Coagulation Credits: 8
- MT 491 - Clinical Immunohematology Credits: 7
- MT 492 - Clinical Chemistry Credits: 11
- MT 493 - Clinical Microbiology Credits: 10
- MT 494 - Clinical Immunology/Serology Credits: 4
- MT 495 - Clinical Seminar Credits: 6

Footnote:

1. Credits vary according to affiliation site. Courses are not limited to MT 490 - MT 495, therefore more credits will be assigned. See individual programs for details.

Sample Medical Laboratory Science Curriculum Plan

First Year

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- or
- BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- General Education Social Science Requirement Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- or
- BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- MT 102 - Medical Technology Orientation II Credits: 1
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16-17

Second Year

Fall Semester

- Free Elective or Medical Laboratory Science Elective¹ Credits: 3-4
- General Education Humanities Requirements Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1

Credits/Semester: 17

Spring Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 306 - Human Molec & Cell Bio Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1

- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Third Year

Fall Semester

- General Education Humanities Credits: 3
- BS 230 - Basic Concepts and Procedures in Medical Laboratory Science Credits: 4
- BS 310 - Anatomy and Physiology I Credits: 3
- CH 340 - Survey of Biochemistry Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- MT 201 - Medical Technology Seminar II Credits: 1

Credits/Semester: 17

Spring Semester

- Free Elective or Medical Laboratory Science Electives Credits: 3-4
- Free Elective Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 358 - Principles and Applications of Immunology Credits: 3
- BS 462 - Genetics Credits: 3
- BS 463 - Genetics Laboratory Credits: 1

Credits/Semester: 16-17

Fourth Year

- MT 490 - Clinical Hem-Coagulation Credits: 8
- MT 491 - Clinical Immunohematology Credits: 7
- MT 492 - Clinical Chemistry Credits: 11
- MT 493 - Clinical Microbiology Credits: 10
- MT 494 - Clinical Immunology/Serology Credits: 4
- MT 495 - Clinical Seminar Credits: 6

Credits/Year: 32-43

Total Minimum Credits: 130

Faculty

Diane Valentin, MT (ASCP) MB

BS (University of the Sciences); MS (Rutgers University)

Instructor of Medical Laboratory Sciences

Director, Medical Laboratory Science Program

Margaret A. Reinhart, MT (ASCP)

BS (Millersville University); MMA (Pennsylvania State University); MS (Villanova University)

Senior Lecturer of Biological Sciences

Adjunct Faculty

Berkshire Medical Center, Pittsfield, MA

Lori Moore, MEd, MT (ASCP)

MEd (Massachusetts College of Liberal Arts)

Program Director

Cleveland Clinic, Cleveland, OH

Barbara Zingale, BS, MT (ASCP)^{CM}

BS (Florida Atlantic University)

Program Director

Jersey Shore University Medical Center, Neptune, NJ

Nancy Jalowski, MAEd, MT (ASCP), PBT^{CM}

MAEd (University of Phoenix)

Program Director

Pennsylvania Hospital, Philadelphia, PA

Jean Buchenhorst, MS, MLS (ASCP)^{CM}

MS (MCP/Hahnemann)

Program Director

Pennsylvania College of Health Sciences, Lancaster, PA

Carol Bond, MA, MT (ASCP)

BS (Shippensburg University) MA (Evangelical Seminary)

Program Director

New York-Presbyterian Brooklyn Methodist Hospital, Brooklyn, NY

Lynn Jones, MSED, MT (ASCP)

MSED (American College of Education)

Program Director

Reading Hospital/Tower Health, Reading PA

Ethan Kentzel, MLS(ASCP)

MLS (Slippery Rock University)

Program Director

St. Christopher's Hospital, Philadelphia, PA

Susanne Dannert MT (ASCP)

BS (Temple University) MS (Thomas Jefferson University)

Program Director

UPMC Chautauqua Medical Laboratory Science Program, Jamestown, NY

Michele G. Harms, MS, MLS (ASCP)^{CM}

MS (State University of New York, Fredonia)

Program Director

Vanderbilt University Medical Center, Nashville, TN

Holly Covas, MPH, MLS (ASCP)^{CM}

MPH (University of California, Berkeley)

Program Director

Microbiology – Major

Microbiology involves the study of small, usually single-cell organisms. The microscopic life forms (microbes) that the discipline

investigates include archaeobacteria, bacteria, fungi, algae, and viruses as well as various animal microscopic parasites. Some microbes cause disease; however, most are not harmful to people, and many are beneficial.

Microbiologists study microbes to: [i] improve our knowledge base; [ii] solve technical problems pertaining to food production and preservation; [iii] identify, prevent, and cure infectious diseases; [iv] produce alternative energy sources; and [v] manage wastes. Microbiologists work in a wide variety of professional environments. The American Society for Microbiology has identified career opportunities in academic, clinical, industrial, pharmaceutical, and government settings for microbiologists with bachelor-level degrees. Furthermore, the undergraduate microbiology degree provides the background necessary to pursue graduate or professional education.

The microbiology curriculum meets the guidelines of the American Society for Microbiology Core Curriculum and is structured, yet flexible enough, to provide students with additional exposure to the natural and physical sciences and humanities, plus independent study and directed research.

Microbiology Degree Requirements

To qualify for the bachelor of science in microbiology, a minimum of 127 credit hours of approved courses is required. Included in these 127 credits must be all the general education and fundamental course requirements. At least 45 credit hours (excluding BS 101 and 204) must represent approved biological science courses. At the 200 level and above, only those credits for which a student has earned a grade of "C-" or better will count toward the minimum biological science credits required for graduation.

Credit hours earned in a course of a biological nature offered by a department other than the Department of Biological Sciences may only be used to meet the minimum credits required to qualify for a bachelor of science in microbiology with written approval of the chair of the Department of Biological Sciences.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Microbiology Fundamental Requirements

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II Credits: 2
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 343 - Microbial Genetics Credits: 4
- BS 350 - Trends in Applied Microbiology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 493 - Biological Sciences Seminar I Credits: 1
- BS 494 - Biological Sciences Seminar II Credits: 1

Track Requirements and Electives

Applied Microbiology & Biotechnology Track Requirements

- BS 461 - Cell Biology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3 or BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2

Applied Microbiology & Biotechnology Track Electives

- An additional 9-11 credits is required for the Applied Microbiology & Biotechnology Track.
- BI 425 - Bioinformatic Computing Credits: 3
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- BI 465 - Microarray Technology Credits: 3
- BI 475 - Proteomics Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 *
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 377 - Ecology Credits: 4
- BS 399 - Independent Study in Biological Sciences Credits: 3 **
- BS 415 - Modern Issues of Vaccinology Credits: 3
- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 450 - Human Virology Credits: 3
- BS 455 - Infection and Immunity Credits: 3 *
- BS 456 - Immunobiology Credits: 4 *
- BS 499 - Directed Research in Biological Sciences Credits: 3 **
- BS 770 - Fundamentals of Brewing Sciences Credits: 3
- BS 771 - Brewery Engineering Credits: 3
- BS 773 - Microbiology of Beer Credits: 2
- BS 774 - Quality Control Lab Credits: 2

*Students may receive credit towards the micro major for only one of BS 358 (Principles and Applications of Immunology), BS 455 (Infection and Immunity), or BS 456 (Immunobiology). Microbiology students are strongly encouraged to consider BS 456 for this option.

**Only 4 credits of BS 399 or BS 499 combined may count towards the micro major. In addition, the microbiology program director must approve the faculty mentor for the BS 399 or BS 499 project to ensure the project fits within the scope of microbiology.

Medical Microbiology & Immunology Track Requirements

- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 or BS 456 - Immunobiology Credits: 4
- BS 450 - Human Virology Credits: 3

Medical Microbiology & Immunology Track Electives

- An additional 4 - 7 credits is required for the Medical Microbiology & Immunology Track.
- BI 425 - Bioinformatic Computing Credits: 3
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- BI 465 - Microarray Technology Credits: 3
- BI 475 - Proteomics Credits: 3
- BS 372 - Aquatic Biology Credits: 4
- BS 375 - Environmental Microbiology Credits: 3
- BS 377 - Ecology Credits: 4
- BS 399 - Independent Study in Biological Sciences Credits: 3 *
- BS 415 - Modern Issues of Vaccinology Credits: 3

- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 461 - Cell Biology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3
- BS 474 - Emerging Biological Threats and Global Sustainability Credits: 3
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2
- BS 499 - Directed Research in Biological Sciences Credits: 3 *
- BS 770 - Fundamentals of Brewing Sciences Credits: 3
- BS 771 - Brewery Engineering Credits: 3
- BS 773 - Microbiology of Beer Credits: 2
- BS 774 - Quality Control Lab Credits: 2

*Only 4 credits of BS 399 or BS 499 combined may count towards the micro major. In addition, the micro program director must approve the faculty mentor for the BS 399 or BS 499 project to ensure the project fits within the scope of microbiology.

Additional Curricular Requirements

- General Education Social Science Discipline Requirement Credits: 6
- General Education Humanities Discipline Requirement Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 202 - Organic Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 203 - Organic Chemistry Lab I Credits: 1
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- CH 340 - Survey of Biochemistry Credits: 3 or CH 341 - Molecular Structure in Biochemistry Credits: 3 or CH 346 - Biochemistry Credits: 4
- CO 101 - Introduction to Communication Credits: 3 or CO 204 - Public Speaking Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PY 201 - Introductory Physics I Credits: 4
(See Footnote 3 Below)
- PY 202 - Introductory Physics II Credits: 4
(See Footnote 3 Below)
- ST 310 - Biostatistics I Credits: 3 or CH 361 - Analytical Chemistry Credits: 3 and CH 363 Analytical Chemistry Laboratory Credits: 1 or CH 366 - Principles of Analytical Chemistry Credits: 3 and CH 363 Analytical Chemistry Laboratory Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Footnotes:

1. Qualified students may substitute CH 111/113 and CH 112/114.
2. Qualified students may substitute CH 211/213 and CH 212/214.
3. Qualified students may substitute PY 211 and PY 212.

Sample Microbiology Curriculum Plan

First Year

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- CH 101 - General Chemistry I Credits: 3
(See Footnote 1 Below)
- CH 103 - General Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15-16

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II Credits: 2
- CH 102 - General Chemistry II Credits: 3
(See Footnote 1 Below)
- CH 104 - General Chemistry Lab II Credits: 1
(See Footnote 1 Below)
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15-16

Second Year

Fall Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
(See Footnote 2 Below)
- CH 203 - Organic Chemistry Lab I Credits: 1
(See Footnote 1 Below)
- PY 201 - Introductory Physics I Credits: 4
(See Footnote 3 Below)

Credits/Semester: 18

Spring Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 343 - Microbial Genetics Credits: 4
- CH 202 - Organic Chemistry II Credits: 3
(See Footnote 2 Below)
- CH 204 - Organic Chemistry Lab II Credits: 1
(See Footnote 2 Below)
- PY 202 - Introductory Physics II Credits: 4
(See Footnote 3 Below)

Credits/Semester: 19

Applied Microbiology & Biotechnology Track

Third Year

Fall Semester

- General Education Humanities Requirement Credits: 3
- BS 461 - Cell Biology Credits: 4 or BS 453 - Microbial Physiology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3 or BS 475 – Molecular Biology Credits: 3
and
- BS 476 - Molecular Biology Lab Credits: 2
or Applied Microbiology & Biotechnology Electives Credits: 3-4.
- CH 340 - Survey of Biochemistry Credits: 3 or CH 341 - Molecular Structure in Biochemistry Credits: 3 or CH 346 - Biochemistry Credits: 4
- ST 310 - Biostatistics I Credits: 3 or CH 361 - Analytical Chemistry Credits: 3 and CH 363 - Analytical Chemistry Laboratory Credits: 1 or CH 366 - Principles of Analytical Chemistry Credits: 3 and CH 363 Analytical Chemistry Laboratory Credits: 1

Credits/Semester: 16-20

Spring Semester

- Applied Microbiology & Biotechnology Elective Credits: 3-4
- General Education Communication Requirement Credits: 3
- General Education Humanities Elective Credits: 3
- BS 350 - Trends in Applied Microbiology Credits: 3

Credits/Semester: 12-13

Fourth Year

Fall Semester

- Applied Microbiology and Biotechnology Elective Credits: 3 - 4
- Free Elective Credits: 3
- BS 461 - Cell Biology Credits: 4 or BS 453 - Microbial Physiology Credits: 4
- BS 464 - Topics in Biotechnology Credits: 3 or BS 475 – Molecular Biology Credits: 3
and
- BS 476 - Molecular Biology Lab Credits: 2
or Applied Microbiology & Biotechnology Elective Credits: 3-4.
- BS 493 - Biological Sciences Seminar I Credits: 1

Credits/Semester: 14-17

Spring Semester

- Applied Microbiology & Biotechnology Elective Credits: 6-8
- Free Electives Credits: 6
- BS 494 - Biological Sciences Seminar II Credits: 1
(See Footnote 4 Below)

Credits/Semester: 13-15

Medical Microbiology & Immunology Track

Third Year

Fall Semester

- General Education Communication Requirement Credits: 3
- General Education Humanities Elective Credits: 3
- BS 453 - Microbial Physiology Credits: 4 or Medical Microbiology and Immunology Elective Credits: 3-4.
- CH 340 - Survey of Biochemistry Credits: 3 or CH 341 - Molecular Structure in Biochemistry Credits: 3 or CH 346 - Biochemistry Credits: 4
- ST 310 - Biostatistics I Credits: 3 or CH 361 - Analytical Chemistry Credits: 3 and CH 363 - Analytical Chemistry Laboratory Credits: 1 or CH 366 - Principles of Analytical Chemistry Credits: 3 and CH 363 Analytical Chemistry Laboratory Credits: 1

Credits/Semester: 15-18

Spring Semester

- Free Elective Credits: 3
- General Education Humanities Elective Credits: 3
- BS 350 - Trends in Applied Microbiology Credits: 3
Select two of the following:
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 or BS 456 – Immunobiology Credits: 4
- BS 450 - Human Virology Credits: 3

Credits/Semester: 15-16

Fourth Year

Fall Semester

- Free Elective Credits: 6
- Medical Microbiology and Immunology Elective credits: 3 - 4.
- BS 453 - Microbial Physiology Credits: 4 or Medical Microbiology and Immunology Elective Credits: 3-4
- BS 493 - Biological Sciences Seminar I Credits: 1
(See Footnote 4 Below)

Credits/Semester: 13-15

Spring Semester

- Free Elective Credits: 6
- BS 494 - Biological Sciences Seminar II Credits: 1
Select 2 courses from the following:
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 358 - Principles and Applications of Immunology Credits: 3 or BS 456 – Immunobiology Credits: 4
- BS 450 - Human Virology Credits: 3

Credits/Semester: 13-14

Total Minimum Credits: 127

Footnotes:

1. Qualified students may substitute CH 111/113 and CH 112/114 for CH 101/103 and CH 102/104.
2. Qualified students may substitute CH 211/213 and CH 212/214 for CH 201/203 and CH 202/204.
3. Qualified students may substitute PY 211 and PY 212 for PY 201 and PY 202.
4. Students planning to graduate in January of final year need to complete Seminar sequence in their third year.

Microbiology – Minor

Careers for microbiologists exist in academic, clinical, industrial, and governmental settings. Students with a minor in microbiology are well prepared to pursue opportunities in the workforce or in graduate or professional schools. Many students earn advanced degrees in medicine or biology, while others seek employment in the health, pharmaceutical, or biotechnological professions. Students must complete a minimum of 18 credits above the introductory level. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Courses

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
or
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1 or BS 136 - Phage Hunters I Credits: 2
- BS 135 - Intro Biology II Lab Credits: 1 or BS 137 - Phage Hunters II Credits: 2

Required Courses (12 credits)

- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 343 - Microbial Genetics Credits: 4
- BS 348 - Clinical Microbiology Credits: 4
or
- BS 453 - Microbial Physiology Credits: 4

Elective Courses

- BI 425 - Bioinformatic Computing Credits: 3
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BS 308 - Human Parasitology Credits: 3
- BS 348 - Clinical Microbiology Credits: 4
- BS 350 - Trends in Applied Microbiology Credits: 3
- BS 355 - Clinical Immunology Credits: 3
- BS 358 - Principles and Applications of Immunology Credits: 3 *
- BS 375 - Environmental Microbiology Credits: 3
- BS 399 - Independent Study in Biological Sciences Credits: 3 **
- BS 415 - Modern Issues of Vaccinology Credits: 3
- BS 441 - No Microbe Is an Island: The Social Life of Microbes Credits: 3
- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 455 - Infection and Immunity Credits: 3 *
- BS 456 - Immunobiology Credits: 4 *
- BS 475 - Molecular Biology Credits: 3
- BS 476 - Molecular Biology Lab Credits: 2
- BS 499 - Directed Research in Biological Sciences Credits: 3 **
- BS 773 - Microbiology of Beer Credits: 2

*Students may receive credit towards the micro minor for only one of BS 358 (Principles and Applications of Immunology), BS 455 (Infection and Immunity), or BS 456 (Immunobiology). Microbiology students are strongly encouraged to consider BS 456 for this option.

**Only 2 credits of BS 399 or BS 499 may count towards the micro minor. In addition, the microbiology program director must approve the faculty mentor for the BS 399 or BS 499 project to ensure the project fits within the scope of microbiology.

Neuroscience - Minor

The interdisciplinary nature of the neuroscience field requires familiarity with components of biology and psychology. A minor in neuroscience will provide an understanding of how different components of the nervous system work together to coordinate

physiological and cognitive functions. Students will gain an appreciation of the complex system and how changes in regulation can impact thoughts and actions.

General Requirements

Students must complete 18 credits beyond the prerequisite courses. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

Prerequisites

- BS 109 - General Biology I Credits: 3
or
- BS 132 - Introductory Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
or
- BS 134 - Intro Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
or
- CH 111 - Principles of Chemistry I Credits: 3
or
- CH 109 - Survey of Chemistry Credits: 4
- PS 101 - Introduction to Psychology Credits: 3

Required Courses (9-10 credits)

- Independent Study or Directed Research or Research Experience Credit approved by the minor program director
Credits: Minimum 2
- NS 260 - Intro to Neuroscience Credits: 1
- NS 261 - Intro to Neuroscience II Credits: 1
- NS 495 - Seminar in Neuroscience Credits: 1

Elective Courses (9 credits)

Choose a minimum of 6 credits of the following:

- BS 425 - Neuroscience Credits: 3
or
- PT 425 - Neuroscience Credits: 4
- NS 415 - Biophysics of the Brain Credits: 1
- NS 422 - Neurodevelopmental Disorders Credits: 1
- NS 424 - Developmental Cognitive Neuroscience Credits: 1
- NS 428 - Neuropsychology Credits: 1
- NS 460 - Neurobiology Credits: 1
- PC 340 - Introduction to Neuropsychopharmacology Credits: 3

Physician Assistant Studies – Undergraduate Pre-Professional Program, Years 1–4

Vision

Our vision is that our graduates will strive for excellence in all academic endeavors, develop a passion for caring for others, and prepare for a future in healthcare.

Mission

The mission of the USciences undergraduate pre-professional physician assistant program is to educate highly qualified students through an accelerated or traditional curriculum that prepares them to be academically successful in a graduate physician assistant program and that nurtures their qualities necessary to become competent and compassionate physician assistants.

Goals

To accomplish our mission and vision, the undergraduate pre-professional physician assistant program at University of the Sciences includes the following objectives:

- To identify those students at the pre-professional level who have the interest, motivation, and potential to be successful in the physician assistant profession.
- To promote in our students the importance of lifelong learning, professionalism, responsibility and ongoing self-evaluation.
- To develop in our students the ability to work collaboratively as part of the healthcare team.
- To prepare the students academically, clinically, and professionally for intense professional training in a graduate professional PA program.
- To socialize students into the role and expectations of the physician assistant.

Physician Assistant – Biomedical Sciences Major in Conjunction with USciences Graduate PA Program

Physician assistants (PAs) are licensed health professionals who practice medicine under the supervision of a physician. PAs are educated with a focus on primary care medicine. They deliver a broad range of medical and surgical services to diverse populations in rural, urban, and suburban communities throughout the country. With a physician assistant education, the graduate may choose to work in primary care, emergency medicine, surgery, and all other specialty practices. The PA profession has numerous employment opportunities and was recently rated as the best job and the fastest growing healthcare career in the U.S.

Eligibility Requirements

Successful completion of the undergraduate pre-professional program at USciences provides a guaranteed interview to the graduate professional program at USciences only after the student has fulfilled all required criteria:

- Successful completion of all required pre-professional coursework at USciences with a minimum cumulative GPA of and minimum natural science GPA of 3.20. These minimums must be earned and maintained from the second year through graduation. There are also requirements at the end of first and second year to advance. (Note: grades of "C-" or lower in any natural science and "C+" or lower in PA-specific courses do not qualify). All natural science and PA-specific courses after freshman year must be taken at USciences. Transfer credit is at the discretion of the program director.
- Completion of the graduate program application via CASPA (an online application service), which includes three to five letters of recommendation (one must be from a physician assistant), and a one-page personal statement describing the applicant's motivation for a career as a physician assistant. The narrative should demonstrate knowledge of the profession, motivation, interpersonal skills, and maturity.
- Documented completion of a minimum of 500 hours of direct patient contact and 100 hours of shadowing a physician assistant or physician. These experiences offer the students an awareness of the intricacies of healthcare and/or human service with exposure to care of the sick or injured. Students are strongly encouraged to become familiar with the depth and breadth of the physician assistant role.
- Demonstration of professional behavior, good judgment, maturity, motivation, and ability to perform well. Successful interview with the graduate program faculty.
- The meeting of program technical standards.

Physician Assistant Undergraduate Pre-Professional Program Degree Requirements (years 1-4)

General Education and Foundation Courses

- General Education Humanities Discipline Requirements Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- BS 4XX 400 Level Biological Sciences Course Credits: 3
- Biological Sciences Electives Credits: 1
- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- BS 204 - Biological Sciences Colloquium Credits: 1
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 358 - Principles and Applications of Immunology Credits: 3
- BS 466 - Genetics Credits: 4
- BS 493 - Biological Sciences Seminar I Credits: 1
- BS 494 - Biological Sciences Seminar II Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- CH 340 - Survey of Biochemistry Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- PY 200 - Survey of Physics Credits: 4 or PY 201 - Introductory Physics I Credits: 4
- SO 101 - Introduction to Sociology Credits: 3
- ST 310 - Biostatistics I Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3
- WR 302 - Scientific Writing Credits: 3

Physician Assistant Studies and Health Science Courses

- MI 110 - Intro Health/Medical Profs Credits: 1
- PHA 206 - PA Shadowing Experience I Credits: 3
- PHA 208 - PA Shadowing Experience II Credits: 3

- PHA 300 - Physician Assistant Seminar Credits: 1
- PHA 303 - Introduction to Pharmacology Credits: 3
- PHA 310 - Medical Terminology I for PA Credits: 1
- PHA 311 - Medical Terminology II PA Credits: 1
- SO 347 - Death and Dying Credits: 3

Sample Physician Assistant Pre-Professional Curriculum

First Year

Minimum of 50 hours of shadowing/patient contact required prior to start of first year.

Fall Semester

- BS 101 - Biology Orientation I Credits: 1
- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- MA 110 - General Calculus Credits: 3
- MI 110 - Intro Health/Medical Profs Credits: 1
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- PHA 206 - PA Shadowing Experience I Credits: 3
- PY 201 - Introductory Physics I Credits: 4
(See Footnote 4 Below)
- SO 101 - Introduction to Sociology Credits: 3

Credits/Semester: 17

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1
- PHA 208 - PA Shadowing Experience II Credits: 3
- PS 101 - Introduction to Psychology Credits: 3
- PY 202 - Introductory Physics II Credits: 4 (Optional) or Free elective Credits: 3

Credits/Semester: 16-17

Third Year

Fall Semester

- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- CH 340 - Survey of Biochemistry Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- PHA 310 - Medical Terminology I for PA Credits: 1

Credits/Semester: 15

Spring Semester

- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 358 - Principles and Applications of Immunology Credits: 3
- BS 466 - Genetics Credits: 4
- PHA 303 - Introduction to Pharmacology Credits: 3
- PHA 311 - Medical Terminology II PA Credits: 1
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 18

Summer

- Application to graduate professional program(s).
- Minimum of 400 documented hours of patient contact required by start of fourth year.
- Minimum of 500 documented hours of patient contact prior to start of professional program.

Fourth Year

Fall Semester

- Biology or Free Elective Credits: 3-6
- General Education Humanities Discipline Requirement Credits: 3
- BS 493 - Biological Sciences Seminar I Credits: 1

- PHA 300 - Physician Assistant Seminar Credits: 1
- SO 347 - Death and Dying Credits: 3
- WR 302 - Scientific Writing Credits: 3

Credits/Semester: 14-17

Spring Semester

- Biological Sciences Electives Credits: 3
- BS 4XX 400 Level Biological Sciences Course Credits: 3
- Elective Credits: 3-6
- General Education Humanities Discipline Requirement Credits: 3
- BS 494 - Biological Sciences Seminar II Credits: 1

Credits/Semester: 13-16

Total Credits: 127

General Note:

An accelerated option where students complete the undergraduate requirements in 3 years is available for highly qualified students. Please discuss your interest in the accelerated program with the undergraduate PA program director.

Chemistry & Biochemistry

Mission

The mission of the Department of Chemistry & Biochemistry is to:

- Promote the expansion of scientific knowledge through the integration of research and teaching.
- Strive to make discoveries and innovations in chemical sciences through research activities by undergraduate and graduate students, and faculty.
- Promote excellence in teaching in all courses and programs to advance student education and future career goals, and prepare them to be lifelong learners.
- Benefit the community and society through dissemination of knowledge, professional service and outreach.

Overview

The chemical sciences are focused on understanding the molecular makeup of the substances around us, from concrete to penicillin to DNA. Chemists and biochemists synthesize new molecules and study how molecules behave in order to improve our lives. They help to develop new products, increase agricultural productivity, and reduce the incidence of disease. Careers for chemists and biochemists exist in academics, industry, and government. Individuals with chemical training find careers in many diverse areas including medicine, patent law, government agencies, pharmaceutical laboratories, and many manufacturing facilities.

The Department of Chemistry & Biochemistry is dedicated to the education of students interested in the health and natural sciences at both the undergraduate and graduate levels.

At the undergraduate level, the department offers three distinct majors leading to the bachelor of science in chemistry, biochemistry, or pharmaceutical chemistry. Students interested in pre-med or pre-law can use any of these degrees as excellent preparation for their further professional education in medicine or patent law. USciences has agreements guaranteeing interviews or provisional acceptances for outstanding students who meet specific requirements in medical professional programs in the region. Students interested in these programs must meet with the pre-professional advisor no later than the second semester of

their first year at the University.

Students may also opt to pursue an integrated MS or PhD degree in conjunction with a BS in chemistry or biochemistry. The MS degree requirements can be completed with as little as one additional year of study.

Students in the chemistry, biochemistry, and pharmaceutical chemistry programs will:

- Achieve an in-depth understanding of important concepts pertaining to all the major areas of chemistry (analytical, biochemical, inorganic, organic, and physical) and be able to apply the knowledge gained.
- Be exposed to a wide variety of laboratory procedures and chemical instrumentation and be able to use them effectively to solve chemical problems.
- Become aware of critical safety issues and environmental regulations.
- Be able to use computers effectively for both scientific and non-scientific tasks.
- Be able to explore the scientific literature using a variety of resources and communicate that information effectively.
- Attain a high level of problem-solving and critical-thinking skills and be able to learn independently.

All three degree programs provide a solid foundation in general, organic, and inorganic chemistry in the first two years, along with supporting courses in biology, mathematics, and physics. Even in these early courses, students have the advantage of relatively small classes. The general education curriculum, completed by all students at the University, provides exposure to the humanities and social sciences, as well as providing critical oral and written communication skills.

During the course of the entire four-year curriculum, students receive training in all five major areas of chemistry (analytical, biochemical, inorganic, organic, and physical) and exposure to a variety of sophisticated instrumentation. Computer technology is incorporated throughout all three curricula, and a department computer cluster is available to support this effort. Chemistry, biochemistry, and pharmaceutical chemistry majors who complete appropriate chemistry electives will also meet the rigorous standards for American Chemical Society (ACS) certification.

Regardless of major, all students are encouraged to carry out an undergraduate research project under the guidance of one of the faculty members in the department. The large number of regular faculty ensures that students receive individual attention both in and out of the classroom. In addition, their backgrounds span all of the traditional areas of chemistry, including analytical, inorganic, organic, and physical chemistry, as well as biochemistry. Their diverse research interests provide a wide variety of research opportunities for students.

Undergraduate research gives the student the opportunity to explore one area of biochemistry or chemistry in depth and to take advantage of the sophisticated instrumentation available in the department. Interdisciplinary areas such as computational chemistry, supported by the advanced computers available in the West Center for Computational Chemistry and Drug Design, also provide exciting opportunities for research. The independent nature of undergraduate research is recognized as a valuable learning experience by industrial and governmental employers, as well as by graduate and professional schools.

Students are also encouraged to participate in the American Chemical Society Student Affiliate Chapter, which organizes and sponsors seminars, field trips to industrial and/or governmental laboratories, picnics, and other social activities.

Students typically have summer internship opportunities, and the University has an excellent record of placement of its graduates in graduate and professional schools, as well as in medical, industrial, and governmental laboratories.

At the graduate level, the department offers the MS and PhD in biochemistry, chemistry, bioinformatics, and pharmacognosy. In addition to the research expertise of the department's faculty members, research professors from the departments of Biological Sciences, and Pharmaceutical Sciences greatly expand the range of research opportunities available for graduate students.

For more complete information about the department's faculty and programs, please consult the department website at www.usciences.edu/chemistry.

Faculty

Madhumati Mahalingam

BS (Delhi, India); MS (Indian Institute of Technology, India); PhD (State University of New York, Stony Brook)
Associate Professor of Chemistry
Interim Chair, Department of Chemistry & Biochemistry

Nathan J. Baird

BS (Wheaton College); MS, PhD (University of Chicago)
Associate Professor of Biochemistry
Interim Dean, Misher College of Arts and Sciences

Catherine M. Bentzley

BS (St. Joseph's University); PhD (University of Delaware)
Associate Professor of Chemistry
Assistant Chair, Department of Chemistry & Biochemistry

Edward R. Birnbaum

BS (Brooklyn College); MS, PhD (University of Illinois)
Professor Emeritus of Chemistry

Michael F. Bruist

BS (Stanford University); PhD (Cornell University)
Associate Professor of Biochemistry

Lena DeLisser-Matthews

BS (Fordham University); MS, PhD (Columbia University)
Professor Emeritus of Chemistry

Walter Dorfner

BA (Boston University); PhD (University of Pennsylvania)
Assistant Professor of Chemistry & Biochemistry

Elisabetta Fasella

BS (Università di Roma "La Sapienza," Italy); MS, PhD (Columbia University)
Associate Professor of Chemistry

Yumee K. Koo

BS, MS (Yonsei University, Korea); PhD (University of Illinois)
Assistant Professor of Biochemistry

Zhijun Li

BS, MS (Tsinghua University, China); PhD (Vanderbilt University)
Professor of Bioinformatics and Research Assistant Professor of Cell Biology and Biotechnology
Director, Graduate Program in Bioinformatics

Zhiwei Liu

BS, MS (Peking University, China); PhD (Emory University)
Associate Professor of Chemistry
Assistant Director, West Center for Computational Chemistry & Drug Design

Charles N. McEwen

BS (College of William and Mary); MS (Atlanta University); PhD (University of Virginia)
Houghton Endowed Professor of Chemistry & Biochemistry

James R. McKee

BS, PhD (University of Maryland)
Professor of Chemistry

Preston B. Moore

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Director, West Center for Computational Chemistry and Drug Design

Elisabeth A. Morlino

BS, PhD (Bowling Green State University)
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Sarah J. Saylor

BS, PhD (University of the Sciences)

Instructor of Chemistry & Biochemistry

Frederick T. Schaefer

AB (Franklin and Marshall College); PhD (University of Wisconsin, Madison)
Associate Professor of Chemistry & Biochemistry

Alexander Sidorenko

MS (I. Franko Lviv State University, Ukraine); PhD (National Academy of Sciences, Ukraine)
Associate Professor of Chemistry & Biochemistry

Julian W. Snow

BS (University of Washington); PhD (University of California, Santa Barbara)
Professor Emeritus of Chemistry & Biochemistry

John W. Tomsho

BS (University of the Sciences); PhD (University of Michigan)
Associate Professor of Chemistry & Biochemistry
Director, Graduate Programs in Biochemistry, Chemistry, and Pharmacognosy and Co-Director, Chemistry Core Facility

Zhihong Wang

BS (Yantai University, China); MS (Xiamen University, China); PhD (University of Utah)
Assistant Professor of Chemistry & Biochemistry

Rodney J. Wigent

BS, MS, PhD (Michigan Technical University)
Professor Emeritus of Chemistry & Biochemistry
Dean Emeritus, College of Graduate Studies

Murray Zanger

BS (City College of New York); PhD (University of Kansas)
Professor Emeritus of Chemistry

Randy J. Zauhar

BS, BA (Eastern Washington University); MS, PhD (Pennsylvania State University)
Professor of Chemistry & Biochemistry, Associate Professor of Bioinformatics, and Research Associate Professor of Biophysics

Biochemistry – Major

Biochemistry is the study of chemical processes within living systems. In other words, it is the study of living systems at the most fundamental level through the analysis of the chemistry of molecules that make up these systems. As the most basic of biomedical sciences, it provides the foundation on which genetics, molecular biology, physiology, cell biology, immunology, and other modern branches of biology and medicine are based.

Undergraduate study in biochemistry at the University provides a solid background for advanced training in any of the areas indicated above, along with an excellent preparation for medicine or any of the other health professions. Students in the biochemistry program also learn the experimental techniques that prepare them for technical positions in biomedical research in one of the growing number of industries involved in biotechnology. From cancer research to gene splicing to photosynthetic capture of solar energy, biochemistry leads the way with new ideas.

The biochemistry program draws on faculty expertise from the departments of Chemistry & Biochemistry and Biological Sciences, in areas including physical and analytical biochemistry, enzymology, cell biology, microbiology, immunology, and genetics. Students begin with a sound preparation in basic biology and chemistry during the first two years, supported by physics and mathematics. The third and fourth years involve, besides biochemistry itself, physical and analytical chemistry, molecular and cell biology, and genetics, as well as electives chosen by the student from an approved list of biology and chemistry courses to meet his/her particular interests. Students also have ample opportunities to pursue undergraduate research in biochemistry.

The sequencing of the human genome is only the first of many steps needed to translate how the human DNA sequence impacts disease through the production and regulation of the thousands of different protein molecules synthesized by the body every day. Biochemists are trained at the interface between chemistry and biology and obtain experience in techniques associated with molecular biology and biotechnology that can be applied effectively in medicine to ameliorate and cure disease.

Biochemistry Degree Requirements

To qualify for the Bachelor of Science in biochemistry, a minimum of 120 credit hours of approved courses is required, including courses in the natural and social sciences, mathematics, humanities, and communications. These requirements fulfill the University general education curriculum.

A minimum of 45 credit hours of courses in all areas of chemistry and 16 credit hours in biology are required, along with supporting courses in mathematics and physics as indicated below. American Chemical Society (ACS) certification of the degree can be obtained by inclusion of selected chemistry courses as part of the 45 credit hours required, together with additional electives. ACS certification requirements include in-depth courses and a minimum of 400 hrs of laboratory experience in four out of five areas of chemistry (Analytical, Biochemistry, Inorganic, Organic and Physical). The department is also accredited by the American Society of Biochemistry and Molecular Biologists (ASBMB). Students receive either certification or certification with high merit from ASBMB based on their performance on an ASBMB certification exam administered in their senior year.

Students are also strongly encouraged to complete as part of their degree program, an undergraduate research project under the guidance of a department faculty member.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Fundamental Requirements in Chemistry (37 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 300 - Discussions in Chemistry Credits: 1
- CH 320 - Essentials of Physical Chemistry Credits: 4
- or
- CH 321 - Physical Chemistry I Credits: 4
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 402 - Seminar in Chemistry II Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- CH 423 - Physical Chemistry Lab I Credits: 2

Supporting Requirements in Science and Mathematics (30–31 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- MA 107 - Precalculus Credits: 3

- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4

And one of the following:

- MA 222 - Calculus III Credits: 4
- ST 310 - Biostatistics I Credits: 3
(ST 310 should be selected only after consultation with a departmental academic advisor)

Advanced Biochemistry Requirements (16 credits)

- BS 461 - Cell Biology Credits: 4
- BS 466 - Genetics Credits: 4
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 444 - Biochemistry Laboratory I Credits: 1
- CH 445 - Biochem Laboratory II Credits: 1

Biochemistry Program Electives (6 credits)

Students must choose a minimum of 6 credits from any combination of the courses listed below. A combined maximum of 3 credits of CH 450 and CH 480 can be used to meet this requirement, and both courses require the approval of the department chair prior to registration. Additional courses, including graduate courses, may be selected with the approval of the department chair.

- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- BI 475 - Proteomics Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 336 - Pharmacognosy Credits: 2
- BS 343 - Microbial Genetics Credits: 4
- BS 348 - Clinical Microbiology Credits: 4
- BS 450 - Human Virology Credits: 3
- BS 453 - Microbial Physiology Credits: 4
- BS 456 - Immunobiology Credits: 4
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 376 - Instrumental Analysis Credits: 3
- CH 411 - Medicinal Chemistry Credits: 3
- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- CH 416 - Chemical Synthesis Laboratory Credits: 3
- CH 420 - Applications of Computational Chemistry Credits: 2
- CH 425 - Inorganic and Materials Synthesis Credits: 2
- CH 431 - Inorganic Chemistry Credits: 3
- CH 448 - Computer-Aided Drug Design Credits: 3
- CH 450 - Undergraduate Research Credits: 3
- CH 455 - Special Topics in Chemistry Credits: 3 *
- CH 480 - Directed Study in Chemistry Credits: 3

Note: CH 455 must be a graded course.

Students may take advantage of the opportunity to integrate their BS degree program with one of the graduate degree programs offered through the department in either chemistry or biochemistry, including the MS (non-thesis), MS (thesis) and PhD programs. Students should consult with the department's graduate program director regarding the differences among the various options and the specific requirements that they need to meet in order to enroll in the integrated program. Students may apply to the integrated program at any point prior to the beginning of the fourth year of their BS program. However, because not all graduate courses are offered every year, the time required to complete a BS/MS integrated program will depend in part on when students enter the program.

Sample Biochemistry Curriculum Plan

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 211 - Physics I Credits: 4

Credits/Semester: 16

Spring Semester

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- PY 212 - Physics II Credits: 4

And one of the following:

- MA 222 - Calculus III Credits: 4
- ST 310 - Biostatistics I Credits: 3
(ST 310 should be selected only after consultation with a chemistry advisor)

Credits/Semester: 14-15

Third Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 4 Below)
- CH 300 - Discussions in Chemistry Credits: 1
- CH 320 - Essentials of Physical Chemistry Credits: 4
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1
- CH 444 - Biochemistry Laboratory I Credits: 1

Credits/Semester: 16

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 466 - Genetics Credits: 4
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
(See Footnote 1 Below)
- CH 445 - Biochem Laboratory II Credits: 1
- CO 204 - Public Speaking Credits: 3
(Meets communication requirement)

Credits/Semester: 14

Fourth Year

Fall Semester

- Biochemistry Program Elective I Credits: 3
(See Footnote 2 Below)
- Free Elective Credits: 3
(See Footnote 3 Below)
- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 4 Below)
- BS 306 - Human Molec & Cell Bio Credits: 3

or

- BS 461 - Cell Biology Credits: 4
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 423 - Physical Chemistry Lab I Credits: 2

Credits/Semester: 15-16

Spring Semester

- Biochemistry Program Elective II Credits: 3
(See Footnote 2 Below)
- General Education Humanities or Social Science Requirement Credits: 6
(See Footnote 4 Below)
- CH 342 - Nucleic Acid Biochemistry Credits: 3
(See Footnote 1 Below)
- CH 402 - Seminar in Chemistry II Credits: 1

Credits/Semester: 13

Total Minimum Credits: 120

Footnotes:

1. The ordering of CH 342 and CH 343 may be reversed upon consultation with a departmental academic advisor. CH 342 and CH 343 are offered on alternate years during the spring semester.
2. Biochemistry program electives, in addition to the preapproved list, may be selected from other appropriate undergraduate courses with the approval of the department chair or designee. CH 450 (3 credits) can satisfy ONLY ONE of the biochemistry electives, although more credits may be taken.
3. One free elective (3 credits) cannot be a course required for the major degree.
4. A course which should be used to meet the General Education Discipline Requirement not satisfied by the courses in the major (i.e. social science or humanities; 6 cr of each are required).

General Notes:

1. American Chemical Society certification of the biochemistry BS degree may be obtained by inclusion of selected chemistry courses as part of the 45 credit hours required, together with additional electives. Consult with a biochemistry advisor.
2. CH 450 - Undergraduate Research experience is strongly encouraged for all department majors. An application form is available in the department office.

Biochemistry – Minor

The minor in biochemistry is designed to provide the student with a sufficient concentration of chemistry and biology courses such that the student will be able to understand a wide range of biochemical phenomena and appreciate the underlying chemistry responsible for the behavior of living systems. Not counting prerequisites, a minimum of 20 credits, including 19 credits of required courses and at least 1 credit of elective courses, are required for the biochemistry minor.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

General Requirements

- A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.
- Up to 6 credits of coursework, with an earned grade of “C” or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Prerequisite Courses

- BS 109 - General Biology I Credits: 3
or
- BS 132 - Introductory Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
or
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- BS 119 - General Biology II Credits: 3
or
- BS 133 - Introductory Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
or
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- CH 101 - General Chemistry I Credits: 3
or
- CH 111 - Principles of Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
or
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 102 - General Chemistry II Credits: 3
or
- CH 112 - Principles of Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
or
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
or
- MA 122 - Calculus I Credits: 4
- PY 201 - Introductory Physics I Credits: 4
or
- PY 211 - Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
or
- PY 212 - Physics II Credits: 4

Required Courses

- BS 461 - Cell Biology Credits: 4
or
- BS 466 - Genetics Credits: 4
- CH 201 - Organic Chemistry I Credits: 3

- or
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- or
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- or
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- or
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- or
- CH 346 - Biochemistry Credits: 4
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- or
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- or
- CH 356 - Molecular Biology and Genetics Credits: 3
- CH 444 - Biochemistry Laboratory I Credits: 1

Elective Courses

Enough additional credits from the following courses to meet the requirements specified above. Other electives as approved by the department chair.

- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 475 - Proteomics Credits: 3
- BS 461 - Cell Biology Credits: 4
- or
- BS 466 - Genetics Credits: 4
- CH 321 - Physical Chemistry I Credits: 4
- or
- CH 320 - Essentials of Physical Chemistry Credits: 4
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- or
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
- or
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- or
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1
- CH 411 - Medicinal Chemistry Credits: 3
- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- CH 445 - Biochem Laboratory II Credits: 1
- CH 448 - Computer-Aided Drug Design Credits: 3
- CH 450 - Undergraduate Research Credits: 3

Notes:

Students who take the CH 346/CH 356 sequence may not apply CH 341, CH 342, or CH 343 as electives toward the minor. CH 342 has CH 341 and BS 466 as prerequisites. BS 466 has CH 341 or CH 346 as prerequisites. BI 450 has CH 341 as a prerequisite. BI 450 is a prerequisite for BI 475. MA 221 is a prerequisite for CH 320 and CH 321. CH 411 and CH 448 have CH

341 as a prerequisite. A maximum of 3 credits of CH 450 can be used to satisfy the elective requirement.

Bioinformatics – Master of Science

Bioinformatics is the study of how information is stored, transformed, and utilized by living things. It is a very broad and diverse discipline. Classically, bioinformatics has encompassed all activities having to do with the analysis of biological sequence data, including sequence assembly, and identification of genes, analysis of gene structure, prediction of expressed proteins, identification of functionally important sequences in both nucleotides and proteins. Now it has broadened to include prediction of three-dimensional structures of proteins and nucleotides, pharmacogenomics (the study of how hereditary factors influence our response to drugs), proteomics (the study of the array of proteins that are actually expressed in each cell), microarray data analysis, and the modeling of metabolic pathways. In every discipline of the life sciences, bioinformatics assumes a role of increasing importance. It is not an understatement to say that bioinformatics is what biology is evolving to become in the 21st century.

Students in the bioinformatics graduate program will:

- Attain an understanding of the fundamentals of molecular biology, genetics, and biotechnology necessary to comprehend and critically evaluate the contemporary scientific literature for Bioinformatics and closely related disciplines.
- Attain a solid understanding of the theoretical and computational concepts that underlie current Bioinformatics practice, especially as they concern sequence analysis, computational genomics, and data mining methods.
- Attain proficiency in software development in a variety of computer languages important to bioinformatics and be competent in web-centered application development.
- Be able to communicate effectively to their colleagues, both in writing and oral presentation.

The master of science in bioinformatics degree necessitates a total of 30 credit hours to complete the program's academic requirements, although most students will complete 31–35 credits depending on their background. There are two different tracks students can specialize in, a biotechnology track or a computational track.

The requirements for the MS are designed with a balanced emphasis on both basic science (biology and biochemistry) and on computing, with special focus on the special programming skills most needed in today's pharmaceutical and biotechnology industries. Most students acquire a basic foundation in bioinformatics by completing the two-semester senior "capstone" sequence, BI 450/BI 451, which together provide an introduction to genomics and to the development of bioinformatics software applications. (Six credits of senior-level coursework may be applied to the graduate degree.) This is followed by more advanced preparation in both biotechnology and software engineering for bioinformatics. A wide range of electives is available to round out the program, including CH 748 - Computer-Aided Drug Design and CH 863 - Special Topics in Analytical Chemistry.

A key feature of our program is a two-semester independent project, which takes the place of a traditional master's thesis. The project is ideally completed in collaboration with an industry or academic partner of the MS bioinformatics program, providing the student with invaluable real-world experience.

Graduate Program Requirements

Core Courses (23 credits)

- BI 768 - High-Throughput Sequencing and Microarray Technology Credits: 3
- BI 775 - Proteomics Credits: 3
- BI 781 - Systems Architecture for Bioinformatics Credits: 3
- BI 785 - Advanced Algorithms for Chemical and Bioinformatics Credits: 3
- BI 790 - Project in Bioinformatics Credits: 4
(two semesters, total credits: 8)
- BI 880 - Direct Study Bioinformatics Credits: 3
- BI 898 - Graduate Seminar Credits: 1
(two semesters, total credits: 2)

Biotechnology Track Required Courses (5 credits)

- BS 764 - Biotechnology Credits: 3
- BS 765 - Biotechnology Lab Credits: 2

Computational Track Required Courses (6 credits)

- BI 745 - Molecular Evolution and Phylogenetics Credits: 3
- BI 755 - Advanced Probability for Bioinformatics Credits: 3
(See Footnote Below)

Footnote:

ST 760 - Special Topics in Statistics may be substituted for BI 755 - Advanced Probability for Bioinformatics with the approval of the program director in advance.

Suggested Electives (3 credits or more)

- BI 425 - Bioinformatic Computing Credits: 3
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- BI 860 - Special Top/ Bioinformatics Credits: 3
- BS 752 - Advanced Immunobiology Credits: 3
- BS 860 - Special Topics in Cell Biology and Biotechnology Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- CH 748 - Computer-Aided Drug Design Credits: 3
- CH 813 - Special Topics in Organic Chemistry Credits: 3
- CH 828 - Biophys & Biochem Methods Credits: 3
- ST 704 - Statistics for Research Credits: 3
- ST 720 - Regression Analysis Credits: 3

Total Minimum Credits: 30

Bioinformatics – Minor

The discipline of bioinformatics has quickly become a theoretical and technical foundation for much of the life sciences. Many disciplines, such as genetics, microbiology, and medicine, have been revolutionized by the application of bioinformatic concepts and tools to problems in classical and molecular research areas. A minor in bioinformatics could have a significant benefit for students who wish to major in a discipline other than bioinformatics but who want to have documented achievement in this exciting, cutting-edge area. Students majoring in biological science, biochemistry, health science, medical laboratory science, pharmacology, and pharmacy would benefit from a minor program in bioinformatics. The Bioinformatics Minor is designed to provide students with a sufficient concentration in molecular biology, computer science and bioinformatics courses such that students will be able to understand how bioinformatics concepts and tools can be applied to problems in disciplines such as genetics, microbiology and medicine. Not counting prerequisites, a minimum of 18 credits, including a minimum of 15 credits of required courses and at least 3 credits of elective courses, are required for the Bioinformatics Minor.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

General Requirements

- A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or

program electives) included in the major curriculum.

- Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon approval of the Department Chair.

Prerequisite Courses

- BS 109 - General Biology I Credits: 3
or
- BS 132 - Introductory Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
or
- BS 134 - Intro Biology I Lab Credits: 1
or
- BS 136 - Phage Hunters I Credits: 2
- BS 119 - General Biology II Credits: 3
or
- BS 133 - Introductory Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
or
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- CH 101 - General Chemistry I Credits: 3
or
- CH 111 - Principles of Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
or
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 102 - General Chemistry II Credits: 3
or
- CH 112 - Principles of Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
or
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
or
- MA 122 - Calculus I Credits: 4
- CH 201 - Organic Chemistry I Credits: 3
or
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
or
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
or
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
or
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1

Required Courses

- BI 450 - Bioinformatics I: Genomics Credits: 3

- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- CS 201 - Computer Programming I Credits: 3
- ST 310 - Biostatistics I Credits: 3

Enough additional credits from the following courses to meet the credit requirements in the credit requirements above. Other electives as approved by the department chair.

- BI 395 - Independent Study in Bioinformatics Credits: 3
- BI 451 - Bioinformatics II Credits: 3
- BI 465 - Microarray Technology Credits: 3
- BI 475 - Proteomics Credits: 3
- BI 495 - Directed Research in Bioinformatics Credits: 3

Notes:

BI 450 has CH 341 as prerequisites. BI 450 is a prerequisite for BI 425, BI 451, BI 465, and BI 475.

Chemistry – Major

Chemistry is a fundamental science that is critical to the understanding of many other scientific and health professional fields. An understanding of the molecular nature of substances, and how they react, enables one to understand how they can best be used to improve our lives.

Over the years, chemists have contributed enormously to the health and well-being of their fellow human beings. Physicians, for example, may prescribe lifesaving drugs; but chemists discover them and make them. The efficiency and productivity of U.S. and worldwide agriculture is due in no small part to the chemical fertilizers and insecticides that chemists have synthesized. Chemists also play an important role in evaluating and treating environmental problems (i.e., "green chemistry") and help to address national security concerns, such as the detection of chemical weapons and explosives.

Chemists are employed in industries as diverse as petroleum refining, food processing, cosmetics, rubber, plastics, fabrics, and energy production. In government labs, they monitor the environment and the purity of our foods and drugs, and in forensic chemistry laboratories, they identify and assist in prosecuting criminals. Many teach the wonders of science in settings from junior high school to university. Some chemistry majors use their degrees as the basis for professional training in medicine, dentistry, veterinary medicine, law, or business.

Chemistry Degree Requirements

To qualify for the Bachelor of Science in chemistry, a minimum of 120 credit hours of approved courses are required, including courses in the natural and social sciences, mathematics, humanities, and communications, which are required to meet the University general education curriculum.

A minimum of 56 credit hours of courses in all areas of chemistry are required, along with supporting courses in mathematics and natural science as indicated below.

American Chemical Society (ACS) certification of the degree can be obtained by inclusion of selected chemistry courses as part of the 56 credit hours required together with additional electives. ACS certification requirements include in-depth courses and a minimum of 400 hrs of laboratory experience in four out of five areas of chemistry (Analytical, Biochemistry, Inorganic, Organic and Physical). Students are also strongly encouraged to complete as part of their degree program, an undergraduate research project under the guidance of a department faculty member.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are

defined as credits for courses offered by the University for

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 300 - Discussions in Chemistry Credits: 1
- CH 321 - Physical Chemistry I Credits: 4
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 402 - Seminar in Chemistry II Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- CH 423 - Physical Chemistry Lab I Credits: 2

Supporting Requirements in Science and Mathematics (27 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4

Advanced Chemistry Program Requirements (13 credits)

- CH 322 - Physical Chemistry II Credits: 4
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 376 - Instrumental Analysis Credits: 3
- CH 425 - Inorganic and Materials Synthesis Credits: 2
- CH 431 - Inorganic Chemistry Credits: 3

Chemistry Program Electives (6 credits)

Students must choose a minimum of 6 credits from any combination of the courses listed below. The CH 450 - Undergraduate Research experience is strongly encouraged for all department majors. An application form is available in the department office. A combined maximum of 3 credits of CH 450 and CH 480 can be used to meet this requirement, and both courses require the approval of the department chair prior to registration. Additional courses, including graduate courses, may be selected with the approval of the department chair.

- CH 342 - Nucleic Acid Biochemistry Credits: 3
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 411 - Medicinal Chemistry Credits: 3

- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- CH 416 - Chemical Synthesis Laboratory Credits: 3
- CH 420 - Applications of Computational Chemistry Credits: 2
- CH 444 - Biochemistry Laboratory I Credits: 1
- CH 445 - Biochem Laboratory II Credits: 1
- CH 448 - Computer-Aided Drug Design Credits: 3
- CH 450 - Undergraduate Research Credits: 3
- CH 455 - Special Topics in Chemistry Credits: 3 *
- CH 464 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 465 - Pharmaceutical Analytical Chemistry Lab Credits: 1
- CH 480 - Directed Study in Chemistry Credits: 3

Note: CH 455 must be a graded course.

Integrated Undergraduate/Graduate Degree Program

Students may take advantage of the opportunity to integrate their BS degree program with one of the graduate degree programs offered through the department in either chemistry or biochemistry, including the MS (non-thesis), MS (thesis), and PhD programs. Students should consult with the department's graduate program director regarding the differences among the various options and the specific requirements needed to enroll in the integrated program. Students may apply to the integrated program at any point prior to the beginning of the fourth year of their BS program. However, because not all graduate courses are offered every year, the time required to complete a BS/MS integrated program will depend in part on when students enter the program.

Sample Chemistry Curriculum Plan

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 211 - Physics I Credits: 4

Credits/Semester: 16

Spring Semester

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- MA 222 - Calculus III Credits: 4
- PY 212 - Physics II Credits: 4

Credits/Semester: 15

Third Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 300 - Discussions in Chemistry Credits: 1
- CH 321 - Physical Chemistry I Credits: 4
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1

Credits/Semester: 15

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- CH 322 - Physical Chemistry II Credits: 4
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 376 - Instrumental Analysis Credits: 3
- CO 204 - Public Speaking Credits: 3
(Meets General Education Communication Requirement)

Credits/Semester: 14

Fourth Year

Fall Semester

- Chemistry Program Elective I Credits: 3
(See Footnote 1 below)
- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 below)
- Free Elective Credits: 3
(See Footnote 2 below)
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 423 - Physical Chemistry Lab I Credits: 2
- CH 431 - Inorganic Chemistry Credits: 3

Credits/Semester: 15

Spring Semester

- Chemistry Program Elective II Credits: 3
(See Footnote 1 Below)
- Free Electives Credits: 6
(See Footnote 2 Below)
- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- CH 402 - Seminar in Chemistry II Credits: 1
- CH 425 - Inorganic and Materials Synthesis Credits: 2

Credits/Semester: 15

Total Minimum Credits: 120

Footnotes:

1. Chemistry program electives, in addition to the preapproved list, may be selected from other appropriate undergraduate courses with the approval of the department chair or designee. CH 450 (3 credits) can satisfy ONLY ONE of the chemistry electives, although more credits may be taken.
2. One free elective (3 credits) cannot be a course required for the major degree.
3. A course which should be used to meet the General Education Discipline Requirement not satisfied by the courses in the major (i.e. social science or humanities; 6 cr of each are required).

General Notes:

1. American Chemical Society certification of the chemistry BS degree can be obtained by inclusion of selected chemistry courses as part of the 56 credit hours required, together with additional electives. Consult with a chemistry advisor.
2. CH 450 - Undergraduate Research experience is strongly encouraged for all department majors. An application form is available in the department office.

Chemistry – Minor

The minor in chemistry is designed to provide the student with a sufficient concentration of chemistry courses that the student will be able to understand a wide range of chemical phenomena and appreciate the impact of chemical phenomena on both his/her profession and life experiences. Not counting prerequisites, a minimum of 20 credits, including 18 credits of required courses, and at least 2 credits of elective courses is required for the chemistry minor.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college

work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor; please see Minors in the Academics section of this catalog.

General Requirements

- A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.
- Up to 6 credits of coursework, with an earned grade of “C” or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Prerequisite Courses

- CH 101 - General Chemistry I Credits: 3
or
- CH 111 - Principles of Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
or
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 102 - General Chemistry II Credits: 3
or
- CH 112 - Principles of Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
or
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
or
- MA 122 - Calculus I Credits: 4
- PY 201 - Introductory Physics I Credits: 4
or
- PY 211 - Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
or
- PY 212 - Physics II Credits: 4

Required Courses

- CH 201 - Organic Chemistry I Credits: 3
or
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
or
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
or
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
or
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 361 - Analytical Chemistry Credits: 3
or
- CH 366 - Principles of Analytical Chemistry Credits: 3

- CH 363 - Analytical Chemistry Lab Credits: 1
or
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1

Any Two (2) of the Following Three (3) Courses (the course not taken may be taken as an elective)

- CH 321 - Physical Chemistry I Credits: 4
(Note: MA 201 is a prerequisite for CH 321)
or
- CH 320 - Essentials of Physical Chemistry Credits: 4
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4

Elective Courses

Enough additional credits from the following courses to meet the requirements specified in the general requirements above. Other electives as approved by department chair.

- CH 322 - Physical Chemistry II Credits: 4
- CH 376 - Instrumental Analysis Credits: 3
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 411 - Medicinal Chemistry Credits: 3
- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- CH 423 - Physical Chemistry Lab I Credits: 2
- CH 425 - Inorganic and Materials Synthesis Credits: 2
- CH 431 - Inorganic Chemistry Credits: 3
- CH 448 - Computer-Aided Drug Design Credits: 3
- CH 450 - Undergraduate Research Credits: 3

Notes:

MA 221 is a prerequisite for CH 320 and CH 321. CH 321 is a prerequisite for CH 322, CH 376, and CH 423. CH 368 has CH 366 and CH 363 (or CH 367) as prerequisites. CH 368 has CH 376 as a corequisite. CH 411 and CH 448 have CH 341 as a prerequisite. CH 423 has CH 321 (or CH 320) and CH 367 (or CH 363) as prerequisites. CH 425 has CH 423 and CH 431 as prerequisites. CH 431 has CH 322 and CH 331 as prerequisites. A maximum of 3 credits of CH 450 can be used towards the Minor.

Chemistry, Biochemistry and Pharmacognosy Graduate Programs

Program Description

The Department of Chemistry & Biochemistry offers graduate programs leading to the Master of Science (MS thesis or non-thesis) and Doctor of Philosophy (PhD) in chemistry (specialties: analytical, computational, medicinal, organic, and physical chemistry); biochemistry (specialties: bioanalytical chemistry and peptide, protein, lipid and nucleic acid chemistry); and pharmacognosy (MS thesis or non-thesis and PhD; specialties: analytical pharmacognosy and natural product synthesis). Pharmacognosy, i.e., natural product chemistry, is a multidisciplinary field drawing on expertise from chemistry, biology, and pharmacology in order to give students the necessary breadth of experience.

Each program is designed to prepare students for careers in academic, industrial, and governmental settings. Individualized programs of study, which take advantage of modern instrumentation, provide a solid foundation for independent research. In addition to the possibility of performing research in the traditional areas in chemistry, i.e., organic, inorganic, physical, analytical, and biochemistry, the close affiliation of chemistry faculty with faculty in pharmacology, toxicology, bioinformatics, and pharmaceuticals has resulted in a particularly strong research focus on the application of chemical methods to research problems in the health sciences and drug discovery.

Students in the graduate programs offered by the Department of Chemistry & Biochemistry will:

- Achieve an in-depth understanding of important concepts pertaining to all the major areas of chemistry appropriate to the research problem being addressed and be able to apply the knowledge gained.
- Be exposed to the laboratory procedures and chemical instrumentation necessary for the solution of the research problem being addressed and be able to use them effectively for that purpose.
- Become aware of critical safety issues and environmental regulations.
- Be able to use computers effectively for both scientific and nonscientific tasks.
- Be able to explore the scientific literature using a variety of resources and communicate that information effectively.
- Attain a level of problem-solving and critical-thinking skills appropriate to the graduate degree being sought and be able to learn independently.

Students also have an exciting opportunity to use computer-modeling techniques to understand and predict the structure and behavior of chemical and biochemical systems through our West Center for Computational Chemistry and Drug Design. The West Center faculty currently consists of a focused group of five faculty members from the Department of Chemistry & Biochemistry with expertise in computational chemistry and biochemistry. A combination of several powerful, parallel-processing, Beowulf "supercomputer" clusters, running sophisticated software packages, is available for use by students.

Students entering the graduate program in chemistry, biochemistry, or pharmacognosy may have any undergraduate degree that satisfies all the prerequisites for these programs. However, in some instances the graduate program director will need to assign appropriate undergraduate courses to ensure that students are properly prepared for the graduate courses in their particular program.

The Department of Chemistry & Biochemistry also offers the option of an integrated BS/MS or BS/PhD degree program for qualified undergraduate students who wish to pursue an MS or PhD degree in biochemistry, chemistry, or pharmacognosy while completing their undergraduate degree. Students interested in this option should contact the graduate program director in the Department of Chemistry & Biochemistry.

Prerequisites

Program	Expected Courses
Core expectations for ALL Programs	Calculus II Organic Chemistry II (with laboratory) Analytical Chemistry I Literature of Chemistry English Composition I
Chemistry	1 term Biochemistry 2 terms Physical Chemistry (with at least 1 term lab) 1 term Instrumental Analysis 1 term Inorganic Chemistry

Biochemistry	2 terms Biochemistry (with at least 1 term lab) 1 term Physical Chemistry 1 term Cell Biology or Advanced Biochemistry 1 term Genetics
Pharmacognosy (Natural Products Chemistry)	1 term Organismal or Population Biology 1 term Cell Biology or Biochemistry 1 term Statistics

MS and PhD Program Requirements

A minimum of 33 credits is required for the MS non-thesis degree; a minimum of 33 credits is required for the MS thesis degree; and a minimum of 43 credits is required for the PhD degree. Students also participate in the department's seminar courses and, if in a MS thesis or PhD program, complete a laboratory rotation to assist in the selection of a thesis research advisor. Specific courses are assigned by the graduate program director and the student's Advisory Committee once a thesis advisor is selected.

In order to help the program director evaluate an entering student's background, each student takes a series of entrance examinations in specific areas of chemistry that will vary depending upon which of the three programs is chosen.

A prospectus describing the student's anticipated independent research project must be submitted by students in an MS thesis or PhD program. This research will be completed under the direction of a member of the graduate faculty, with the guidance of an Advisory Committee. Students who enter the PhD program must also complete a series of comprehensive examinations. Each MS thesis and PhD student must complete the research necessary to defend a thesis based on an original research project and report the results of this research at professional meetings. PhD students must publish at least one original research article in peer-reviewed scientific journals.

Biochemistry Curricula

MS (Non-Thesis) Requirements

Core Courses (12 credits)

- CH 728 - Advanced Biochemistry Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- ST 704 - Statistics for Research Credits: 3

Elective Courses (21 credits)

Choose one of the following courses:

- BS 861 - Cell and Molecular Biology Credits: 3
 - CH 727 - Physical Biochemistry Credits: 3
 - CH 828 - Biophys & Biochem Methods Credits: 3
- Additional 700 or 800 level Chemistry Courses - Credits: 18

Total Credits: 33

MS (Thesis) Requirements

Core Courses (15 credits)

- CH 728 - Advanced Biochemistry Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Courses (6 credits)

Courses must be approved by Advisor or Advisory Committee

Choose one of the following courses:

- BS 861 - Cell and Molecular Biology Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 828 - Biophys & Biochem Methods Credits: 3
- Additional 700 or 800 level Chemistry Courses - Credits: 3

Research Courses (12+ credits)

- CH 799 - Master's Research Credits: 9 (Note: 10 credits minimum)
- CH 878 - Introduction to Research Credits: 2

Total Credits: 33

PhD Requirements

Core Credits (15 credits)

- CH 728 - Advanced Biochemistry Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Courses (6 credits)

Courses must be approved by Advisor or Advisory Committee

Choose one of the following courses:

- BS 861 - Cell and Molecular Biology Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 828 - Biophys & Biochem Methods Credits: 3
- Additional 700 or 800 level Chemistry Courses - Credits: 3

Research Courses (22+ credits)

- CH 878 - Introduction to Research Credits: 2
- CH 899 - Doctoral Research Credits: 9 (Note: 20 credits minimum)

Chemistry Curricula

MS (Non-Thesis) Requirements

Core Courses (9 credits)

- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- ST 704 - Statistics for Research Credits: 3

Elective Courses (24 credits)

Courses must be approved by Advisor or Advisory Committee

- Two Organic Chemistry, Analytical Chemistry, Physical Chemistry, or Bioinformatics Courses - Credits: 6
- Additional 700 or 800 level Chemistry Courses - Credits: 18

Total Credits: 33

MS (Thesis) Requirements

Core Credits (12 credits)

- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Courses (9 credits)

Courses must be approved by Advisor or Advisory Committee

- Two Organic Chemistry, Analytical Chemistry, Physical Chemistry, or Bioinformatics Courses - Credits: 6
- Additional 700 or 800 level Chemistry Course - Credits: 3

Research Courses (12+ credits)

- CH 799 - Master's Research Credits: 9 (Note: 10 credits minimum)
- CH 878 - Introduction to Research Credits: 2

PhD Requirements

Core Courses (12 credits)

- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Courses (9 credits)

Courses must be approved by Advisor or Advisory Committee

- Two Organic Chemistry, Analytical Chemistry, Physical Chemistry, or Bioinformatics Courses - Credits: 6
- Additional 700 or 800 level Chemistry Course - Credits: 3

Research Courses (22+ credits)

- CH 878 - Introduction to Research Credits: 2
- CH 899 - Doctoral Research Credits: 9 (Note: 20 credits minimum)

Total Credits: 43

Pharmacognosy – Natural Products Chemistry

MS (Non-Thesis) Requirements

Core Courses (15 credits)

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- ST 704 - Statistics for Research Credits: 3

Elective Courses (18 credits)

Courses must be approved by Advisor or Advisory Committee

Choose one:

- CH 718 - Heterocyclic Chemistry Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 762 - Analytical Separations Chemistry Credits: 3
- CH 764 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 767 - Applied Spectroscopy Credits: 3

Additional 700 or 800 level Chemistry or Biology Courses - Credits: 15

Total Credits: 33

MS (Thesis) Requirements

Core Courses (18 credits)

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Course (3 credits)

Course must be approved by Advisor or Advisory Committee

Choose one of the following courses:

- CH 718 - Heterocyclic Chemistry Credits: 3
- CH 727 - Physical Biochemistry Credits: 3
- CH 762 - Analytical Separations Chemistry Credits: 3
- CH 764 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 767 - Applied Spectroscopy Credits: 3

Research Courses (12+ credits)

- CH 799 - Master's Research Credits: 9 (Note: 10 credits minimum)
- CH 878 - Introduction to Research Credits: 2

Total Credits: 33

PhD Requirements

Core Courses (18 credits)

- BS 736 - Advanced Pharmacognosy Credits: 3
- BS 870 - Molecular Pharmacognosy Credits: 3
- CH 786 - Research Ethics Credits: 1
- CH 802 - Research Seminar Credits: 2
- CH 805 - Critical Evaluation of Literature Credits: 1
- CH 880 - Current Literature Credits: 2
- CH 885 - Scientific Writing in Chemical Sciences Credits: 3
- ST 704 - Statistics for Research Credits: 3

Elective Course (3 credits)

Course must be approved by Advisor or Advisory Committee

Choose one of the following courses:

- CH 718 - Heterocyclic Chemistry Credits: 3
- CH 727 - Physical Biochemistry Credits: 3

- CH 762 - Analytical Separations Chemistry Credits: 3
- CH 764 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 767 - Applied Spectroscopy Credits: 3

Research Courses (22+ credits)

- CH 878 - Introduction to Research Credits: 2
- CH 899 - Doctoral Research Credits: 9 (Note: 20 credits minimum)

Total Credits: 43

Pharmaceutical Chemistry – Major

Pharmaceutical chemistry is an area of chemistry that focuses on the development and evaluation of new drugs. Modern medicine relies on a multitude of drugs produced through the efforts of pharmaceutical chemists, including drugs such as cisplatin, used in the treatment of cancer, and AZT, used in the treatment of AIDS. The most effective approaches to drug development rely on a fundamental knowledge of the chemical and biochemical basis underlying the targeted disease state and how that disease affects the living system.

Pharmaceutical chemists may perform two very different kinds of functions in the pharmaceutical industry: 1) a "synthetic" function and 2) an "analytical" function, each of which requires a correspondingly different kind of chemical training.

The "synthetic" pharmaceutical chemist, sometimes also called a medicinal chemist, is asked to devise and implement strategies for the synthesis of drugs that can reduce or eliminate the impact of disease, injuries, or genetic defects. Subsequent efforts are focused on the modification of the drug or change in the delivery mechanism (e.g., pill vs. patch) with the goal of maximizing the therapeutic effects while minimizing the negative side effects and lowering the cost of production.

Students interested in this "synthetic" function are advised to obtain a BS degree in chemistry at the undergraduate level, rather than a degree in pharmaceutical chemistry. Additional training at the MS and/or PhD level in synthetic or medicinal chemistry is often needed to pursue this career.

In contrast, the "analytical" pharmaceutical chemist is typically involved in devising analytical procedures that ensure that the drug produced for sale is pure and that the drug and its metabolites can be detected in an individual taking the drug. This latter aspect is critical for necessary toxicological and pharmacological studies to determine if the drug is both efficacious and safe and at what levels. These kind of analytical skills also play a critical role in forensic applications.

Students interested in this "analytical" focus, which is the focus of the pharmaceutical chemistry BS degree at USciences, will often enter the pharmaceutical industry or forensic laboratory directly with a BS degree, although advanced degrees may also be obtained. Students with this degree may also be involved in clinical trials of new drugs or in sales.

Pharmaceutical chemists are in high demand within the vast pharmaceutical industry and are also employed in government regulatory agencies such as the Food and Drug Administration (FDA), the Department of Agriculture, the Environmental Protection Agency (EPA), and the Federal Bureau of Investigation (FBI). They may be involved in drug synthesis or drug analysis or as a technical representative in the marketing division of a company.

Pharmaceutical Chemistry Degree Requirements

To qualify for the Bachelor of Science in pharmaceutical chemistry, a minimum of 122 credit hours of approved courses are required, including courses in the natural and social sciences, mathematics, humanities, and communications, which are required to meet the University general education curriculum.

A minimum of 55 credit hours of courses in all areas of chemistry are required, along with supporting courses in mathematics and natural science as indicated below. American Chemical Society certification of the degree can be obtained by inclusion of selected chemistry courses as part of the 55 credit hours required, together with additional electives. ACS certification requirements include in-depth courses and a minimum of 400 hrs of laboratory experience in four out of five areas of chemistry (Analytical, Biochemistry, Inorganic, Organic and Physical). Students are also strongly encouraged to complete an undergraduate research project as part of their degree program, under the guidance of a department faculty member.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Fundamental Requirements in Chemistry (37 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 300 - Discussions in Chemistry Credits: 1
- CH 321 - Physical Chemistry I Credits: 4
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 402 - Seminar in Chemistry II Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- CH 423 - Physical Chemistry Lab I Credits: 2

Supporting Requirements in Science and Mathematics (27 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4

Advanced Pharmaceutical Chemistry Program Requirements (18 credits)

- CH 322 - Physical Chemistry II Credits: 4
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 376 - Instrumental Analysis Credits: 3
- CH 411 - Medicinal Chemistry Credits: 3
- CH 464 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 465 - Pharmaceutical Analytical Chemistry Lab Credits: 1

Pharmaceutical Chemistry Program Electives (9-10 credits)

Students must choose a minimum of 9 credits from one of the following two combination of the courses:

1st combination: CH 448, Computer Aided Drug Design, Credits: 3, and at least 6 credits from Pharmaceutical Chemistry program electives selected from the list below.

or

2nd combination: PH 316, Pharmaceutics and Biopharmaceutics I, Credits: 3 and PH 317, Pharmaceutics and Biopharmaceutics II, Credits: 4, and at least 3 additional credits chosen from courses listed below.

Alternative courses, including selected courses in pharmaceutical sciences and graduate courses, may be selected with the approval of the department chair.

CH 450 - Undergraduate Research experience is strongly encouraged for all departmental majors; application forms are available in the department office. A combined maximum of 3 credits of CH 450 and CH480 can be used to meet this requirement, and both courses require the approval of the department chair prior to registration. For ACS certification, the area of undergraduate research must include either Biochemistry or Inorganic chemistry for students pursuing BS in pharmaceutical chemistry.

- CH 400 - Chemical Science Internship Credits: 12
- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- CH 416 - Chemical Synthesis Laboratory Credits: 3
- CH 420 - Applications of Computational Chemistry Credits: 2
- CH 425 - Inorganic and Materials Synthesis Credits: 2
- CH 431 - Inorganic Chemistry Credits: 3
- CH 444 - Biochemistry Laboratory I Credits: 1
- CH 445 - Biochem Laboratory II Credits: 1
- CH 448 - Computer-Aided Drug Design Credits: 3
- CH 450 - Undergraduate Research Credits: 3
- CH 455 - Special Topics in Chemistry Credits: 3 *
- CH 480 - Directed Study in Chemistry Credits: 3
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 317 - Pharmaceutics and Biopharmaceutics II Credits: 4

Note: CH 455 must be a graded course.

Integrated Undergraduate/Graduate Degree Program

Students may take advantage of the opportunity to integrate their BS degree program with one of the graduate degree programs offered through the department in either chemistry or biochemistry, including the MS (non-thesis), MS (thesis), and PhD programs. Students should consult with the department's graduate program director regarding the differences among the various options and the specific requirements that they need to meet in order to enroll in the integrated program. Students may apply to the Integrated Program at any point prior to the beginning of the fourth year of their BS program. However, because not all graduate courses are offered every year, the time required to complete a BS/MS integrated program will depend in part on when students enter the program.

Sample Pharmaceutical Chemistry Curriculum Plan

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 120 - Orientation for the Chemical Sciences Credits: 1

- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement (MD) Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 404 - Literature of Chemistry Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 211 - Physics I Credits: 4

Credits/Semester: 16

Spring Semester

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- MA 222 - Calculus III Credits: 4
- PY 212 - Physics II Credits: 4

Credits/Semester: 15

Third Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- CH 300 - Discussions in Chemistry Credits: 1
- CH 321 - Physical Chemistry I Credits: 4
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 366 - Principles of Analytical Chemistry Credits: 3

- CH 367 - Analytical and Physical Methods Laboratory I Credits: 1

Credits/Semester: 15

Spring Semester

- Multidisciplinary Inquiry Requirement (MD) Credits: 3
- CH 322 - Physical Chemistry II Credits: 4
- CH 343 - Intermediary Metabolic Biochemistry Credits: 3
- CH 368 - Analytical and Physical Methods Laboratory II Credits: 1
- CH 376 - Instrumental Analysis Credits: 3
- CO 204 - Public Speaking Credits: 3

Credits/Semester: 17

Fourth Year

Fall Semester

- Free Elective Credits: 3
(See Footnote 1 Below)
- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- Pharmaceutical Chemistry Program Elective Credits: 3
(See Footnote 2 Below)
- CH 401 - Seminar in Chemistry I Credits: 1
- CH 411 - Medicinal Chemistry Credits: 3
- CH 423 - Physical Chemistry Lab I Credits: 2

Credits/Semester: 15

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
(See Footnote 3 Below)
- Pharmaceutical Chemistry Program Electives Credits: 6-7
- CH 402 - Seminar in Chemistry II Credits: 1
- CH 464 - Pharmaceutical Analytical Chemistry Credits: 3
- CH 465 - Pharmaceutical Analytical Chemistry Lab Credits: 1

Credits/Semester: 14-15

Total Minimum Credits: 122

Footnotes:

1. One free elective (3 credits) cannot be a course required for the major degree.
2. Students must choose a minimum of 9 credits from one of the following two combinations of courses - 1st combination: CH 448 Computer Aided Drug Design (3 Credits), and at least 6 credits from pharmaceutical chemistry program electives or other courses approved by department chair or designee OR 2nd combination: PH 316 Pharmaceutics and Biopharmaceutics I (3 credits), and PH 317 Pharmaceutics and Biopharmaceutics II (4 credits), and

at least 3 additional credits chosen from pharmaceutical chemistry program electives or other courses approved by department chair or designee. A combination maximum of 3 credits of CH 450 and CH 480 can be used to meet the program electives requirement.

3. A course which should be used to meet the General Education Discipline Requirement not satisfied by the courses in the major. (i.e. social science or humanities; 6 cr of each are required).

General Notes:

1. American Chemical Society certification of the pharmaceutical chemistry BS degree may be obtained by inclusion of selected chemistry courses as part of the 55 credit hours required, together with additional electives. Consult with a chemistry advisor.
2. The CH 450 - Undergraduate Research experience is strongly encouraged for all department majors. An application form is available in the department office. For ACS certification, the area of undergraduate research must include either Biochemistry or Inorganic chemistry for students pursuing BS in pharmaceutical chemistry.

Humanities Mission

The Department of Humanities aims to develop in students an understanding and an appreciation of history and literature, philosophy and language, art and music. It hopes thereby to stimulate students' imaginations and their joy in life. It also provides training in writing, in the fundamentals of research in the humanities, and in the basics of the fine arts. It undertakes to serve the entire University community by sponsoring lectures, concerts, and many other special events that show the best of the humanities and the fine arts.

The Department of Humanities offers a major in medical humanities.

The Department of Humanities offers minors in humanities and Spanish.

Faculty

Kevin Murphy

BA (Towson University); MA, PhD (University of Maryland, College Park)

Professor of History

Chair, Department of Humanities

Jill M. Baren

BS (Brown University); MS (University of Pennsylvania); MBA (Brandeis University); MD (University of Pittsburgh)

Professor of Biological Sciences and Humanities

Provost and Vice President, Academic Affairs

Jeffrey M. Brown

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Fellow in Humanities

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Emeritus Faculty

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BA (Columbia University); MA (Tufts University); PhD (University of Pennsylvania)
Professor Emeritus of German

Laurie G. Kirsznner

BA (Barnard College); MA (New York University); PhD (Temple University)
Professor Emeritus of English

William A. Reinsmith

BA (St. Charles Borromeo Seminary); MA (Villanova University); DA (Carnegie Mellon University)
Professor Emeritus of Humanities

David Traxel

AB (University of California, Berkeley); MA, PhD (University of California, Santa Cruz)
Professor Emeritus of History

Humanities – Minor

The humanities minor is a program of study that provides students with an opportunity to study the humanities through a discipline-based, interdisciplinary, or topically focused approach. The program consists of 18 credits of approved humanities coursework. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. The optional capstone course in the program is HU 498 - Directed Study in the Humanities. Qualified candidates for the humanities minor will be invited to summarize their research in an oral report to the department faculty.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work. According to the University policy, a student must have the approval of his/her academic advisor in order to apply for a minor. No more than 6 credits may be transferred from another institution. The department chair will determine transferability.

For more information on applying for a completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Courses

- WR 101 - Writing and Rhetoric I Credits: 3

Elective Courses

Courses at or above the 200 level from the department's course offerings may be used for this minor. One of the multidisciplinary inquiry courses may apply to the humanities minor. All courses applicable to the humanities minor must be preapproved by the chair of the Department of Humanities.

Medical Humanities - Major

In this major students study the various fields of humanities (literature, philosophy, ethics, history, classics, and religion) and their application to health care education and practice. Students choose to complete rigorous and highly flexible requirements in the natural sciences (biology, chemistry, physics) and develop a high level of competency in the humanities. These areas of study provide insight into the human condition, suffering, personhood, and our responsibility to each other, and offer a complementary perspective on healthcare. Attention to these subjects helps to develop and nurture skills of observation, analysis, empathy, and self-reflection—skills that are necessary for humane healthcare.

The new "Critical Analysis and Reasoning Skills" section of the Medical College Admissions Test is designed to help medical schools assess how students think by asking them to analyze passages from a wide range of disciplines, including ethics, philosophy and cultural studies. This major focuses on helping future physicians and other health care professionals develop the ability to think critically and deeply, to know where to seek answers, and how to solve problems in the clinical environment. Such study imparts the skill, sensitivity and human awareness that will increasingly define the successful, empathetic health care professional of the 21st century.

All majors participate in a year-long, one-on-one capstone project with a faculty member. Those bound for medical school are advised by the department and by the pre-med advisor. The major is excellent preparation for advanced study in a variety of fields, and for careers in Health Law Practice, Health Education Wellness Programs, Pharmaceutical Sales, Health Care Administration, various positions in insurance companies and hospitals, and many others.

Learning Outcomes for Majors in Medical Humanities

Students who successfully complete the curriculum of the humanities and science major will be able to:

- Write at a high level of proficiency.
- Read and interpret texts with insight.
- Describe how the humanities and the sciences comment on and relate to each other.
- Have a basic knowledge of at least one language other than English.
- Apply the methods of literary and historical study as well as those of the bench scientist.
- Enter well-prepared into graduate or professional school or employment.

Medical Humanities Degree Requirements

To qualify for the bachelor of science in medical humanities, a minimum of 121 credit hours of approved courses is required, of which 49 hours must be in approved courses in the humanities. In addition, 25 credits of science are required, beyond the general education requirements, to give a total of 32 credits in science. Students must maintain a "C" average (2.0). Coursework is to be distributed as indicated below.

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are

defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Core Requirements (7 credits)

- HU 101 - Orientation to Humanities Credits: 1
- HU 494 - Pre-Capstone Credits: 3
- HU 495 - Senior Seminar Credits: 3

Distribution Requirements (12 credits)

Take four of six courses:

- CA 303 - Ancient Medicine Credits: 3
- EN 329 - Medicine and Literature Credits: 3
- HI 322 - History of US Medicine and Public Health Credits: 3
- HU 317 - Medicine and Hispanics Credits: 3
- PL 313 - Philosophy of Medicine Credits: 3
- RS 320 - Religion and Medicine Credits: 3

Foreign Language Requirement (3 credits)

Major Concentration (52 credits)

Science Program Electives, Credits: 25

Courses with the following prefixes fulfill the science program electives: BS, CH, PY, others as approved by the department chair)

Humanities Program Electives, Credits: 27 credits

Courses with the following prefixes fulfill the relevant distribution requirement and the program elective requirement: AC, AR, EN, ET, HI, HU, LA, PL, RS, SP; others as approved by the department chair

Free Elective (6 credits)

Sample Medical Humanities Curriculum Plan

First Year

- Foreign Language Requirement Credits: 3
- HU 101 - Orientation to Humanities Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- Free Elective Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 17

Second Year

Fall Semester

- General Education Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- Science Program Elective I Credits: 4
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1

Credits/Semester: 14

Spring Semester

- General Education Social Science Requirement Credits: 3
- Major Distribution Course 2 (English) Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- PY 200 - Survey of Physics Credits: 4

Credits/Semester: 17

Third Year

- General Education Humanities Requirement Credits: 3
- Humanities Program Elective 1 Credits: 3
- Major Distribution Course 3 (Fine Arts) Credits: 3
- Science Program Elective II Credits: 4
- CO 101 - Introduction to Communication Credits: 3

Credits/Semester: 16

Spring Semester

- General Education Humanities Requirement Credits: 3
- General Education Elective (outside major) Credits: 3
- Major Distribution Course 4 (History) Credits: 3
- Major Distribution Course 5 (Philosophy) Credits: 3
- Science Program Elective III Credits: 4

Credits/Semester: 16

Fourth Year

Fall Semester

- Humanities Program Elective 2 Credits: 3
- Humanities Program Elective 3 Credits: 3
- Humanities Program Elective 4 Credits: 3
- Humanities Program Elective 5 Credits: 3
- Science Program Elective IV Credits: 4

Credits/Semester: 16

Spring Semester

- General Education Elective (outside major) Credits: 3
- Humanities Program Elective 6 Credits: 3
- Humanities Program Elective 7 Credits: 3
- Humanities Program Elective 8 Credits: 3
- HU 495 - Senior Seminar Credits: 3

Credits/Semester: 15

Total Credits: 121

Spanish for Healthcare Professionals - Undergraduate Certificate

Healthcare in the U.S. is complex and ever-changing, but its foundation remains simple—the ability to communicate clearly and effectively, one-on-one, with patients. Students completing this certificate program will gain the linguistic and cultural fluency to better serve the growing Spanish-speaking population in a variety of healthcare settings.

The Spanish for Healthcare Professionals Certificate Program is a postsecondary, pre-baccalaureate certificate, requiring 15 credits to complete. This certificate program will offer those working in, or those who plan to work in, the healthcare industry with quality language instruction, and enhanced cultural awareness, specific to the unique working environment of healthcare. Graduates will have the ability to assist in meeting the need for bilingual Spanish healthcare professionals.

Given the nature of language courses, with each successive course building on what is learned in prior courses, students will take the five required courses in the order presented below, taking only one course at a time (i.e., one course per semester).

Requirements

Successful completion of the certificate requires 15 credits:

- HU 317 - Medicine and Hispanics Credits: 3
- SP 201 - Intermediate Spanish I Credits: 3
- SP 202 - Intermediate Spanish II Credits: 3
- SP 301 - Spanish for Healthcare Professionals Credits: 3

- SP 303 - Conversation & Composition Credits: 3

Eligibility

Students from outside USciences must have a High school diploma, and proficiency at the third semester level (equivalent to one year) of college Spanish. Each student will take a required placement test to ensure that he/she possesses the requisite proficiency to position him/her for success in SP201-Intermediate Spanish, the first course in the curriculum. Students not placing at the required level are free to take lower level Spanish courses at University of the Sciences or elsewhere to increase their competency and re-take the placement test.

Students presently enrolled in a USciences undergraduate or pre-professional/professional health sciences program must be in good academic standing, take the required placement test and demonstrate proficiency at the third semester level (equivalent to one year) of college Spanish. In addition, they must obtain the approval of their academic advisor and either the academic program director or dean for their major, and obtain the approval of the Program Director for the Spanish for Healthcare Professionals Certificate Program.

Matriculated students in a USciences degree program who are interested in pursuing this Certificate Program are encouraged to begin the Certificate Program early in their academic career, usually by the fifth semester of college work, to allow sufficient time to complete the five required courses.

Additional Information

Students enrolled in the Spanish for Healthcare Professionals Certificate Program must earn a grade of "C" or better in each required course in order to progress to the next course in the curriculum and successfully complete the Program.

If a student completes one or more courses in the Program and for whatever reason does not progress to the next course, the student may continue in the Program at a later date. However, if the student is away from the Program for one year or more, the student must retake the placement test to determine the most appropriate course for continuation in the Program and will enroll in the course the next time it is offered.

A maximum of six credits, equivalent to SP 201 and SP 202, may be transferred from another institution with the approval of the Humanities Department chair.

Spanish – Minor

The Spanish minor is designed to provide students with a concentration in the Spanish language and culture that will both enhance their marketable skills in the healthcare professions and increase their employment opportunities regardless of their career path. Students will have the opportunity to explore all aspects of Spanish culture including language, literature, and the arts of both the Old and New Worlds.

The need for Spanish-speaking professionals continues to increase with the growing Hispanic population in the United States. Successful completion of the Spanish minor will provide healthcare students with additional skills to augment the quality of healthcare services. USciences students in other fields will also attain knowledge and skills useful to them both personally and professionally.

Requirements

Successful completion of the minor requires 18 credits. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum.

15 Credits Will Be Chosen from

- Courses in Spanish numbered above 200

Any of the following:

HU courses including:

- HU 340 - Special Topics in Humanities Credits: 3
- HU 399 - Independent Study-Humanities Credits: 3
- HU 498 - Directed Study in the Humanities Credits: 3 (optional)

Eligibility

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work. A student must have a 2.00 GPA or higher and must have the approval of his/her advisor in order to apply for the program.

Additional Information

To complete the minor successfully, students must earn a grade of "C+" or better in each of their courses in the minor and must maintain a minimum overall GPA of 2.00.

A maximum of six credits may be transferred from another institution with approval of the Humanities Department chair.

For more information on applying for a completing a minor, please see Minors in the Academics section of this catalog.

Mathematics, Physics, and Statistics

The mission of the Department of Mathematics, Physics, and Statistics is as follows:

Education

- Provide a major program in physics.
- Facilitate the development of the students' higher order thinking abilities in the disciplines of mathematics, physics, and statistics.
- Provide excellent instruction in mathematics, physics, and statistics for all majors.
- Provide minors programs in the disciplines of the department.
- Provide interdisciplinary programs in collaboration with other departments.
- Provide USciences graduate students and faculty of other departments with expertise in mathematics, physics, and statistics to support their research and teaching.

Research

- Conduct research and scholarly work in mathematics, physics and statistics for the purpose of advancing knowledge.
- Provide opportunities for students to engage in undergraduate and graduate research.

Service

- Provide service and expert consultation to USciences students and faculty, appropriate professional organizations, committees, and the community.
- Participate in the life of the University through work on institutional, divisional, and departmental committees.
- Develop activities on campus designed to foster an appreciation for and understanding of mathematics, physics, and statistics.

Faculty

Elia V. Eschenazi

Doctor of Physics (Honors) (Università degli Studi Milano, Italy); PhD (Drexel University)
Professor of Physics
Chair, Department of Mathematics, Physics, and Statistics

Salar Y. Alsardary

BS (University of Sulaimania, Iraq); MS (University of Mosul, Iraq); MA, PhD (West Virginia University)
Professor of Mathematics

Tarlok S. Aurora

BS, MS (University of Bombay, India); PhD (University of Arkansas)
Professor of Physics

Bernard J. Brunner

BS (Wheeling Jesuit University); MS, PhD (Ohio State University)
Associate Professor of Physics

Sergio Freire

BS (PUC University, Brazil); MSc, PhD (Federal University of Minas Gerais, Brazil)
Associate Professor of Physics

Paul Halpern

BA (Temple University); MA, PhD (State University of New York, Stony Brook)
Professor of Physics

Amy Kimchuk

BS (Gwynedd-Mercy College); MA (Villanova University)
Senior Lecturer in Mathematics

Sungwook Kim

PhD (University of Missouri, Columbia)
Assistant Professor of Statistics

Roberto C. Ramos

BS (University of the Philippines); MS, PhD (University of Washington)
Associate Professor of Physics
Director, Center for Undergraduate Research

Edward Reimers

BA (LaSalle University); MA (State University of New York, Binghamton)
Instructor in Mathematics

Abolfazi Saghafi

BSc (Azad University, Iran); MSc (Shahid Beheshti University, Iran); PhD (Iran University of Science & Technology); PhD (University of South Florida)
Assistant Professor of Statistics

Jessie Taylor

BS (Calvin College); MS (University of Notre Dame); PhD (University of Pennsylvania)
Assistant Professor of Physics

Lia Vas

BSc (University of Novi Sad, Serbia); PhD (University of Maryland, College Park)
Professor of Mathematics

Carl Walasek

BS (University of Illinois, Urbana); MS (DePaul University)
Instructor in Statistics
Director, Certificate Program

Emeritus Faculty

Durai Sabapathi

BS (Madras University, India); MS, PhD (Temple University)

Professor Emeritus of Statistics

Biophysics – Minor

Biophysics is a rapidly developing field, applying the study of materials and physical interactions to an understanding of biological systems. The biophysics minor is intended to be a flexible program, combining a basic understanding of modern physics, cell biology, and biophysics with selected advanced topics related to the field.

Students must take at least 18 credits of required and elective courses for the minor, and a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair. Students may not earn both a biophysics minor and a physics minor.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisites

- BS 119 - General Biology II Credits: 3
or
- BS 133 - Introductory Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
or
- BS 135 - Intro Biology II Lab Credits: 1
or
- BS 137 - Phage Hunters II Credits: 2
- CH 202 - Organic Chemistry II Credits: 3
or
- CH 212 - Principles of Organic Chemistry II Credits: 3
- MA 122 - Calculus I Credits: 4
- PY 212 - Physics II Credits: 4

Required Courses

- PY 301 - Modern Physics I Credits: 3
- PY 322 - Intro Biophysics Credits: 2
- PY 340 - Biophysics I Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 490 - Special Topics in Physics Credits: 3
(Must be related to biophysics and be approved in advance by the minor advisor)
or
- PY 495 - Undergraduate Research in Physics Credits: 2
(Must be related to biophysics and be approved in advance by the minor advisor)

Elective Courses

Choose at least two of the following courses, at least one of which must be in physics (PY), mathematics (MA), or statistics (ST). Note that some of these courses have prerequisites:

- Other courses as approved by the department
- BI 450 - Bioinformatics I: Genomics Credits: 3
- BS 461 - Cell Biology Credits: 4
- BS 466 - Genetics Credits: 4
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- CS 201 - Computer Programming I Credits: 3
- MA 202 - Mathematical Analysis IV Credits: 4
- MA 320 - Differential Equations Credits: 3
- PY 302 - Modern Physics II Credits: 3
- PY 701 - Medical Physics Credits: 3
- ST 310 - Biostatistics I Credits: 3

Biostatistical Methods with SAS Programming - Graduate Certificate

A report by McKinsey Global Institute estimates that by 2018, the U.S. could face a shortage of 190,000 people with deep analytic skills in addition to 1.5 million managers and analysts with an ability to use big data for effective decision-making.

To meet the demand for quantitative expertise, USciences offers this certificate program in partnership with SAS, creator of the world's most widely used statistical software. The curriculum blends analytic SAS programming with technical and practical aspects of biostatistical applications and trains students in communicating results to a variety of audiences. Completing this certificate program gives current working professionals and graduate students a competitive advantage and broadens their career options.

Students are required to successfully earn a total of 12 credit hours. All statistics courses included in the certificate program are 3 credits each, therefore students will be required to complete a total of 4 courses, two required and two electives.

Required Courses (6 Credits)

- ST 710 - Biostatistical Methods Credits: 3
- or
- ST 704 - Statistics for Research Credits: 3
- ST 711 - SAS Programming & Data Analysis Credits: 3

Elective Courses (6 Credits)

(Choose Two)

- ST 701 - Design and Analysis of Experiments Credits: 3
- ST 715 - Statistics for Clinical Trials Credits: 3
- ST 720 - Regression Analysis Credits: 3
- ST 736 - Survival Analysis Credits: 3
- ST 745 - Advanced SAS Programming Credits: 3

Total Credits: 12

Mathematics – Minor

Mathematics is the fundamental language of all science-related majors as it is needed as a tool to help describe various scientific phenomena that occur. Many biological and medical phenomena can be studied mathematically or have substantial

quantitative components. Mathematical areas such as combinatorics, graph theory, and statistics are being applied to the problem of genetic mapping. Further, differential geometry and topology are currently being used to study the basic physical and chemical properties of DNA. Mathematical modeling of the heart enabled researchers to discover why a phenomenon called ventricular fibrillation occurs. The unique mixture of a mathematics minor and a life science education will enhance many career opportunities.

This minor requires a total of 20 credits, six courses after MA 102, four required and two elective. A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Required Courses

- MA 201 - Mathematical Analysis III Credits: 4
or
- MA 221 - Calculus II Credits: 4
- MA 202 - Mathematical Analysis IV Credits: 4
or
- MA 222 - Calculus III Credits: 4
- MA 314 - Discrete Mathematics Credits: 3
- MA 316 - Linear Algebra Credits: 3

Elective Courses

- Other courses as approved by the department
- CS 201 - Computer Programming I Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 330 - Geometry Credits: 3
- MA 340 - Introduction to Graph Theory Credits: 3
- MA 360 - Topics in Mathematics with Applications to Chemistry Credits: 3
- MA 370 - Mathematical Methods for the Physical Sciences I (cross-listed as PY 370) Credits: 3
- MA 371 - Mathematical Methods for the Physical Sciences II (cross-listed as PY 371) Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- MA 422 - Mathematical Modeling Credits: 3
- MA 430 - Differential Geometry Credits: 3
- MA 490 - Special Topics or Research in Mathematics Credits: 1 to 3
- ST 310 - Biostatistics I Credits: 3
- ST 321 - Advanced Topics in Probability Credits: 3

Physics - Integrated BS/MS

The Integrated BS/MS in Physics program is a 4 + 1 program intended to provide students with the state-of-the-art knowledge, skills, and technical foundations in physics required to tackle contemporary scientific and technological challenges. It uniquely offers three tracks representing the leading-edge fields of materials science, biophysics, and complex systems. These offer students expertise in important modern endeavors such as the study of novel materials, the use of physics techniques to better understand biological systems, and the extraordinary world of chaotic dynamics and complex systems. Students in this program complete a set of foundational and core courses in physics and specialized fields, assuring a well-rounded exposure to the subject grounded in vital connections to contemporary scientific and technological advances. Graduates from this program will be well prepared to enter immediately into rewarding professional careers in vital sectors of research and development, manufacturing

and entrepreneurship or, if they choose, continue on to other graduate or professional degrees. USciences offers a truly distinctive program in physics that provides the essential training required for modern applications.

Academic Standards

Course Selection

Courses may count toward meeting degree requirements and/or electives either for the undergraduate (BS) degree or for the graduate (MS) degree, but not for both.

The MS degree requires a minimum of three (3) credits at the 800-level, a maximum of six (6) credits at the 300- or 400-level, and the remainder at the 700- or 800-level. Many graduate courses are not offered every year and some may be offered only in the summer and in the evenings or weekends. A student may choose to put off certain undergraduate courses which may delay the student's ability to earn the BS degree and may also impact the student's ability to obtain financial aid as an undergraduate student. Students in the Integrated BS/MS in Physics program are responsible for working with their faculty advisor to ensure that they do not significantly disrupt their undergraduate course sequence by pursuing graduate courses.

Undergraduate and Graduate Transcripts

Separate transcripts for the undergraduate degree and for the graduate (MS) degree will be maintained. In order to remain enrolled in the Integrated BS/MS in Physics program, students must maintain a minimum of a 3.00/4.00 cumulative grade point average (GPA) in both their undergraduate and graduate degree programs.

Grade Requirements, Probation, and Dropped from Program

Students in the Integrated BS/MS in Physics program must maintain a cumulative GPA of 3.00 as undergraduate students and earn a "B-" or better grades in all courses that are being used to fulfill the requirements for the MS degree.

If a student fails to maintain a cumulative GPA of 3.00 in either the BS program or the MS program, then the student will be placed on probation in the MS program. The student will have two (2) consecutive semesters (not counting summer sessions) to bring up the cumulative GPA to a minimum 3.00 in each program. During this time, the student must maintain a minimum of a 3.00 semester GPA in each program. Failure to maintain this minimum semester GPA or to earn the minimum cumulative GPA within two semesters will cause the student to be dropped from the Integrated BS/MS in Physics program—the student will remain in the BS in Physics program as long as the student continues to meet the minimum criteria for that program.

Students who are dropped from the Integrated BS/MS in Physics program are eligible to apply to a USciences graduate program through the normal process, but will not be allowed to enter any USciences graduate program until they have successfully completed a baccalaureate degree program. Students who do not already hold a baccalaureate degree and are dropped from or leave the BS in Physics program will also be dropped from the graduate program.

Degree Track Review

Students enrolled in the Integrated BS/MS in Physics program must undergo a degree track review for their graduate program at the end of the academic year in which they would normally complete the undergraduate degree and also at the end of their first academic year as a graduate student. Additional degree track reviews can occur at the discretion of the Program Director. Based on this review, a student may be invited to change graduate degree tracks or may be dropped from the graduate program.

Student Classification and Financial Aid

Students enrolled in the Integrated BS/MS in Physics program will be classified as undergraduate students up until the completion of the BS degree. However, at the end of the 4th year of enrolled status as an undergraduate at USciences (less for transfer students), the student will not be eligible for normal undergraduate financial aid, but may be eligible for aid as a graduate student. Additionally, beyond this time frame, the student will be charged at the graduate or integrated degree program tuition rate.

Awarding of the MS Degree

The MS degree will not be awarded prior to earning the BS degree. Unless the student already holds a baccalaureate degree, a student must complete the degree requirements for the BS degree before or simultaneously with the completion of the MS degree. A student who leaves USciences before the completion of the BS degree will not be awarded the MS degree even if all of the graduate degree requirements have been met. In such cases, students may petition to be awarded the MS degree within 3 years of

leaving USciences if a baccalaureate degree has been earned at another institution with regional accreditation.

Integrated BS/MS Degree Requirements - Biophysics

Undergraduate Requirements

Fundamental Requirements

- General Education Humanities Requirement Credits: 6
- General Education Social Science Requirement Credits: 6
- Multidisciplinary Inquiry Credits: 6
- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- CS 201 - Computer Programming I Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Biophysics Track Requirements

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 340 - Biophysics I Credits: 3

Graduate Requirements

Core Graduate Requirements

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 750 - Quantum Mechanics Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Biophysics Track Requirements

- PY 840 - Experimental Techniques in Biophysics Credits: 3
- PY 841 - Physical Approach to Life Sciences Credits: 3

Thesis option Graduate Requirement

- PY 799 - Graduate Research in Physics Credits: 3-5

Non-Thesis option Graduate Electives

- Choose two:
- PY 751 - Advanced Quantum Mechanics Credits: 3
- DS 401 - Introduction to Data Structure/Algorithms Credits: 3
- DS 403 - Applied Machine Learning Credits: 3
- PY 725 - Advanced Nonlinear Dynamics Credits: 3
- PY 815 - Polymer Physics Credits: 3
- PY 817 - Quantum Information Credits: 3
- PY 830 - Photonics Credits: 3
- PY 832 - Network Theory and Its Applications Credits: 3
- PY 833 - Pattern Formation Credits: 3
- PY 834 - Complexity Theory Credits: 3
- PY 890 - Graduate Special Topics in Physics Credits: 3

Sample BS/MS in Physics Biophysics Track Curriculum Plan

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1

- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4

Credits/Semester: 17

Second Year

Fall Semester

- Multidisciplinary Inquiry Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Spring Semester

- Multidisciplinary Inquiry Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- MA 222 - Calculus III Credits: 4
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 18

Third Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 6
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2

Credits/Semester: 18

Spring Semester

- MA 316 - Linear Algebra Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 710 - Advanced Mechanics Credits: 3

Credits/Semester: 18

Fourth Year (Thesis Option)

Fall Semester

- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 380 - Electronics Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 750 - Quantum Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 17

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 6
 - CO 101 - Introduction to Communication Credits: 3
 - PY 340 - Biophysics I Credits: 3
 - PY 496 - Advanced Research in Physics Credits: 3
 - PY 799 - Graduate Research in Physics Credits: 3-5
- Note: PY 799 may be taken in the summer between the 4th and 5th years.

Credits/Semester: 18

Fifth Year (Thesis Option)

Fall Semester

- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 840 - Experimental Techniques in Biophysics Credits: 3

Credits/Semester: 12

Spring Semester

- PY 896 Graduate Research Credits: 4
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 841 - Physical Approach to Life Sciences Credits: 3

Credits/Semester: 8

Total Minimum Credits: 160

Fourth Year (Non-Thesis Option)

- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 380 - Electronics Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 750 - Quantum Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 17

Spring Semester

- General Education Humanities or Social Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 340 - Biophysics I Credits: 3

Credits/Semester: 16

Spring Semester

Fifth Year (Non-Thesis Option)

Fall Semester

- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 840 - Experimental Techniques in Biophysics Credits: 3

Credits/Semester: 12

Spring Semester

- Graduate Physics Electives Credits: 6
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 841 - Physical Approach to Life Sciences Credits: 3

Credits/Semester: 10

Total Minimum Credits: 156

Integrated BS/MS Degree Requirements - General/Complex Track

Fundamental Requirements and Complex/General Physics Track Requirements

- General Education Humanities Requirement Credits: 6
- General Education Social Science Requirement Credits: 6
- Multidisciplinary Inquiry Credits: 6
- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Graduate Requirements

Core Graduate Requirements

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 850 - Experimental Techniques in Materials Science Credits: 3

General/Complex Track Requirements

- PY 725 - Advanced Nonlinear Dynamics Credits: 3

Thesis and Non-Thesis option Graduate Elective Requirement

- Non-thesis students must take 12 credits of physics electives from the list below and 3 credits of either biology, chemistry or physics electives from the list below.
- Thesis students must take 6 credits of physics electives from the list below and 3 credits of either biology, chemistry, or physics from the list below.

Complex/General Physics Track Electives

- MA 315 - History of Mathematics Credits: 3
- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
- PY 335 - Views of the Cosmos Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 490 - Special Topics in Physics Credits: 3

Biology and Chemistry Electives

- BS 132 - Introductory Biology I Credits: 3 &
- BS 134 - Intro Biology I Lab Credits: 1
- BS 133 - Introductory Biology II Credits: 3 &
- BS 135 - Intro Biology II Lab Credits: 1
- BS 461 - Cell Biology Credits: 4
- BS 243 - Microbial Science Credits: 3 &
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3

- CH 341 - Molecular Structure in Biochemistry Credits: 3

Thesis option Graduate Requirement

Sample BS/MS in Physics General/Complex Track Curriculum Plan

First Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4

Credits/Semester: 17

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 17

Third Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2

Credits/Semester: 18

Spring Semester

- PY 380 - Electronics Credits: 3
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 710 - Advanced Mechanics Credits: 3

Credits/Semester: 18

Fourth Year (Thesis Option)

Fall Semester

- Free Elective Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 431 - Statistical Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 750 - Quantum Mechanics Credits: 3

Credits/Semester: 18

Spring Semester

- Physics Elective Credits: 6
- Physics/Chemistry/Biology Elective Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3
- PY 799 - Graduate Research in Physics Credits: 3-5
Note: PY 799 may be taken in the summer between the 4th and 5th years.
- ST 331 - Regression Analysis Credits: 3

Credits/Semester: 18

Fifth Year (Thesis Option)

Fall Semester

- PY 896 Graduate Research Credits: 4
- PY 725 - Advanced Nonlinear Dynamics Credits: 3
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Credits/Semester: 12

Spring Semester

- Graduate Physics Elective Credits: 3
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 799 - Graduate Research in Physics Credits: 3-5

Credits/Semester: 8

Total Minimum Credits: 156

Fourth Year (Non-Thesis Option)

Fall Semester

- Free Elective Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 431 - Statistical Mechanics Credits: 3
- PY 750 - Quantum Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Credits/Semester: 18

Spring Semester

- Physics/Chemistry/Biology Elective Credits: 3
- Physics Elective Credits: 6
- PY 496 - Advanced Research in Physics Credits: 3
- ST 331 - Regression Analysis Credits: 3

Credits/Semester: 18

Fifth Year (Non-Thesis Option)

Fall Semester

- PY 725 - Advanced Nonlinear Dynamics Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Credits/Semester: 9

Spring Semester

- Graduate Physics Elective Credits: 6
- PY 896 Graduate Research Credits: 4
- PY 700 - Graduate Physics Seminar Credits: 1

Credits/Semester: 10

Total Minimum Credits: 152

Integrated BS/MS Degree Requirements - Materials Science

Undergraduate Requirements

Fundamental Requirements

- General Education Humanities Requirement Credits: 6
- General Education Social Science Requirement Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- PY 100 - Physics Orientation Credits: 1
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1

- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Materials Science Track Requirements

- PY 440 - Introduction to Nanoscience Credits: 3
- PY 470 - Solid State Physics Credits: 3
- PY 480 - Introduction to Materials Science Credits: 3

Graduate Requirements

Core Graduate Requirements

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 750 - Quantum Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Materials Science Track Requirements

- PY 850 - Experimental Techniques in Materials Science Credits: 3
- PY 851 - Quantum Materials Credits: 3

Thesis option Graduate Requirement

- PY 799 - Graduate Research in Physics Credits: 3-5

Thesis and Non-Thesis option Graduate Elective Requirement

Non-thesis and thesis students must take 6 credits of physics electives from the list below and 3 credits of biology, chemistry, or physics electives from the list below.

Biology and Chemistry Electives

- BS 132 - Introductory Biology I Credits: 3 &
- BS 134 - Intro Biology I Lab Credits: 1
- BS 133 - Introductory Biology II Credits: 3 &
- BS 135 - Intro Biology II Lab Credits: 1
- BS 461 - Cell Biology Credits: 4
- BS 243 - Microbial Science Credits: 3 &
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3

Physics Electives

- MA 315 - History of Mathematics Credits: 3
- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
- PY 335 - Views of the Cosmos Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 490 - Special Topics in Physics Credits: 3

Sample BS/MS in Physics Materials Science Track Curriculum Plan

First Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- General Education Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6

- PY 212 - Physics II Credits: 4
- MA 221 - Calculus II Credits: 4

Credits/Semester: 17

Spring Semester

- General Education Humanities or Social Science Requirement Credits: 3
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 17

Third Year

Fall Semester

- Free Elective Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2

Credits/Semester: 18

Spring Semester

- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 710 - Advanced Mechanics Credits: 3

Credits/Semester: 18

Fourth Year (Thesis Option)

Fall Semester

- Free Elective Credits: 3
- General Education Humanities or Social Science Requirement Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 430 - Thermodynamics Credits: 3
- PY 480 - Introduction to Materials Science Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 18

Spring Semester

- Physics/Chemistry/Biology Elective Credits: 3
- PY 896 Graduate Research Credits: 4
- PY 305 - Physics Seminar Credits: 1
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 470 - Solid State Physics Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3
- PY 750 - Quantum Mechanics Credits: 3
- PY 799 - Graduate Research in Physics Credits: 3-5
Note: PY 799 may be taken in the summer between the 4th and 5th years.

Fifth Year (Thesis Option)

Fall Semester

- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 850 - Experimental Techniques in Materials Science Credits: 3

Credits/Semester: 12

Spring Semester

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 851 - Quantum Materials Credits: 3

Credits/Semester: 8

Total Minimum Credits: 156

Fourth Year (Non-Thesis Option)

Fall Semester

- Free Elective Credits: 3
- General Education Humanities or Social Science Requirement Credits: 3
- PY 430 - Thermodynamics Credits: 3
- PY 480 - Introduction to Materials Science Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 17

Spring Semester

- Physics/Chemistry/Biology Elective Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 470 - Solid State Physics Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3

Fifth Year (Non-Thesis Option)

Fall Semester

- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 850 - Experimental Techniques in Materials Science Credits: 3

Credits/Semester: 9

Spring Semester

- Graduate Physics Electives Credits: 6
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 851 - Quantum Materials Credits: 3

Credits/Semester: 10

Total Minimum Credits: 152

Physics - Master of Science (MS)

The MS in Physics program is intended to provide students with the state-of-the-art knowledge, skills, and technical foundations in physics required to tackle contemporary scientific and technological challenges. It uniquely offers three tracks representing the leading-edge fields of materials science, biophysics, and complex systems. These offer students expertise in important modern endeavors such as the study of novel materials, the use of physics techniques to better understand biological systems, and the extraordinary world of chaotic dynamics and complex systems. Students in this program complete a set of foundational and core courses in physics and specialized fields, assuring a well-rounded exposure to the subject grounded in vital connections to contemporary scientific and technological advances. Graduates from this program will be well prepared to enter immediately into rewarding professional careers in vital sectors of research and development, manufacturing and entrepreneurship or, if they choose, continue on to other graduate or professional degrees. USciences offers a truly distinctive program in physics that provides the essential training required for modern applications.

Core Courses

Non-Thesis (24 Credits)

- Graduate Physics Elective Credits: 6
- PY 700 - Graduate Physics Seminar Credits: 1

- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Thesis (28 Credits)

- Research Credits: 10
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 750 - Quantum Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Concentrations (6 Credits)

Biophysics

- PY 840 - Experimental Techniques in Biophysics Credits: 3
- PY 841 - Physical Approach to Life Sciences Credits: 3

Materials Science

- PY 850 - Experimental Techniques in Materials Science Credits: 3
- PY 851 - Quantum Materials Credits: 3

Complex Systems

- Physics or Data Science Elective Credits: 3
- PY 725 - Advanced Nonlinear Dynamics Credits: 3

Graduate Physics Elective I

- PY 725 - Advanced Nonlinear Dynamics Credits: 3
- PY 815 - Polymer Physics Credits: 3
- PY 817 - Quantum Information Credits: 3
- PY 830 - Photonics Credits: 3
- PY 890 - Graduate Special Topics in Physics Credits: 3

Graduate Physics Elective II

- PY 832 - Network Theory and Its Applications Credits: 3
- PY 833 - Pattern Formation Credits: 3
- PY 834 - Complexity Theory Credits: 3
- PY 890 - Graduate Special Topics in Physics Credits: 3

Master of Science (MS) - (Non-Thesis)

First Year

Fall Semester

- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 8

Spring Semester

- PY 750 - Quantum Mechanics Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3

Credits/Semester: 9

Second Year

Materials Science Track

Fall Semester

- Graduate Physics Elective (I or II) Credits: 3
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 850 - Experimental Techniques in Materials Science Credits: 3

Credits/Semester: 7

Spring Semester

- Graduate Physics Elective (I or II) Credits: 3
- PY 851 - Quantum Materials Credits: 3

Credits/Semester: 6

Biophysics Track

Fall Semester

- Graduate Physics Elective (I or II) Credits: 3
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 840 - Experimental Techniques in Biophysics Credits: 3

Credits/Semester: 7

Spring Semester

- Graduate Physics Elective (I or II) Credits: 3
- PY 841 - Physical Approach to Life Sciences Credits: 3

Credits/Semester: 6

Complex Systems Track

Fall Semester

- Graduate Physics Elective (I or II) Credits: 3
- PY 700 - Graduate Physics Seminar Credits: 1
- PY 725 - Advanced Nonlinear Dynamics Credits: 3

Credits/Semester: 7

Spring Semester

- Graduate Physics Elective (I or II) Credits: 3
- Graduate Physics Elective (II) Credits: 3

Credits/Semester: 6

Total Minimum Credits: 30

Master of Science (MS) - Thesis

First Year

Fall Semester

- PY 703 - Entrepreneurship and Physics in Industry Credits: 2
- PY 710 - Advanced Mechanics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Credits/Semester: 8

Spring Semester

- PY 750 - Quantum Mechanics Credits: 3
- PY 810 - Advanced Electromagnetism Credits: 3
- PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics Credits: 3

Credits/Semester: 9

Second Year

Materials Science Track

Fall Semester

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 850 - Experimental Techniques in Materials Science Credits: 3

Credits/Semester: 9

Spring Semester

-
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 851 - Quantum Materials Credits: 3

Credits/Semester: 8

Total Minimum Credits: 34

Biophysics Track

Fall Semester

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 840 - Experimental Techniques in Biophysics Credits: 3

Credits/Semester: 9

Spring Semester

- PY 799 - Graduate Research in Physics Credits: 3-5
- PY 841 - Physical Approach to Life Sciences Credits: 3

Credits/Semester: 8

Total Minimum Credits: 34

Complex Systems Track

Fall Semester

- PY 700 - Graduate Physics Seminar Credits: 1
- PY 725 - Advanced Nonlinear Dynamics Credits: 3
- PY 799 - Graduate Research in Physics Credits: 3-5

Credits/Semester: 9

Spring Semester

- Graduate Physics Electives (II) Credits: 3
- PY 799 - Graduate Research in Physics Credits: 3-5

Credits/Semester: 8

Total Minimum Credits: 34

Physics – Major

Physics is the fundamental science of nature, encompassing the tiniest and largest things in the world—and every scale in-between. In past centuries, physicists have unraveled laws governing the forces of nature and explored the structure of matter at the deepest level. Today some of the most exciting discoveries in physics are at the nanoscale—the realm of atoms and molecules—and apply to biological materials as well as other types of substances.

USciences offers a unique bachelor of science in physics degree. The program is exceptional in offering one of the few undergraduate physics programs in the region with biophysics, medical physics, pre-med, astrophysics, and materials science tracks. These tracks provide focus to upper-level courses and offer an applied interdisciplinary connection with current issues in industry, medicine, and research. The culmination of the student learning experience in the program is a capstone senior-level research course sequence where each student is matched with a physics faculty mentor to complete a project and develop and deliver a formal seminar presentation.

Students who obtain a bachelor of science in physics degree could potentially go on to engineering, medical, graduate, teaching, and other professional schools, as well as a career in industry or any other pursuit in which knowledge of physics is a prerequisite. By concentrating in the medical physics or biophysics degree track, students will get a heavier emphasis in biological sciences that would benefit them in careers as a medical physicist, biomedical researcher, or imaging/MRI professional. In the materials science track, students will receive a heavier focus on new materials and nanostructures useful in the development of new biomedical technologies, cancer research, alternative sources of energy, the next generation of computers, and engineering functions. By concentrating in the astrophysics track, students will learn about the applications of physics to astronomical bodies and the universe itself. Finally, students electing the pre-med track will be especially well prepared for medical school.

Students in the physics program will:

- Understand the discipline-specific knowledge in physics.
- Be able to integrate knowledge of physics with knowledge from other disciplines.
- Have strong physics reasoning and problem-solving skills and be able to apply these skills to the solution of theoretical and applied problems.
- Have strong skills in applying experimental methods.
- Be able to read and understand scientific literature.
- Be able to communicate effectively, both orally and in writing, with both professionals and non-professionals.
- Be able to work effectively within a team and to assume a leadership role.
- Have a broad educational background.

Physics Degree Requirements – General Track

The minimum number of credit hours to earn a BS in physics with the general track is 122. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (76 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3

- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3

Physics Electives (9 credits)

- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
- PY 335 - Views of the Cosmos Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 490 - Special Topics in Physics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Footnote:

Students taking PY 330 or PY 335 will receive credit toward the major only if they complete an additional mathematical research project.

Physics/Biology/Chemistry Elective (3 credits)

Choices for Physics Electives: any of the Physics Electives listed above

Choices for Chemistry Electives:

- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3

Choices for Biology Electives:

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 461 - Cell Biology Credits: 4

Unrestricted Electives (9 credits)

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (General Track)

First Year

Fall Semester

- Humanities or Social Sciences General Education Requirement Credits: 3
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1

- PY 211 - Physics I Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4

Credits/Semester: 17

- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 14

Third Year

Fall Semester

- CO 101 - Introduction to Communication Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3

Credits/Semester: 15

Spring Semester

- Free Elective Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 450 - Quantum Mechanics Credits: 3

Credits/Semester: 16

Fourth Year

Fall Semester

- Humanities or Social Science Requirement Credits: 6
- Physics Elective Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Credits/Semester: 14

Spring Semester

- Free Elective Credits: 3
- Physics Elective Credits: 6
- Physics/Chemistry/Biology Elective Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for BS in Physics: 122

Physics Degree Requirements – Astrophysics Track

The minimum number of credit hours to earn a BS in physics with the astrophysics track is 122. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (76 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

- PY 496 - Advanced Research in Physics Credits: 3

Astrophysics Track Requirements (9 credits)

- MA 430 - Differential Geometry Credits: 3
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3

Physics Electives (3 credits)

- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 435 - General Relativity Credits: 3
- PY 335 - Views of the Cosmos Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 490 - Special Topics in Physics Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Footnote:

Students taking PY 330 or PY 335 will receive credit toward the major only if they complete an additional mathematical research project.

Unrestricted Electives (9 credits)

Additional Requirement

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (Astrophysics Track)

First Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
 - CH 111 - Principles of Chemistry I Credits: 3
 - CH 113 - Principles of Chemistry Lab I Credits: 1
 - MA 107 - Precalculus Credits: 3
 - PE 101 - Physical Education I Credits: 0
 - PY 100 - Physics Orientation Credits: 1
 - WR 101 - Writing and Rhetoric I Credits: 3
-
- CH 112 - Principles of Chemistry II Credits: 3

- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4

Credits/Semester: 17

Spring Semester

- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4
- PY 305 - Physics Seminar Credits: 1

Credits/Semester: 15

Third Year

Fall Semester

- CO 101 - Introduction to Communication Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3
- Free Elective Credits: 3
- MA 430 - Differential Geometry Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 450 - Quantum Mechanics Credits: 3

Credits/Semester: 16

Fourth Year

Fall Semester

- Humanities or Social Science Requirement Credits: 6
- PY 431 - Statistical Mechanics Credits: 3
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Credits/Semester: 14

Spring Semester

- Free Elective Credits: 3
- Physics Elective Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for Physics Degree with Astrophysics Track: 122

Physics Degree Requirements – Biophysics Track

The minimum number of credit hours to earn a BS in physics with the biophysics track is 126. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (76 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1

- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 431 - Statistical Mechanics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3

Biophysics Track Requirements (22 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 340 - Biophysics I Credits: 3

Unrestricted Elective (3 credits)

Additional Requirement

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (Biophysics Track)

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1

- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4

Credits/Semester: 17

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- MA 222 - Calculus III Credits: 4
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 15

Third Year

Fall Semester

- Humanities and Social Sciences Requirement Credits: 6
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 406 - Advanced Lab Credits: 1

Credits/Semester: 16

Spring Semester

- MA 316 - Linear Algebra Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 410 - Electricity and Magnetism Credits: 3
- PY 450 - Quantum Mechanics Credits: 3

Credits/Semester: 15

Fourth Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
 - Multidisciplinary Inquiry Requirement Credits: 3
 - CH 341 - Molecular Structure in Biochemistry Credits: 3
 - PY 431 - Statistical Mechanics Credits: 3
 - PY 495 - Undergraduate Research in Physics Credits: 2
-
- Humanities or Social Science Requirement Credits: 3
 - CO 101 - Introduction to Communication Credits: 3
 - PY 305 - Physics Seminar Credits: 1
 - PY 340 - Biophysics I Credits: 3
 - PY 420 - Optics & Wave Phenomena Credits: 3
 - PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for Physics Degree with Biophysics Track: 126

Physics Degree Requirements – Materials Science Track

The minimum number of credit hours to earn a BS in physics with the materials science track is 122. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (82 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3

- PY 431 - Statistical Mechanics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3

Materials Science Track Requirements (9 credits)

- PY 440 - Introduction to Nanoscience Credits: 3
- PY 470 - Solid State Physics Credits: 3
- PY 480 - Introduction to Materials Science Credits: 3

Physics/Biology/Chemistry Elective (3 credits)

Choices for Physics Electives:

- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
(See Footnote Below)
- PY 335 - Views of the Cosmos Credits: 3
(See Footnote Below)
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 490 - Special Topics in Physics Credits: 3
- PY 771 - Math Meth for Phys Sci Credits: 3

Footnote:

Students taking PY 330 or PY 335 will receive credit toward the major only if they complete an additional mathematical research project.

Choices for Chemistry Electives:

- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 331 - Basic Inorganic Chemistry Credits: 3
- CH 341 - Molecular Structure in Biochemistry Credits: 3

Choices for Biology Electives:

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3

- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 461 - Cell Biology Credits: 4

Unrestricted Electives (9 credits)

Additional Requirement

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (Materials Science Track)

First Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- MA 221 - Calculus II Credits: 4

- PY 212 - Physics II Credits: 4

Credits/Semester: 17

Spring Semester

- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 410 - Numerical Analysis Credits: 3
- PY 213 - Physics III Credits: 4

Credits/Semester: 14

Third Year

Fall Semester

- CO 101 - Introduction to Communication Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3

Credits/Semester: 15

Spring Semester

- Free Elective Credits: 3
- PY 370 - Mathematical Methods for the Physical Sciences I Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 450 - Quantum Mechanics Credits: 3

Credits/Semester: 16

Fourth Year

Fall Semester

- Humanities or Social Science Requirement Credits: 6
- PY 431 - Statistical Mechanics Credits: 3
- PY 480 - Introduction to Materials Science Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Credits/Semester: 14

Spring Semester

- Physics/Chemistry/Biology Elective Credits: 3

- Free Elective Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 470 - Solid State Physics Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for BS in Physics with Material Science Track: 122

Physics Degree Requirements – Medical Physics Track

The minimum number of credit hours to earn a BS in physics with the medical physics track is 132. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (67 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3
- ST 320 - Introduction to Probability Credits: 3

Medical Physics Track Requirements (31 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1

- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 302 - Modern Physics II Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3

Physics/Biology/Biochemistry Elective (3 credits)

Choices for Physics Electives:

- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
(See Footnote Below)
- PY 335 - Views of the Cosmos Credits: 3
(See Footnote Below)
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3
- PY 490 - Special Topics in Physics Credits: 3

Footnote:

Students taking PY 330 or PY 335 will receive credit toward the major only if they complete an additional mathematical research project.

Choices for Biology/Biochemistry Electives:

- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 461 - Cell Biology Credits: 4
- BS 466 - Genetics Credits: 4
- CH 342 - Nucleic Acid Biochemistry Credits: 3

Unrestricted Elective (3 credits)

Additional Requirement

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (Medical Physics Track)

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Spring Semester

- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- MA 316 - Linear Algebra Credits: 3
- MA 222 - Calculus III Credits: 4
- PY 213 - Physics III Credits: 4

Credits/Semester: 18

Third Year

Fall Semester

- CH 341 - Molecular Structure in Biochemistry Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3

Credits/Semester: 15

Spring Semester

- Humanities or Social Science Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3

Fourth Year

Fall Semester

- Humanities or Social Science Requirement Credits: 6
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 412 - Physics of Radiation Therapy Credits: 3

Credits/Semester: 14

Spring Semester

- Free Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 340 - Biophysics I Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for BS in Physics with Medical Physics Track: 126

Physics Degree Requirements – Pre-Med Track

The minimum number of credit hours to earn a BS in physics with the pre-med track is 127. In addition to the University's general education requirements, the following are needed for the program:

Fundamental Requirements (64 credits)

- CH 111 - Principles of Chemistry I Credits: 3
- CH 112 - Principles of Chemistry II Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1

- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- MA 221 - Calculus II Credits: 4
- MA 222 - Calculus III Credits: 4
- MA 316 - Linear Algebra Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 100 - Physics Orientation Credits: 1
- PY 211 - Physics I Credits: 4
- PY 212 - Physics II Credits: 4
- PY 213 - Physics III Credits: 4
- PY 301 - Modern Physics I Credits: 3
- PY 305 - Physics Seminar Credits: 1
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2
- PY 496 - Advanced Research in Physics Credits: 3

Pre-Med Track Requirements (32 credits)

- BS 132 - Introductory Biology I Credits: 3
- BS 133 - Introductory Biology II Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- BS 135 - Intro Biology II Lab Credits: 1
- BS 466 - Genetics Credits: 4
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- CH 341 - Molecular Structure in Biochemistry Credits: 3
- PY 302 - Modern Physics II Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3

Physics/Biology/Biochemistry Elective (3 credits)

Choices for Physics Electives:

- MA 422 - Mathematical Modeling Credits: 3
- PY 330 - Descriptive Astronomy Credits: 3
(See Footnote Below)
- PY 335 - Views of the Cosmos Credits: 3
(See Footnote Below)
- PY 425 - Chaos and Nonlinear Dynamics Credits: 1
- PY 435 - General Relativity Credits: 3
- PY 440 - Introduction to Nanoscience Credits: 3
- PY 445 - Introduction to Fluid Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 463 - The Physics of Stars and Black Holes Credits: 3
- PY 465 - Introduction to Cosmology Credits: 3

- PY 490 - Special Topics in Physics Credits: 3

Footnote:

Students taking PY 330 or PY 335 will receive credit toward the major only if they complete an additional mathematical research project.

Choices for Biology/Biochemistry Electives:

- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 461 - Cell Biology Credits: 4
- CH 342 - Nucleic Acid Biochemistry Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 411 - Advanced Electromagnetism Credits: 3
- PY 412 - Physics of Radiation Therapy Credits: 3

Statistics Elective (3 credits)

- ST 310 - Biostatistics I Credits: 3
- ST 320 - Introduction to Probability Credits: 3

Unrestricted Elective (3 credits)

Additional Requirement

In order to earn a degree from Misher College of Arts and Sciences, a student must complete thirty (30) in-residence credits at a University campus. Fifteen (15) of the thirty in-residence credits must be at the 300 level or higher. In-residence credits are defined as credits for courses offered by the University for which a student receives credit and a grade that can contribute to the student's calculated grade point average.

Sample Physics Curriculum Plan (Pre-Med Track)

First Year

Fall Semester

- BS 132 - Introductory Biology I Credits: 3
- BS 134 - Intro Biology I Lab Credits: 1
- CH 111 - Principles of Chemistry I Credits: 3
- CH 113 - Principles of Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PY 100 - Physics Orientation Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- BS 133 - Introductory Biology II Credits: 3
- BS 135 - Intro Biology II Lab Credits: 1
- CH 112 - Principles of Chemistry II Credits: 3
- CH 114 - Principles of Chemistry Lab II Credits: 1
- MA 122 - Calculus I Credits: 4
- PE 102 - Physical Education II Credits: 1
- PY 211 - Physics I Credits: 4

Credits/Semester: 17

Second Year

Fall Semester

- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- MA 221 - Calculus II Credits: 4
- PY 212 - Physics II Credits: 4
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- Statistics Elective Credits: 3
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- MA 222 - Calculus III Credits: 4
- PY 213 - Physics III Credits: 4

Credits/Semester: 18

Third Year

Fall Semester

- CH 341 - Molecular Structure in Biochemistry Credits: 3
- MA 320 - Differential Equations Credits: 3
- PY 301 - Modern Physics I Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 380 - Electronics Credits: 3

Credits/Semester: 15

Spring Semester

- Humanities or Social Sciences Requirement Credits: 3
- Physics Elective Credits: 3
- CO 101 - Introduction to Communication Credits: 3

- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3

Credits/Semester: 16

Fourth Year

Fall Semester

- Free Elective Credits: 3
- Humanities or Social Science Requirement Credits: 6
- PY 305 - Physics Seminar Credits: 1
- PY 412 - Physics of Radiation Therapy Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Credits/Semester: 15

Spring Semester

- Humanities or Social Science Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 466 - Genetics Credits: 4
- PY 340 - Biophysics I Credits: 3
- PY 496 - Advanced Research in Physics Credits: 3

Credits/Semester: 16

Total Minimum Credits for BS in Physics with Pre-Med Track: 127

Physics – Minor

Physics is a pivotal field of science with many important applications, from the use of radioisotopes in therapy to the use of magnetic resonance imaging (MRI) in the detection of diseases. Clearly, an understanding of modern physics is of vital importance for many students. This is especially the case for those who wish to pursue careers in medical, biological, chemical, biochemical, or pharmaceutical research or in advanced physical therapy. The physics minor provides students with some of the background needed for work or advanced studies in any of these areas. It consists of 1 prerequisite course (4 credits), 2 required courses (7 credits), and at least 4 elective courses (totaling a minimum of 11 credits) from the list below. Note that a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the student's major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair. Students may not earn both a physics minor and a biophysics minor.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course

- PY 212 - Physics II Credits: 4

Required Courses

- MA 202 - Mathematical Analysis IV Credits: 4
- PY 301 - Modern Physics I Credits: 3

Elective Courses

- Other courses as approved by the department
- MA 316 - Linear Algebra Credits: 3
- or
- MA 320 - Differential Equations Credits: 3
- PY 310 - Mechanics Credits: 3
- PY 340 - Biophysics I Credits: 3
- PY 380 - Electronics Credits: 3
- PY 406 - Advanced Lab Credits: 1
- PY 410 - Electricity and Magnetism Credits: 3
- PY 420 - Optics & Wave Phenomena Credits: 3
- PY 430 - Thermodynamics Credits: 3
- PY 450 - Quantum Mechanics Credits: 3
- PY 460 - Topics in Contemporary Physics Credits: 2
- PY 490 - Special Topics in Physics Credits: 3
- PY 495 - Undergraduate Research in Physics Credits: 2

Statistics – Minor

The statistics minor is suited not only for those students who will perform their own research for their career but also those who need to remain current with the latest developments in research. Statistics is a toolbox required for most scientific studies, and in most scientific areas of the job market there is an increasing demand for students with a strong background in statistics and good quantitative skills. Statistics tell us how to collect numerical information in the form of data, evaluate it, and draw conclusions from it. Furthermore, statistics determines what information is relevant in a given problem and whether the conclusions drawn from a study are to be trusted.

The purpose of the statistics minor is to teach the fundamental concepts and the popular applications, so that students can apply the latter on their own and have a basic understanding of the more complicated applications encountered in academic papers.

Descriptive statistics deals with methods for organizing and summarizing data. When the data is a sample and the objective is to go beyond the sample to draw conclusions about the population we use inferential methods. For instance, inferential statistics tells us whether differences observed between two groups are likely to be real or due to randomness. Probability forms the bridge between the descriptive and inferential techniques and leads to a better understanding of how inferential procedures are developed. One of the most used concepts in statistical inference—the P-Value—is, in fact, a conditional probability.

This minor requires a total of 18 credits: 9 credits of required courses and 9 credits of elective courses. A minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Up to 6 credits of coursework, with an earned grade of "C" or better, taken at another accredited institution may be applied to the course requirements of the minor upon prior approval of the department chair.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Required Courses

- ST 310 - Biostatistics I Credits: 3
- ST 331 - Regression Analysis Credits: 3
- ST 332 - Design and Analysis of Experiments Credits: 3

Elective Courses

- Other courses as approved by the department
- CS 329 - Systems Simulation I Credits: 3
- MA 201 - Mathematical Analysis III Credits: 4
or
- MA 316 - Linear Algebra Credits: 3
- ST 321 - Advanced Topics in Probability Credits: 3
- ST 322 - Advanced Topics in Statistical Inference Credits: 3
- ST 333 - Categorical Data Analysis Credits: 3
- ST 334 - Applied Multivariate Analysis Credits: 3
- ST 335 - Statistics for Clinical Trials Credits: 3
- ST 340 - SAS Programming and Data Analysis Credits: 3
- ST 350 - Statistical Software Packages Credits: 3
- ST 480 - Directed Study in Biostatistics Credits: 3
- ST 490 - Special Topics in Applied Biostatistics Credits: 3

Philadelphia College of Pharmacy

Since its founding in 1821 as the first college of pharmacy in the Western Hemisphere, the Philadelphia College of Pharmacy (PCP) continues its mission to educate and develop students to become leaders and innovators in patient care, research and business who are differentiated by their professional and ethical values. Early graduates of PCP founded and led pharmaceutical manufacturing companies of national and international prominence, aided in part by our location in the heart of the Pennsylvania-Delaware-New Jersey pharmaceutical industry corridor. The college, through its faculty and alumni, has consistently provided leadership in pharmaceutical discovery and the evolution of pharmacy practice and education.

The Philadelphia College of Pharmacy launched the post-baccalaureate doctor of pharmacy (PharmD) in 1967, one of the earliest such programs on the East Coast. Graduates from this program have led the development of PharmD programs at other schools of pharmacy, have established practice innovations now considered the standard of practice, and have demonstrated and validated the wide variety of roles that are now expertly filled by pharmacists. In 1994, the PharmD degree was approved as the entry-level program for all entering students seeking a career as pharmacy practitioners. In 2018, a new and innovative competency driven PharmD curriculum, one of the first in the country, was launched.

Opportunities to meet the shortage of research- and industry-focused BS graduates have been met through the four-year BS programs in pharmacology and toxicology (begun in 1979) and pharmaceutical sciences (begun in 1999). Through these programs, the college is able to provide the pharmaceutical industry and research employers with capable, well-educated professionals. These BS program options also enable interested students to enter graduate or other professional programs.

In 2018, the department of pharmaceutical and healthcare business (formally part of Mayes College) was merged into PCP. The BS (begun in 1998) and MBA (begun in 2002) programs in pharmaceutical and health care business are one of the few specialized programs in the country dedicated exclusively to the pharmaceutical and healthcare business. The department also offers three post-graduate certificate programs and three minors in business.

Providing a high quality and innovative education for learners is our ultimate goal. The expertise of the faculty in Philadelphia College of Pharmacy includes community, ambulatory and acute care pharmacy practice, pharmacy administration, pharmaceuticals, medicinal chemistry, pharmacology, toxicology, pharmacokinetics, and pharmaceutical product and medical device development. In addition, our pharmaceutical and healthcare business faculty bring expertise in marketing, finance, healthcare systems, management, leadership and entrepreneurship. The approach to education is learner-centered and developmental, building knowledge, skills, and self-confidence incrementally, with a focus on "learning and knowing by doing", whether in a laboratory, classroom or in a clinical or other experiential setting. Whether the class is a lecture, recitation, conference, or laboratory, the emphasis is on active engagement by students and faculty, and on individual student success.

The PharmD program is a professional program supported by faculty in the Department of Pharmaceutical Sciences (DPS) and the Department of Pharmacy Practice and Pharmacy Administration (DoPP/PA), and is fully accredited by ACPE (Accreditation Council for Pharmacy Education). DPS also supports two undergraduate programs, the BS in pharmacology and toxicology and the BS in pharmaceutical sciences, as well as graduate level (MS, PhD) programs in pharmaceuticals and pharmacology/toxicology. DoPP/PA offers several postgraduate (residency and fellowship) training opportunities for advanced pharmacy training. Faculty in the Department of Pharmaceutical and Healthcare Business (PHB) are outstanding teachers with real-world experience in the business of health care. The BS and MBA in pharmaceutical and healthcare business programs are accredited by the Accreditation Council for Business Schools and Programs (ACBSP), a leading specialized accreditation association for business education supporting, celebrating, and rewarding teaching excellence.

Pharmacy – PharmD (Doctor of Pharmacy)

The practice of pharmacy is regulated by law, similar to other healthcare professions. In the United States, state laws limit pharmacy practice to those who have been duly licensed by the state. Qualifications for licensure include graduation from an accredited college of pharmacy, completion of required internship hours, and passing pharmacy practice and law examinations as determined by the board of pharmacy within the state. Only graduates with the Doctor of Pharmacy (PharmD) degree from an ACPE-accredited school of pharmacy are eligible for licensure.

At Philadelphia College of Pharmacy, the education of the student pharmacist is built upon a thorough knowledge of the chemical, physical, biological and social sciences as well as the liberal arts. During the pre-professional phase of the program, which normally takes 2 academic years, pharmacy students complete most or all of the University general education requirements and all of the pharmacy program pre-requisites. During the pre-professional years, pharmacy students have the flexibility to complete minors, double majors, and study abroad (although this may require additional years in the pre-professional program). During the first three professional years (P1, P2, P3), student pharmacists integrate, elaborate, and apply their acquired knowledge, skills and attitudes through focused and integrated competency-driven professional coursework, interprofessional education, and Introductory Pharmacy Practice Experiences (IPPEs). The final year of professional training (P4) involves Advanced Pharmacy Practice Experiences (APPEs) which allow student pharmacists to complete their personal and professional evolution to become compassionate and confident pharmacy professionals.

Most students are admitted into the PharmD program directly from high school as part of the six-year direct entry doctor of pharmacy program. Upon completing the pre-professional phase of the program, students who meet the academic standards of the program (see Progression section below) will directly progress to the professional years of the PharmD program. Students who meet the prerequisite requirements can also be admitted into the professional phase of the program (P1 year) as an external transfer or internal change of major. In addition, students who hold a baccalaureate degree and meet the professional pre-requisites may enter as a P1 student. Transfer change of major admissions are admitted on a competitive basis and may be limited by space.

Admission into the P1 year of the PharmD program is the responsibility of the Philadelphia College of Pharmacy Admissions Committee. The process and requirements for acceptance are distinct from direct-entry U1 admission, but similarly entail evaluation of academic capability and suitability for professional education via previous academic record and a required professional education readiness interview.

Experiential learning is accomplished through a coordinated effort between the office of experiential programs and the department of pharmacy practice / pharmacy administration. This IPPEs in P1-P3 and Advanced Pharmacy Practice Experiences APPEs in the P4 year. The experiential program utilizes the extensive community, institutional, and industry sites available locally, nationally and internationally. As described below (see Experiential Education), additional prerequisites must be fulfilled for placement and successful completion of experiential education.

Vision Statement

Our vision is to create and foster dedicated pharmacists who will have a moral commitment to improve the quality of life of individual patients and have a positive impact on society by being an integral part of the healthcare team. Our graduates will be compassionate, knowledgeable, skilled and innovative, job- ready pharmacy practitioners, who will become trusted and respected leaders of the pharmacy profession. They will be able to adapt to the dynamic nature of the healthcare system and changing technology and serve as positive role models in the community. Our program will foster these ideals by providing a strong scientific education and the skills and attitudes (including patient-centered focus, inter-professional and lay communication, collaborative problem-solving, and proactive critical-thinking) needed in entry-level pharmacists' roles now and in the future.

The goal of the PharmD program is to prepare a graduate who will be capable of providing patient care, with an emphasis on pharmaceutical care, as a means of achieving optimal patient outcomes. As such, the PharmD program outcomes expect each

graduate to demonstrate competency (and the associated knowledge, skills and attitudes) in entry-level pharmacists' roles, as outlined below (further details can be found in the PCP Student Handbook).

Competency Driven Curriculum

The Competency Driven Curriculum was implemented for P1 students in fall 2018. The anticipated benefits of this professional curriculum are greater student retention within the program and on time progression through the professional curriculum, as well as enhanced career preparation to meet the changing needs of the pharmacy profession. The curriculum is designed that each student meets set competencies (listed below) by the end of the program.

1. Patient Safety - Accurately Dispense Medications: Demonstrate a commitment to and a valuing of patient safety by assuring accurate preparation, labeling, dispensing and distribution of prescriptions and medication orders.

2. Basic Patient Assessment: Collect record and assess subjective and objective patient data to define health and medication-related problems. Patient information must be collected in a manner demonstrating knowledge of patient educational level, the unique cultural and socioeconomic situations of patients, and comply with requirements for patient privacy.

3. Foundational knowledge: The graduate is able to develop, integrate, and apply knowledge from the foundational sciences (e.g. medication information, biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care.

4. Identify, prevent and resolve drug related problems: Correlate drug related variables and patient related variables to identify and assess drug related problems. Evaluate how the unique characteristics of patients and patient populations impact on manifestations of drug-related problems.

5. Mathematics applied to pharmaceutical calculations, compounded medications, dose calculations, and applications of pharmacokinetic calculations: Utilize pharmaceutical and pharmacokinetics mathematics to perform accurate medication calculations. Value the importance of total accuracy in performing and applying these calculations.

6. Ethical, Professional, and Legal Behavior: In all health-care activities, demonstrate knowledge of and sensitivity towards the unique characteristics of each patient. Comply with all federal, state, and local laws related to pharmacy practice. Demonstrate ethical and professional behavior in all practice activities.

7. General Communication Abilities: Demonstrate effective communication abilities in interactions with patients, their families and caregivers, and other healthcare providers. Communication should be consistent with education level, cultural issues, and be empathetic. Elicit feedback validating understanding of communication.

8. Counseling Patients: Provide effective health and medication information to patients and/or care givers and confirm patient and/or care giver understanding of the information being provided.

9. Drug Information Analysis and Literature Research: Assess information needs of patients and health providers and apply knowledge of study design and literature analysis and retrieval to provide accurate, evidence-based drug information.

10. Health and Wellness – Public Health: Know and apply principles of health and wellness in provision of individual and population-based health and wellness information. Integrate unique characteristics of individuals and populations in design of health and wellness information.

11. Innovation and Entrepreneurship: Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.

In the competency-driven curriculum, the focus is on students developing the knowledge, skills, attitudes and behaviors for confident and collaborative patient-centered care, innovation and leadership right from day one of their first professional year. The four-year professional curriculum is delivered in a modular format, utilizing leading edge pedagogical and assessment best practices, with inter-professional and experiential education fully integrated with the didactic curriculum. Crucial to the success of the new curriculum is the personalized learning support students receive, and the sequential, pre-planned assessments of competence at specific performance levels, both focused (within modules) and integrated across individual course modules.

The curriculum is comprised of a series of foundational modules in practice skills/professional behavior and communication, biomedical (biochemistry, cell biology), immunology, and pharmaceutical sciences, and health care policy and law; a series of fourteen integrated Pharmacy Sciences, Disease and Therapeutics modules; a two module series focused on Medication Use Systems; a two module sequence focused on Drug Information and Literature Evaluation; an Applied Professional Behavior and

Communication module; an Entrepreneurship module; two Integrated Practice Modules; and electives. These courses are interspersed with 300 hours of Introductory Pharmacy Practice Experiences (IPPEs) off campus during the P1-P3 years and brought to a practice ready level during the P4 year by a minimum of 1440 hours of Advanced Pharmacy Practice Experiences (APPEs).

Degree Requirements

For first-year undergraduate students (U1) entering fall 2019 and beyond (Catalog Year 2019), all but six credits General Education requirements must be met before entering the professional curriculum. Students in the Classes of 2022 may have their Multidisciplinary Inquiry requirement waived with the expectation that the six credits will be replaced by either a Humanities or Social Sciences course. With the exception of transfer students who already hold a BS degree, the Bachelor of Science in Pharmaceutical and Healthcare Studies (PHHCS) will be conferred at the end of the P2 year upon successful completion of general education requirements and the specific coursework for the degree. The Doctor of Pharmacy Degree will be conferred at the end of the P4 year upon successful completion of all education requirements and specific coursework (including experiential) for the degree.

Progression

For direct entry PharmD students, automatic progression from undergraduate status into P1 (first professional year) occurs when the following criteria are met:

1. Completion of all required pre-professional and undergraduate coursework resulting in a minimum cumulative GPA of 2.70 and a minimum natural science/math GPA of 2.50.
2. Successful completion of the Professional Education Readiness Competency (PERC) interview.

Students may take up to eight semesters to meet these progression standards. Students who do not meet these criteria will be withdrawn from the program; if their cumulative GPA is above 2.50, these students will be reviewed for readmission into the program on a competitive basis, space permitting. If not readmitted, students may apply to other programs.

Progression within the PharmD program is defined as the year-to-year advancement in the program, based on satisfactory completion of all required coursework, all extrinsic summative assessments and reassessments (ESARs), achievement of minimum academic and program-specific grade point averages, and meeting any additional academic requirements, including proficiencies, in a timely manner.

- Students who achieve below a semester GPA of 2.30 will receive program probation. Students who exceed two program probations or do not complete program requirements within the maximum number of years of residence in the program will be withdrawn from the program.
- Students must achieve a minimum grade of "C-" ("P" if taking pass/fail election) for satisfactory completion of all non-elective required courses with the prefix PA, PC, PH, PP, or RX and must adhere to the appropriate course sequencing as indicated by prerequisites, co-requisites, and program year.
- Students entering in Catalogue Year 2016 (Graduating Class of 2022 and beyond) must successfully complete all Extrinsic Summative Assessments and Reassessments (ESAR) before the start of the next academic year in order to progress to the next academic year.
- Students who achieve a grade of less than "C-" upon repetition of the same non-elective required course with the prefix PA, PC, PH, PP, or RX will be dropped from the program.

The Office of the Dean of PCP monitors compliance with all academic standards as well as student progression through the program. The Office of the Dean of PCP determines the eligibility of students to take summer re-offerings of courses and how many courses may be taken on a case -by- case basis. For greater detail, please see the PCP Student Handbook.

All required professional coursework (with prefixes PA, PC, PH, PP, RX) must be completed at PCP/ USciences.

Residency and Length of Time to Complete Program of Student

Direct entry PharmD students up to 8 semesters to complete pre-professional coursework (excluding summer sessions or inter-sessions). Students admitted into the first professional year (P1) of the Doctor of Pharmacy Program must be enrolled for at least four years (i.e., 8 semesters of at least 12 credits/semester) in residency at PCP, regardless of the extent or nature of previous academic experience. Such students entering into P1 will receive transfer credit for those basic sciences and general education courses that are considered equivalent in content and semester credit to similar courses included in the pharmacy curriculum as long as they receive a grade of "C" or better.

Technical Standards

Admitted students must meet and acknowledge understanding of the technical standards that define the cognitive, affective, and psychomotor domains needed as a student pharmacist and future pharmacy professional. As students advance through the program, they are inculcated with and acknowledge the incrementally increasing level of expectations for knowledge, skills, attitudes and behaviors associated with becoming a healthcare professional through signing of additional agreements on a yearly basis. The technical standards are detailed in the PCP Student Handbook.

Accreditation

The Doctor of Pharmacy degree program is accredited by the Accreditation Council for Pharmacy Education (ACPE). The ACPE is an autonomous and independent national agency whose board of directors (the decision- and policy-making body) includes pharmacy educators, pharmacy practitioners, state board of pharmacy members/executives, and a public representative. A three-member public interest panel also provides public perspectives in the policy- and decision- making processes of accreditation. ACPE offices are located at 135 S. LaSalle Street, Chicago, IL 60603-4810, 312.664.3575, www.acpe-accredit.org. Accreditation status is available at the website.

Student Comments and Complaints

ACPE requires that colleges of pharmacy respond to any written complaints by pharmacy students relating to adherence to the standards, policies, and procedures of ACPE. Students should submit a written comment or complaint to the Office of the Dean of Pharmacy (GH 2016). All comments or complaints will be evaluated, and a written response will be provided. Students are also encouraged to visit the ACPE website at www.acpe-accredit.org, where comments/complaints may be submitted.

Student Participation in Experiential Education

Students and the University must satisfy requirements imposed by training sites as a condition of student participation in experiential education. As a prerequisite to being permitted to begin, or continue, rotations (IPPEs or APPEs) at off-campus training sites, students must be able to:

- Provide a Social Security number.
- Provide a medical history including immunity to infectious diseases via documentation of infectious disease history (e.g., measles, rubella, hepatitis B) and/or vaccinations, including titers for certain agents, as requested by and per site or program schedule.
- Have a negative PPD or chest x-ray, if indicated.
- Complete a physical examination.
- Submit to a criminal background check and other background checks with disclosure to site of any convictions consistent with their criteria.
- Submit to a drug screen with disclosure to site of any positive findings for drugs that are taken without medical supervision.
- Provide evidence of and maintain personal medical insurance coverage at all times while at off-campus training sites.
- Provide clinical training certifications (e.g. CPR or BLS) that are required by site.

Depending on the requirements of the affiliation agreement between the site and the University, the documentation requested may be coordinated by or at the training site, or facilitated by the University using campus-based programs, or an external agency. In all cases, the student is ultimately responsible for ensuring all prerequisites have been satisfied, with documentation submitted in a timely manner, per deadlines, and any associated costs. Placement in experiential sites will depend on timely completion of prerequisites and student identification of preferences, but may be subject to a lottery system if supply and demand are mismatched. Students may be required to obtain their own transportation and to assume associated costs for their own automobile or public transportation to and from experiential sites.

Doctor of Pharmacy students are expected to agree and comply with the conditions of the Pharmacy Practice Professionalism Agreement during pharmacy practice experiential coursework (IPPEs and APPEs), which can be found in the PCP Student Handbook. A student unable to comply with the agreement may be removed from a rotation, may fail a rotation, or may be

administratively withdrawn from the PharmD (Doctor of Pharmacy) program.

If a student is unable to satisfy the requirements listed above, the University may be unable to place the student in an experiential education setting. As a result, the student may be unable to complete the graduation requirements outlined by the major and may be unable to obtain licensure. Specific licensure requirements for each state's board of pharmacy and licensure examination pass rates for graduates can be found at the National Association of Boards of Pharmacy website (www.nabp.net). Licensure pass rates, retention and progression data and other programmatic measures for PCP's PharmD program are posted on the on PCP web site.

Competency Driven Doctor of Pharmacy Program

General Education

- Social Science Disciplinary Requirement Credits: 3
- Humanities Discipline Requirements Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3 or CO 204 Public Speaking Credits: 3
- EC 201 - Introduction to Microeconomics Credits: 3 or EC 101 Introduction to Macroeconomics Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Science and Math

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
or
- CH 111 - Principles of Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
or
- CH 112 - Principles of Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
or
- CH 113 - Principles of Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1
or
- CH 114 - Principles of Chemistry Lab II Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
or
- CH 211 - Principles of Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
or
- CH 212 - Principles of Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
or

- CH 213 - Principles of Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- or
- CH 214 - Principles of Organic Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PP 190 - Pharmacy Orientation Credits: 1
- PY 201 - Introductory Physics I Credits: 4
- ST 310 - Biostatistics I Credits: 3

Required Professional Phase Courses

- RX6XX - Advanced Pharmacy Practice Experience Credits: 36 1440 Hours of Experience
- RX 302 - Professional Orientation Credits: 2
Note: Part of this course occurs the week prior to the start of the University fall semester classes and attendance is mandatory.
- RX 305 - Fndn of Clinical Immunology Credits: 3
- RX 316 - Practice Skills/Professional Behavior 1 Credits: 4
- RX 325 - Medication Use Systems I Credits: 3
- RX 330 - Foundations of Biomedical Sciences Credits: 4
- RX 340 - Foundations of Pharmaceutical Sciences 1 Credits: 3
- RX 345 - Foundations of Pharmaceutical Sciences 2 Credits: 3
- RX 350 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 1: Disease Prevention and Self-Care Credits: 3
- RX 355 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 2: Cardiovascular 1 Credits: 3
- RX 365 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 3: Pulmonary Credits: 3
- RX 380 - IPPE-1: Service Learning/Community Practice 1 Credits: 1
- RX 390 - IPPE-2: Service Learning/Community Practice 2 Credits: 1
- RX 415 - Foundations of Health Care Policy/Law Credits: 3
- RX 420 - Practice Skills/Professional Behavior 2 Credits: 3
- RX 425 - Medication Use Systems 2 Credits: 3
- RX 430 - Health Information Retrieval and Evaluation Credits: 3
- RX 435 - Literature Evaluation & Evidence-based Medicine Credits: 3
- RX 440 - Foundations of Pharmaceutical Sciences 3 Credits: 3
- RX 452 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 4: Cardiovascular 2 Credits: 3
- RX 454 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 5: Renal/Hepatic Credits: 3
- RX 455 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 6: Endocrine/Reproductive Credits: 3
- RX 457 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 7: Infectious Disease 1 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1
- RX 510 - Applied Professional Behavior and Communications Credits: 2
- RX 520 - Entrepreneurship Credits: 1
- RX 530 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 8: Infectious Disease 2 Credits: 3
- RX 534 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 9: Central Nervous System 1 Credits: 3
- RX 538 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 10: Central Nervous System 2 Credits: 3
- RX 543 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 11: Gastrointestinal/Nutrition Credits: 3
- RX 545 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 12: Immunology/Musculoskeletal/Skin Credits: 3

- RX 553 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 13: Hematology/Oncology Credits: 3
- RX 555 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 14: Infectious Disease 3 Credits: 3
- RX 570 - Integrated Practice 1 Credits: 3
- RX 575 - Integrated Practice 2 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Professional Electives (6 credits)

Proficiencies/Competencies

- Basic Life Support for Healthcare Providers or CPR/AED for Professional Rescuers and Healthcare Providers
- Pharmacy Calculations

Pre-professional Doctor of Pharmacy Program Curriculum Plan

First Undergraduate Year (U1)

Fall Semester

- General Education Humanities or Social Sciences Requirement Credits: 3
 - (Humanities course strongly encouraged)
 - BS 109 - General Biology I Credits: 3
 - BS 110 - General Biology I Lab Credits: 1
 - CH 101 - General Chemistry I Credits: 3
 - CH 103 - General Chemistry Lab I Credits: 1
 - MA 107 - Precalculus Credits: 3 *
 - PE 101 - Physical Education I Credits: 0
 - PP 190 - Pharmacy Orientation Credits: 1
 - WR 101 - Writing and Rhetoric I Credits: 3
- * Students may test out of MA 107 Precalculus

Credits/Semester: 15-18

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- or
- CO 204 - Public Speaking Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Second Undergraduate Year (U2)

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- EC 201 - Introduction to Microeconomics Credits: 3 or EC 101 Introduction to Macroeconomics Credits: 3

Credits/Semester: 17

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1
- ST 310 - Biostatistics I Credits: 3
- PY 201 - Introductory Physics I Credits: 4

Credits/Semester: 17

First Professional Year (P1)

Fall Semester

- Professional Elective or Humanities or Social Sciences Credits: 3
- RX 302 - Professional Orientation Credits: 2
- RX 316 - Practice Skills/Professional Behavior 1 Credits: 4
- RX 330 - Foundations of Biomedical Sciences Credits: 4
- RX 340 - Foundations of Pharmaceutical Sciences 1 Credits: 3
- RX 350 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 1: Disease Prevention and Self-Care Credits: 3
- RX 380 - IPPE-1: Service Learning/Community Practice 1 Credits: 1

Credits/Semester: 20

Spring Semester

- Professional Elective or Humanities or Social Science Credits: 3
- RX 305 - Fndn of Clinical Immunology Credits: 3
- RX 325 - Medication Use Systems I Credits: 3
- RX 345 - Foundations of Pharmaceutical Sciences 2 Credits: 3
- RX 355 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 2: Cardiovascular 1 Credits: 3
- RX 365 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 3: Pulmonary Credits: 3
- RX 390 - IPPE-2: Service Learning/Community Practice 2 Credits: 1

Credits/Semester: 19

Second Professional Year (P2)

Fall Semester

- Professional Elective Credits: 1-3
- RX 420 - Practice Skills/Professional Behavior 2 Credits: 3
- RX 425 - Medication Use Systems 2 Credits: 3
- RX 430 - Health Information Retrieval and Evaluation Credits: 3
- RX 440 - Foundations of Pharmaceutical Sciences 3 Credits: 3
- RX 452 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 4: Cardiovascular 2 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
- or
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1

Credits/Semester: 16-19

Spring Semester

- Professional Elective Credits: 1-3
- RX 415 - Foundations of Health Care Policy/Law Credits: 3
- RX 435 - Literature Evaluation & Evidence-based Medicine Credits: 3
- RX 454 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 5: Renal/Hepatic Credits: 3
- RX 455 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 6: Endocrine/Reproductive Credits: 3
- RX 457 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 7: Infectious Disease 1 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
- or
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1

Credits/Semester: 16-19

Total Credits to receive a BS Pharmaceutical and Healthcare Studies (PHHCS) degree: 138 minimum

Third Professional Year (P3)

Fall Semester

- Professional Elective Credits: 1-3
- RX 510 - Applied Professional Behavior and Communications Credits: 2
- RX 520 - Entrepreneurship Credits: 1
- RX 530 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 8: Infectious Disease 2 Credits: 3
- RX 534 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 9: Central Nervous System 1 Credits: 3
- RX 538 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 10: Central Nervous System 2 Credits: 3

- RX 570 - Integrated Practice 1 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
or
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Credits/Semester: 16-19

Spring Semester

- Professional Elective Credits: 1-3
- RX 543 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 11: Gastrointestinal/Nutrition Credits: 3
- RX 545 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 12: Immunology/Musculoskeletal/Skin Credits: 3
- RX 553 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 13: Hematology/Oncology Credits: 3
- RX 555 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 14: Infectious Disease 3 Credits: 3
- RX 575 - Integrated Practice 2 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
or
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Credits/Semester: 16-19

Fourth Professional Year (P4)

Summer/Fall/Spring

- RX6XX - Advanced Pharmacy Practice Experiences Credits: 36 - 1440 Practice Hours

Credits/Year: 36

Total Minimum Credits: 206

Notes:

- Any Social Science or Humanities course approved as a professional elective will count towards both Social Sciences, or Humanities and professional elective requirements.
- 6 cr of professional electives to be completed by the end of P3

Doctor of Pharmacy - Post-Baccalaureate Program

- Students entering P1 in 2020

Requirements:

- US Baccalaureate (BS or BA) degree, or equivalent (completion of general education per the degree-granting institution requirements)
- Successful PERC Interview

- Undergraduate Coursework: 8 cr Biology with lab; 8 cr General Chemistry with lab; 8 cr Physics with lab; 8 cr Organic Chemistry with lab; 4 cr Microbiology with lab; 6 cr Anatomy and Physiology or equivalent; 3 cr calculus

Required Professional Phase Courses

- RX6XX - Advanced Pharmacy Practice Experience Credits: 36 1440 Hours of Experience
- RX 302 - Professional Orientation Credits: 2
- RX 305 - Fndn of Clinical Immunology Credits: 3
- RX 316 - Practice Skills/Professional Behavior 1 Credits: 4
- RX 325 - Medication Use Systems I Credits: 3
- RX 330 - Foundations of Biomedical Sciences Credits: 4
- RX 340 - Foundations of Pharmaceutical Sciences 1 Credits: 3
- RX 345 - Foundations of Pharmaceutical Sciences 2 Credits: 3
- RX 350 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 1: Disease Prevention and Self-Care Credits: 3
- RX 355 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 2: Cardiovascular 1 Credits: 3
- RX 365 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 3: Pulmonary Credits: 3
- RX 380 - IPPE-1: Service Learning/Community Practice 1 Credits: 1
- RX 390 - IPPE-2: Service Learning/Community Practice 2 Credits: 1
- RX 415 - Foundations of Health Care Policy/Law Credits: 3
- RX 420 - Practice Skills/Professional Behavior 2 Credits: 3
- RX 425 - Medication Use Systems 2 Credits: 3
- RX 430 - Health Information Retrieval and Evaluation Credits: 3
- RX 435 - Literature Evaluation & Evidence-based Medicine Credits: 3
- RX 440 - Foundations of Pharmaceutical Sciences 3 Credits: 3
- RX 452 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 4: Cardiovascular 2 Credits: 3
- RX 454 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 5: Renal/Hepatic Credits: 3
- RX 455 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 6: Endocrine/Reproductive Credits: 3
- RX 457 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 7: Infectious Disease 1 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1
- RX 510 - Applied Professional Behavior and Communications Credits: 2
- RX 520 - Entrepreneurship Credits: 1
- RX 530 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 8: Infectious Disease 2 Credits: 3
- RX 534 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 9: Central Nervous System 1 Credits: 3
- RX 538 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 10: Central Nervous System 2 Credits: 3
- RX 543 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 11: Gastrointestinal/Nutrition Credits: 3
- RX 545 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 12: Immunology/Musculoskeletal/Skin Credits: 3
- RX 553 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 13: Hematology/Oncology Credits: 3
- RX 555 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 14: Infectious Disease 3 Credits: 3
- RX 570 - Integrated Practice 1 Credits: 3
- RX 575 - Integrated Practice 2 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Professional Electives (6 credits)

Doctor of Pharmacy - Post-Baccalaureate Program Curriculum Plan

First Professional Year (P1)

Fall Semester

- Professional Elective or Humanities or Social Science Credits: 3
- RX 302 - Professional Orientation Credits: 2
- Note: 1 credit of the course occurs prior to the start of the University fall semester classes and attendance is mandatory
- RX 316 - Practice Skills/Professional Behavior 1 Credits: 4
- RX 330 - Foundations of Biomedical Sciences Credits: 4
- RX 340 - Foundations of Pharmaceutical Sciences 1 Credits: 3
- RX 350 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 1: Disease Prevention and Self-Care Credits: 3
- RX 380 - IPPE-1: Service Learning/Community Practice 1 Credits: 1

Credits/Semester: 17-20

Spring Semester

- Professional Elective Credits: 2 or Humanities or Social Science Credits: 3
- RX 305 - Fndn of Clinical Immunology Credits: 3
- RX 325 - Medication Use Systems I Credits: 3
- RX 345 - Foundations of Pharmaceutical Sciences 2 Credits: 3
- RX 355 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 2: Cardiovascular 1 Credits: 3
- RX 365 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 3: Pulmonary Credits: 3
- RX 390 - IPPE-2: Service Learning/Community Practice 2 Credits: 1

Credits/Semester: 17-19

Second Professional Year (P2)

Fall Semester

- Professional Elective Credits: 1-3
- RX 420 - Practice Skills/Professional Behavior 2 Credits: 3
- RX 425 - Medication Use Systems 2 Credits: 3
- RX 430 - Health Information Retrieval and Evaluation Credits: 3
- RX 440 - Foundations of Pharmaceutical Sciences 3 Credits: 3
- RX 452 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 4: Cardiovascular 2 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
- or
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1

Credits/Semester: 16-19

Spring Semester

- RX 415 - Foundations of Health Care Policy/Law Credits: 3
- RX 435 - Literature Evaluation & Evidence-based Medicine Credits: 3
- RX 455 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 6: Endocrine/Reproductive Credits: 3
- RX 457 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 7: Infectious Disease 1 Credits: 3
- RX 480 - IPPE 3: Advanced Community/Ambulatory Care Credits: 1
or
- RX 490 - IPPE 4: Institutional Pharmacy Credits: 1

Credits/Semester: 16-19

Third Professional Year (P3)

Fall Semester

- Professional Elective Credits: 1-3
- RX 510 - Applied Professional Behavior and Communications Credits: 2
- RX 520 - Entrepreneurship Credits: 1
- RX 530 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 8: Infectious Disease 2 Credits: 3
- RX 534 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 9: Central Nervous System 1 Credits: 3
- RX 570 - Integrated Practice 1 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
or
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Credits/Semester: 16-19

Spring Semester

- Professional Elective Credits: 1-3
- RX 543 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 11: Gastrointestinal/Nutrition Credits: 3
- RX 545 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 12: Immunology/Musculoskeletal/Skin Credits: 3
- RX 553 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 13: Hematology/Oncology Credits: 3
- RX 555 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 14: Infectious Disease 3 Credits: 3
- RX 575 - Integrated Practice 2 Credits: 3
- RX 580 - IPPE 5: Advanced Institutional Pharmacy Credits: 1
or
- RX 590 - IPPE6: Patient Care Elective Credits: 1

Credits/Semester: 16-19

Fourth Professional Year (P4)

Summer/Fall/Spring

- RX6XX - Advanced Pharmacy Practice Experiences Credits: 36 - 1440 Practice Hours

Credits/Year: 36

Total Minimum Credits: 139

Note:

- Students are required to take 6 cr of professional electives.

Pharmaceutical and Healthcare Business

Mission

Our mission is for passionate and accomplished faculty to foster a student-centered environment where graduates become confident with academic knowledge and practical skills to be successful leaders and employees in the global pharmaceutical and healthcare industries through real-world experiences.

The focus of the department is to develop critical thinking, problem-solving, and highly effective communication skills that transform our students into influential and persuasive leaders and contributors with expertise in the pharmaceutical and healthcare business.

Our business programs are fully accredited by the Accreditation Council for Business Schools and Programs (ACBSP).

Upon completion of the MBA in Pharmaceutical and Healthcare Business program students will be able to:

- Apply knowledge of the fundamentals of accounting, finance, marketing, management, and economics courses to critique and develop new business strategies in response to the global challenges and opportunities facing the pharmaceutical and healthcare industry.
- Demonstrate the ability to communicate effectively with a wide variety of people in diverse situations.
- Discriminate and judge business decisions within the framework of acceptable ethical and legal choices in this highly regulated pharmaceutical and healthcare industry.
- Model effective teamwork behavior and leadership strategies in interdisciplinary and culturally diverse settings.

Upon completion of the BS in Pharmaceutical and Healthcare Business program students will be able to:

- Apply knowledge of fundamentals of accounting, finance, marketing, management and economics courses to analyze business strategies in response to the global challenges facing the pharmaceutical and healthcare industry.
- Understand the biological sciences and apply this knowledge of health and disease states for use in the development and marketing of appropriate pharmaceuticals and technologies.
- Demonstrate the ability to communicate effectively with a wide variety of people in diverse situations.
- Discriminate and judge business decisions within the framework of acceptable ethical and legal choices in this highly regulated pharmaceutical and healthcare industry.
- Model effective teamwork behavior and leadership strategies in interdisciplinary and culturally diverse settings.
- Monitor sources of information for evaluating critical events and potential solutions for problems in the dynamic global health care environment.

Pharmaceutical and Healthcare Business Minors

The Department of Pharmaceutical and Healthcare Business in the Philadelphia College of Pharmacy offers undergraduate and professional degree students several minors to help prepare them for their careers. The minors are an important supplement to major degree studies since business skills are very attractive to virtually all employers after graduation. By adding a business-

related minor, students will be able to enhance their career entry and long-term prospects by developing the necessary knowledge and skill-building experiences that will add to their core academic and experience base.

Three business-related minors have been designed based upon the typical career paths that USciences students will likely follow post-graduation. The minors are business, marketing, and pharmaceutical and healthcare business. Each has a specific focus to provide non-business students with the knowledge and skills necessary to make more informed business decisions and enhance their organizational contribution. Beyond the core requirements for each minor, the course of study can be tailored to fulfill a student's specific needs and interests, in consultation with their minor advisor.

Interested students should apply to the selected minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work. For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Faculty

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BA (Panjab University, India); MBA (Indian Institute of Management, India); MS, PhD (University of Pennsylvania)
Associate Professor of Pharmaceutical and Healthcare Business
Chair, Pharmaceutical and Healthcare Business
Director, MBA Pharmaceutical and Healthcare Business Program

Barbara Diemer

BA, MBA (LaSalle University); MEd (Temple University); DBA (Walden University)
Assistant Professor of Pharmaceutical and Healthcare Business

F. Greg Lucado, Jr.

BS (Virginia Military Institute); MS (University of Missouri); MBA (Temple University)
Associate Professor of Pharmaceutical and Healthcare Business

Karen McDougal

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Adjunct Assistant Professor of Pharmaceutical and Healthcare Business

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Adjunct Assistant Professor of Pharmaceutical and Healthcare Business

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BS, MS, PhD (Northeastern University)
Adjunct Professor of Pharmaceutical and Healthcare Business

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Kimberly Wolfe

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W. Michael Wolfe

BS (Elizabethtown College); CPA/ABV, CVA
Adjunct Assistant Professor of Pharmaceutical and Healthcare Business

Danielle Ziernicki

BS, PharmD (University of the Sciences)
Adjunct Assistant Professor of Pharmaceutical and Healthcare Business

Business – Postgraduate Certificates

Meet specific business objectives by earning a certificate in as little as 12 months or as long as four years. Customize coursework to suit your needs. Classes are offered either on campus at USciences or online. Areas of concentration include pharmaceutical business, finance, or marketing.

The options below are examples. Students wanting to pursue a certificate should speak with the program director to discuss goals and choose appropriate courses. The program requires a minimum of five courses that must be approved in advance by the program director.

Certificate in Pharmaceutical & Healthcare Business

- PB 707 - Issues and Trends in Health Policy Credits: 3
- PB 762 - Pharmaceutical Research and Development Management Credits: 2
- PB 771 - Regulation of Prescription Drugs and Ethical Issues Credits: 2
- PB 774 - Ethical Issues in Pharmaceutical Business Credits: 2
- PB 790 - Multidiscipline Strategic Management III Credits: 1

Certificate in Pharmaceutical Marketing

- PB 751 - Introduction to Marketing Credits: 2
- PB 753 - Pharmaceutical Marketing and Sales Management Credits: 2
- PB 761 - Competitive Analysis and Strategic Business Planning Credits: 2
- PB 792 - Multidiscipline Strategic Management II Credits: 1
- PB 880 - International Pharma Business Credits: 2

Certificate in Finance

- PB 711 - Managerial and Financial Accounting Credits: 2
- PB 721 - Managerial Finance Credits: 2
- PB 722 - Corporate Finance Credits: 2
- PB 794 - Multidiscipline Strategic Management IV Credits: 1
- PB 840 - Health Economics Credits: 3

General Business – Minor

The general business minor is designed to provide non-business majors with general business knowledge and practical skill development related to business organizational functions. The knowledge gained in this minor is useful for students who will be working in any organizational setting, regardless of the student's major. This minor is a pathway to develop an appreciation and understanding of core fundamental business skills, including accounting, finance, management, and marketing.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

To satisfactorily complete a minor in general business, students must complete a minimum of 20 credits including the prerequisite course (2 credits), required courses (6 credits), and elective courses (12 credits).

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course:

- PB 120 - Introduction to Business Seminar Credits: 2

Required Courses:

- EC 101 - Introduction to Macroeconomics Credits: 3
- PB 316 - Accounting Theory Credits: 3

Suggested Elective Courses Include*:

- PB 315 - Business Law Credits: 3
- PB 318 - Financial Management Credits: 3
- PB 319 - Introduction to Marketing Management Credits: 3
- PB 323 - Principles of Management Credits: 3
- WR 303 - Professional Writing Credits: 1

*Note:

Elective courses should be made in consultation with the student's assigned minor advisor. Other elective courses that have a common intellectual bond can be approved by the minor advisor, program director, or department chair.

Total Credits: 20

Marketing – Minor

The marketing minor is designed to provide non-business majors with an opportunity to gain an appreciation of what it takes to

be successful in marketing in today's ever-changing global business environment. The emphasis of this minor is to develop in-depth marketing knowledge and build the practical skills necessary to market products and services to such diverse audiences as physicians and other healthcare professionals, patients, and payers, as well as in business-to-business situations.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

To satisfactorily complete a minor in marketing, students must complete a minimum of 20 credits including the prerequisite course (2 credits), required courses (9 credits), and elective courses (9 credits).

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course:

- PB 120 - Introduction to Business Seminar Credits: 2

Required Courses:

- EC 101 - Introduction to Macroeconomics Credits: 3
- PB 316 - Accounting Theory Credits: 3
- PB 319 - Introduction to Marketing Management Credits: 3

Suggested Elective Courses Include*:

- PB 425 - Consumer Behavior: Healthcare Marketing Applications Credits: 3
- PB 430 - Brand Management Credits: 3
- PB 435 - Advertising and Promotion Credits: 3
- PB 437 - International Marketing of Pharmaceuticals Credits: 2
- PB 478 - Pharmaceutical Marketing Research Credits: 3
- WR 303 - Professional Writing Credits: 1

*Note:

Elective courses should be made in consultation with the student's assigned minor advisor. Other elective courses that have a common intellectual bond can be approved by the minor advisor, program director, or department chair.

Total Credits: 20

MBA in Pharmaceutical and Healthcare Business

Overview

Pharmaceutical and Healthcare Business

The MBA in pharmaceutical and healthcare business at University of the Sciences is intensive, demanding, and designed for those who aspire to the highest leadership positions in the pharmaceutical and healthcare industry.

Central to the MBA at University of the Sciences is the focus on the related industries that comprise this sector, including medical devices, diagnostics, vaccines, clinical care, and others. We employ creative cutting-edge learning technologies, close collaboration with students and faculty, and a singular emphasis on helping each student achieve his/her professional goals for the hyper-competitive pharmaceutical and healthcare business environment.

University of the Sciences' MBA is taught in the context of the pharmaceutical and healthcare industry. Students build clear knowledge and skill sets for anticipating and addressing the emerging challenges of a global pharmaceutical marketplace by working closely with a mix of our full-time and adjunct faculty, all of whom have extensive senior-level experience working in industry and government. Over the course of the program, each student will be actively engaged in learning:

- Real-world leadership and management strategies
- Emerging global healthcare-related business models and challenges
- Multinational and national healthcare systems and services
- How to lead change processes in complex organizational settings
- How to lead teams in increasingly collaborative work environments
- Financial, regulatory, and reimbursement issues
- Effective communication and problem solving in a global, virtual environment

Students may choose to pursue an MBA in one of two formats or a combination of the two: (1) evening track, (2) online, or (3) apply to one format and take some courses in the other format when it is helpful to do so. This flexibility allows students to accommodate their program to the demands of adult life and their comfort with taking demanding courses in a fast-paced online environment.

All students have the opportunity to interact with highly motivated students and to make connections and enlarge their network of contacts throughout the industry. Students may take from 24 months to 5 years to complete the 40-credit program.

The evening MBA program is designed for students who are new to the pharmaceutical or healthcare fields. Students attend classes in the evening on USciences' West Philadelphia campus, online, or with a combination of both; classes are generally scheduled between 5:30 and 8:30 p.m.

The online format is a strong fit for students who have some experience in the pharmaceutical or healthcare field and who want to gain the knowledge and skills necessary to advance their careers. The program offers a total of 21 courses—18 of which are delivered via the internet. The remaining three courses are conducted either on University of the Sciences' campus or at a convenient executive conference center.

To enter the MBA degree program students must have a bachelor's degree from an accredited institution. Entering MBA students arrive with varying levels of previous business education and experience. In order to assure that classes are conducted at a consistent and productive graduate level, faculty will review entrants' transcripts to evaluate their preparedness. Based on these transcripts and professional experience, entrants may be asked to take one or more foundation courses. These may be completed at a college/university or through cost efficient, flexible online tutorials provided by USciences. Typical foundation requirements might include accounting and Excel proficiency.

Through the Integrated Graduate Credit Program (IGCP) students who are currently enrolled in undergraduate or first professional programs at USciences may take MBA courses for credit above their primary degree program. If accepted into IGCP they may accumulate up to 15 credits without incurring any additional tuition. This program has limited space and acceptance is competitive. Credits accrued in the MBA program may not be applied to another degree. If all 15 credits are completed during their first degree program, students can look forward to completing their MBA in as little as 14 months after graduation. The MBA can be completed either on campus or online.

MBA in Pharmaceutical and Healthcare Business (40 credits)

Required Courses (31 credits)

- PB 707 - Issues and Trends in Health Policy Credits: 3
- PB 711 - Managerial and Financial Accounting Credits: 2
- PB 721 - Managerial Finance Credits: 2
- PB 722 - Corporate Finance Credits: 2
- PB 731 - Business Statistics Credits: 2
- PB 741 - Team Dynamics-Human Resources Management Credits: 2
- PB 742 - Leadership and Development Credits: 2
- PB 751 - Introduction to Marketing Credits: 2
- PB 752 - Introduction to Market Research Credits: 2
- PB 761 - Competitive Analysis and Strategic Business Planning Credits: 2

- PB 774 - Ethical Issues in Pharmaceutical Business Credits: 2
- PB 840 - Health Economics Credits: 3
- PB 880 - International Pharma Business Credits: 2
- PB 888 - Methods of Inquiry/Analysis Credits: 1
- PB 890 - Capstone Global Bus Strategies Credits: 2

Multidiscipline Strategic Management (3 credits)

Students must complete three 1-credit MSM courses. (See Footnote 1 Below)

- PB 792 - Multidiscipline Strategic Management II Credits: 1
- PB 794 - Multidiscipline Strategic Management IV Credits: 1
- PB 790 - Multidiscipline Strategic Management III Credits: 1
- or
- PB 798 - MSM V Cannabis Industry Credits: 1

Elective Courses (6 credits)

- PB 753 - Pharmaceutical Marketing and Sales Management Credits: 2
- PB 762 - Pharmaceutical Research and Development Management Credits: 2
- PB 771 - Regulation of Prescription Drugs and Ethical Issues Credits: 2
- or
- PB 759 - Cannabis Marketing and Sales Credits: 2
- PB 767 - Introduction to Medical Cannabis Industry Credits: 2
- PB 768 - Finance and Regulation of Cannabis Industry Credits: 2

Footnotes:

1. Currently PB 790, PB 792, PB 794, and PB 798 are options to fulfill the multidiscipline strategic management course requirement.
2. Currently PB 880 fulfills the global graduate course requirement. Other global graduate courses may be considered as elective options.
3. Students enrolled in the MBA program may only repeat PB-890 Capstone once if a grade of W or below B- is earned. If the student does not earn a grade of B- or better on the second attempt to complete the Capstone, the student will be dropped from the MBA Program. This policy does not apply if a "W" is granted based on a leave approved by the appropriate Dean's office.

Sample Evening MBA in Pharmaceutical and Healthcare Business Curriculum Plan

First Year

Fall Semester

- PB 707 - Issues and Trends in Health Policy Credits: 3
- PB 731 - Business Statistics Credits: 2
- PB 741 - Team Dynamics-Human Resources Management Credits: 2
- PB 751 - Introduction to Marketing Credits: 2

Credits/Semester: 9

Spring Semester

- PB 711 - Managerial and Financial Accounting Credits: 2
- PB 752 - Introduction to Market Research Credits: 2
- PB 753 - Pharmaceutical Marketing and Sales Management Credits: 2
- PB 774 - Ethical Issues in Pharmaceutical Business Credits: 2

Credits/Semester: 8

Summer Semester

- PB 721 - Managerial Finance Credits: 2
- PB 771 - Regulation of Prescription Drugs and Ethical Issues Credits: 2
- PB 792 - Multidiscipline Strategic Management II Credits: 1

Credits/Semester: 5

Second Year

Fall Semester

- PB 722 - Corporate Finance Credits: 2
- PB 762 - Pharmaceutical Research and Development Management Credits: 2
- PB 840 - Health Economics Credits: 3
- PB 880 - International Pharma Business Credits: 2
- PB 888 - Methods of Inquiry/Analysis Credits: 1

Credits/Semester: 10

Spring Semester

- PB 742 - Leadership and Development Credits: 2
- PB 761 - Competitive Analysis and Strategic Business Planning Credits: 2
- PB 790 - Multidiscipline Strategic Management III Credits: 1
- PB 794 - Multidiscipline Strategic Management IV Credits: 1
- PB 890 - Capstone Global Bus Strategies Credits: 2

Credits/Semester: 8

Total Credits: 40

Sample Online MBA in Pharmaceutical and Healthcare Business Curriculum Plan

Semester 1 (Fall)

- PB 711 - Managerial and Financial Accounting Credits: 2
 - PB 741 - Team Dynamics-Human Resources Management Credits: 2
- (See Footnote 1 Below)

- PB 762 - Pharmaceutical Research and Development Management Credits: 2
- PB 771 - Regulation of Prescription Drugs and Ethical Issues Credits: 2
or
- PB 767 - Introduction to Medical Cannabis Industry Credits: 2

Semester 2 (Spring)

- PB 721 - Managerial Finance Credits: 2
- PB 722 - Corporate Finance Credits: 2
- PB 751 - Introduction to Marketing Credits: 2
Choose One:
- PB 790 - Multidiscipline Strategic Management III Credits: 1 or
- PB 798 - MSM V Cannabis Industry Credits: 1

Credits/Semester: 7

Semester 3 (Summer)

- PB 731 - Business Statistics Credits: 2
- PB 752 - Introduction to Market Research Credits: 2
Choose One:
- PB 753 - Pharmaceutical Marketing and Sales Management Credits: 2 or
- PB 759 - Cannabis Marketing and Sales Credits: 2

Credits/Semester: 6

Semester 4 (Fall)

- PB 761 - Competitive Analysis and Strategic Business Planning Credits: 2
- PB 774 - Ethical Issues in Pharmaceutical Business Credits: 2
- PB 794 - Multidiscipline Strategic Management IV Credits: 1

Credits/Semester: 5

Semester 5 (Spring)

- PB 707 - Issues and Trends in Health Policy Credits: 3
- PB 742 - Leadership and Development Credits: 2
- PB 880 - International Pharma Business Credits: 2

Credits/Semester: 7

Semester 6 (Summer)

- PB 840 - Health Economics Credits: 3

Semester 7 (Fall)

- PB 792 - Multidiscipline Strategic Management II Credits: 1

- PB 890 - Capstone Global Bus Strategies Credits: 2
(See Footnote 2 Below)

Credits/Semester: 3

Total Credits: 40

Footnotes:

1. PB 741 and PB 742 are one-week, classroom-based courses.
2. PB 890 includes classroom-based final presentations. Students enrolled in the MBA program may only repeat PB-890 Capstone once if a grade of W or below B- is earned. If the student does not earn a grade of B- or better on the second attempt to complete the Capstone, the student will be dropped from the MBA program. This policy does not apply if a "W" is granted based upon a leave approved by the appropriate Dean's office.

Pharmaceutical and Healthcare Business – Major

This bachelor's level program is designed to prepare 'job ready' graduates to competently assume entry-level business positions in the pharmaceutical, life sciences, diagnostics, device, healthcare and other industries, in fields such as marketing, advertising, sales, consulting, medical education, public relations, operations, compliance, market research and project management. Additionally it also prepares students to successfully undertake graduate education in business and related fields.

Graduates of the program are prepared to eventually fulfill leadership and management responsibilities in a variety of healthcare industry settings through the curriculum's emphasis on building broad-based business knowledge and practical skill development in the tasks required of leaders in the industry. Our students' unique understanding of the scientific, professional, economic, and practical issues that influence pharmaceutical and healthcare business prepares them for success in a broad range of industry roles.

The curriculum integrates the fundamentals of business with liberal arts and biological sciences courses. Students take courses in business (marketing, economics, accounting, finance, and management) as well as courses with a focus on knowledge of the pharmaceutical and healthcare sector. An optional industry internship may be scheduled between the third and fourth years of the program.

BS in Pharmaceutical and Healthcare Business Curriculum (120 credits)

General Education

- General Education Humanities Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1

Science and Math

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- MA 104 - College Algebra Credits: 3

- ST 310 - Biostatistics I Credits: 3

Pharmaceutical and Healthcare Business

- EC 101 - Introduction to Macroeconomics Credits: 3
- EC 201 - Introduction to Microeconomics Credits: 3
- ET 313 - Business Ethics Credits: 3
- PB 120 - Introduction to Business Seminar Credits: 2
- PB 190 - Business Orientation Credits: 1
- PB 242 - Health Care Systems Credits: 2
- PB 243 - Advanced Healthcare Systems Credits: 3
- PB 315 - Business Law Credits: 3
- PB 316 - Accounting Theory Credits: 3
- PB 317 - Managerial Accounting Credits: 3
- PB 318 - Financial Management Credits: 3
- PB 319 - Introduction to Marketing Management Credits: 3
- PB 323 - Principles of Management Credits: 3
- PB 335 - Marketing Applications in the Clinical Use of Drugs I Credits: 3
- PB 336 - Marketing Applications in the Clinical Use of Drugs II Credits: 4
- PB 382 - Special Topics in Pharmaceutical and Healthcare Business I Credits: 2
- PB 383 - Special Topics in Pharmaceutical and Healthcare Business II Credits: 2
- PB 435 - Advertising and Promotion Credits: 3
- PB 437 - International Marketing of Pharmaceuticals Credits: 2
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- PB 478 - Pharmaceutical Marketing Research Credits: 3
- PB 482 - Special Topics in Pharmaceutical and Healthcare Business III Credits: 2
- PB 483 - Special Topics in Pharmaceutical and Healthcare Business IV Credits: 2
- PB 490 - Senior Thesis Methodology Credits: 2
- PB 491 - Senior Thesis Credits: 3
- PB 564 - Clinical Pharmacoeconomics Credits: 2

Writing

- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3
- WR 303 - Professional Writing Credits: 1

Business Elective (8 credits)

Unrestricted Elective (3 credits)

Sample Curriculum Plan

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- MA 104 - College Algebra Credits: 3

- PB 190 - Business Orientation Credits: 1
- PB 319 - Introduction to Marketing Management Credits: 3
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- EC 201 - Introduction to Microeconomics Credits: 3
- PB 120 - Introduction to Business Seminar Credits: 2
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 16

Second Year

Fall Semester

- General Education Humanities Requirement Credits: 3
- Multidisciplinary Inquiry Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- EC 101 - Introduction to Macroeconomics Credits: 3
- PB 242 - Health Care Systems Credits: 2
- PB 323 - Principles of Management Credits: 3

Credits/Semester: 17

Spring Semester

- Unrestricted Elective Credits: 3
- Multidisciplinary Inquiry Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- PB 243 - Advanced Healthcare Systems Credits: 3
- WR 303 - Professional Writing Credits: 1

Credits/Semester: 15

Third Year

Fall Semester

- Business Elective Credits: 3 (Note: PB 425 is recommended)
- PB 316 - Accounting Theory Credits: 3
- PB 335 - Marketing Applications in the Clinical Use of Drugs I Credits: 3
- PB 383 - Special Topics in Pharmaceutical and Healthcare Business II Credits: 2

- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 14

Spring Semester

- ET 313 - Business Ethics Credits: 3
- PB 317 - Managerial Accounting Credits: 3
- PB 336 - Marketing Applications in the Clinical Use of Drugs II Credits: 4
- PB 382 - Special Topics in Pharmaceutical and Healthcare Business I Credits: 2
- PB 478 - Pharmaceutical Marketing Research Credits: 3

Credits/Semester: 15

Fourth Year

Fall Semester

- Business Elective Credits: 3 (Note: PB 430 is recommended)
- PA 465 - Pharmacoeconomics and Medication Selection Credits: 2
or
- PB 564 - Clinical Pharmacoeconomics Credits: 2
- PB 318 - Financial Management Credits: 3
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- PB 483 - Special Topics in Pharmaceutical and Healthcare Business IV Credits: 2
- PB 490 - Senior Thesis Methodology Credits: 2

Credits/Semester: 14

Spring Semester

- Business Elective Credits: 2 (Note: PB 325 is recommended)
- PB 315 - Business Law Credits: 3
- PB 435 - Advertising and Promotion Credits: 3
- PB 437 - International Marketing of Pharmaceuticals Credits: 2
- PB 482 - Special Topics in Pharmaceutical and Healthcare Business III Credits: 2
- PB 491 - Senior Thesis Credits: 3

Credits/Semester: 15

Total Credits: 120

Pharmaceutical and Healthcare Business – Minor

The pharmaceutical and healthcare business (PHB) minor is designed to provide non-business majors with specific, in-depth industry knowledge and practical skill development related to the broad pharmaceutical and healthcare business industry (e.g., pharmaceuticals, biopharmaceuticals/biotechs, device and diagnostics, patient advocacy groups, and supplier organizations). This minor is a pathway to develop an in-depth appreciation and understanding of how the industry, science, and business converge, as well as to provide core foundational business skills.

Interested students should apply to the minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

To satisfactorily complete a minor in pharmaceutical and healthcare business, students must complete a minimum of 20 credits including the prerequisite course (2 credits), required courses (8 credits), and elective courses (10 credits).

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Prerequisite Course:

- PB 120 - Introduction to Business Seminar Credits: 2

Required Courses:

- EC 101 - Introduction to Macroeconomics Credits: 3
- PB 242 - Health Care Systems Credits: 2
- PB 316 - Accounting Theory Credits: 3

Suggested Elective Courses Include*:

- PB 243 - Advanced Healthcare Systems Credits: 3
- PB 318 - Financial Management Credits: 3
- PB 319 - Introduction to Marketing Management Credits: 3
- PB 323 - Principles of Management Credits: 3
- PB 383 - Special Topics in Pharmaceutical and Healthcare Business II Credits: 2
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- WR 303 - Professional Writing Credits: 1

***Note:**

Elective courses should be made in consultation with the student's assigned minor advisor. Other elective courses that have a common intellectual bond can be approved by the minor advisor, program director, or department chair.

Total Credits: 20

Pharmaceutical Sciences

Mission

The mission of the Department of Pharmaceutical Sciences is to educate and mentor students in the sciences of medicinal chemistry, pharmaceuticals, pharmacology, physiology, and toxicology at the undergraduate (BS), professional (PharmD), and graduate (MS, PhD) levels, and to conduct and foster research in these disciplines.

Vision

The vision of the department is to engage students in a challenging and thorough educational experience in the pharmaceutical sciences through classroom and laboratory instruction and independent, directed scientific research. We strive to provide our students with a strong foundation of specialized knowledge in the pharmaceutical sciences; the laboratory, communication, and evidence-based critical thinking skills; ethical and innovative attitudes and approaches; and opportunities to achieve a high degree of accomplishment and leadership.

Overview

The Department of Pharmaceutical Sciences offers two undergraduate degrees, the BS in pharmacology/toxicology, and the BS in pharmaceutical sciences, and contributes pharmaceutical science expertise, in collaboration with the Department of Pharmacy Practice and Pharmacy Administration, to the Doctor of Pharmacy (PharmD) program. It also offers graduate programs (MS and PhD) in pharmaceutics, pharmacology/toxicology, and industrial pharmacy.

Faculty

Does not include adjunct faculty. A list is available from the department chair.

Isabelle Mercier

BS, PhD (University of Montreal, Canada)
Associate Professor of Pharmaceutical Sciences
Chair, Department of Pharmaceutical Sciences

Adeboye Adejare

BS, MS (University of Iowa); PhD (Ohio State University)
Professor of Pharmaceutical Sciences

Bin Chen

BS, MS (Nanjing University, China); PhD (Catholic University, Leuven, Belgium)
Associate Professor of Pharmaceutical Sciences
Director, Graduate Program in Pharmacology and Toxicology

Anil P. D'Mello

BPharm (University of Bombay, India); PhD (University of Pittsburgh)
Professor of Pharmaceutical Sciences
Co-Director, BS Program in Pharmaceutical Sciences

Pardeep K. Gupta

BPharm, MPharm (Panjab University, India); MS (Philadelphia College of Pharmacy and Science); PhD (University of Wisconsin)
Professor of Pharmaceutics
Director, Industrial Pharmacy Laboratory

Jean-Francois Jasmin

BS, PhD (Université de Montréal, Canada)
Associate Professor of Pharmaceutical Sciences

S. (Kamal) Jonnalagadda

BPharm (Birla Institute of Technology and Science, India); PhD (University of Nebraska)
Professor of Pharmaceutics
Director, Graduate Program in Pharmaceutics

Ra'ed Khashan

BS (Yarmouk University, Jordan); BPharm (Jordan University of Science & Technology); MS (University of Texas at Austin), PhD (University of North Carolina at Chapel Hill)
Assistant Professor of Pharmaceutical Sciences

Zhiyu Li

BS (Nakai University, China); MS (University of Science and Technology of China); PhD (University of Maryland)
Associate Professor of Pharmaceutical Sciences
Co-Director, BS Program in Pharmacology and Toxicology

Peter J. Harvison

BS (Carnegie Mellon University); PhD (State University of New York, Buffalo)
Leonard and Madlyn Abramson Chair in Pharmacology

Clyde M. Ofner III

BS, PhD (Temple University)

Professor of Pharmaceutics

Raymond F. Orzechowski

BS (Philadelphia College of Pharmacy and Science); MS, PhD (Temple University)

Professor Emeritus of Pharmacology and Toxicology

Elias W. Packman

BS, MS, DSc (Philadelphia College of Pharmacy and Science)

Research Professor Emeritus of Pharmacology and Toxicology

G. Victor Rossi

BS, MS (Philadelphia College of Pharmacy and Science); PhD (Purdue University)

Leonard and Madlyn Abramson Professor Emeritus of Pharmacology

Roger L. Schnaare

BS (St. Louis College of Pharmacy); MS, PhD (Purdue University)

Professor Emeritus of Pharmacy

Edwin T. Sugita

BS, MS, PhD (Purdue University)

Professor Emeritus of Pharmacy

Asha Suryanarayanan

BPharm (University of Bombay, India); PhD (University of Alaska, Fairbanks)

Assistant Professor of Pharmaceutical Sciences

Ruy Tchao

BS (University of Nottingham, England); PhD (University of Manchester, England)

Professor of Pharmacology and Toxicology

Shanaz M. Tejani-Butt

BS, MS (University of Bombay, India); PhD (Medical College of Virginia)

Professor of Pharmacology and Toxicology

Jason Wallach

BS (Indiana University of Pennsylvania); PhD (University of the Sciences)

Assistant Professor of Pharmaceutical Sciences

Pharmaceutical Sciences - Minor

Description and Learning Objectives

The minor in Pharmaceutical Sciences will provide students with a foundation in the interdisciplinary pharmaceutical sciences field. Students will learn the core concepts and practices of the science of pharmaceuticals, including dosage formulation, manufacturing, quality assurance, and regulatory compliance. Students will understand the principles and approaches of drug discovery, development, and delivery.

Requirements & Expectations

Students must complete 18 credits beyond the prerequisite courses. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Interested students should apply to the pharmaceutical sciences minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

Coursework & Duration

Prerequisite courses:

- CH 101 and CH 102 or CH 111 and CH 112
- CH 103 and CH 104 or CH 113 and CH 114
- MA 107 and MA 110
- CH 201 and CH 202 or CH 211 and CH 212
- CH 203 and CH 204 or CH 213 and CH 214
- BS 205 or BS 310
- BS 206 or BS 311

Required courses: 11-12 Credits

- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 318 - Pharmaceutics Laboratory Credits: 1
- PH 317 - Pharmaceutics and Biopharmaceutics II Credits: 4

Elective courses: minimum of 7 credits

- CH 320 - Essentials of Physical Chemistry Credits: 4
or
- CH 321 - Physical Chemistry I Credits: 4
- CH 356 - Molecular Biology and Genetics Credits: 3
or
- BS 466 - Genetics Credits: 4
or
- BS 475 - Molecular Biology Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
or
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- CH 411 - Medicinal Chemistry Credits: 3
- CH 414 - Structure-Activity Relationships (SAR) Credits: 3
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PC 315 - Introduction to Toxicology Credits: 2
- PH 330 Research Techniques in Pharmaceutical Sciences Credits: 3
- PH 400 - Cosmetic Science Credits: 2
- PH 401 - Cosmetic Science Lab Credits: 2
- PH 402 - Controlled-Release Dosage Forms Credits: 2
- PH 450 - Manufacturing Pharmacy Credits: 2
- ST 310 - Biostatistics I Credits: 3

Total Minimum Credits: 18

Pharmaceutical Sciences – Major

The pharmaceutical sciences program provides a strong basic sciences foundation in biology, chemistry, mathematics, and

pharmaceutics; integrates the essential contributions of the humanities, social sciences, and communications; and utilizes laboratory-based courses to develop and refine research skills. The graduate will have the background to understand how physicochemical and pharmaceutical principles are applied in formulation development, manufacturing, and animal and human testing of different types of drug delivery systems.

Learning outcomes:

- Students should have the ability to integrate concepts taught in basic courses into their professional courses.
- Students should be proficient in basic laboratory skills required by departments of pharmaceutics in the pharmaceutical industry.
- Students should be able to electronically retrieve relevant literature from scientific databases.
- Students should be able to effectively communicate both verbally and in writing.

The demand for graduates with a degree in the pharmaceutical sciences is presently very high and growing; excellent entry-level positions are available in the cosmetics and pharmaceutical industry, government, specialty dosage form development laboratories, and biotechnology companies. Areas include research, product development, manufacturing, quality control, and regulatory affairs.

Students who excel academically will find the pharmaceutical sciences major to be a unique pre-professional degree for programs in pharmacy, medicine, and law. Alternatively, for these students, pursuit of MS and PhD programs in the pharmaceutical sciences is another rewarding postgraduate option. See the Department of Pharmaceutical Sciences section for information about the PhD and MS degree programs in pharmaceutics.

Highly qualified prospective students may also seek admission to the combined BS in pharmaceutical sciences/MS in pharmaceutics degree program. Successful students will receive the BS degree at the completion of the fourth year and the MS degree at the end of the fifth year.

Philadelphia College of Pharmacy is one of the few colleges in the United States that offers a BS in pharmaceutical sciences degree.

Degree Requirements

To qualify for graduation, a minimum of 129 credit hours of approved courses is required in the curriculum. The curriculum encourages students to take multiple elective courses that allow them to pursue a minor or to develop an area of specialization.

To qualify for entry into the third year, a student must have attained a cumulative grade point average of 2.00 or greater at the end of the summer semester of their second year.

Residency Requirements for the BS in Pharmaceutical Sciences Program

Completing the BS in pharmaceutical sciences program requires that students enroll at the University for at least half of the total number of credits required for graduation OR that students enroll at the University for a minimum of four fall and/or spring semesters of full-time (at least 12 credits per semester) study.

BS in Pharmaceutical Sciences

Students entering in Catalog Years 2018 and beyond (graduating classes of 2022 and beyond) - with general education

General Education

- General Education Humanities Discipline Requirement Credits: 6
- General Education Social Science Discipline Requirement Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1

- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Science and Math

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- CH 346 - Biochemistry Credits: 4
- CH 356 - Molecular Biology and Genetics Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
- ST 310 - Biostatistics I Credits: 3

Pharmaceutical Sciences

- PH 330 - Research Techniques in Pharmaceutical Sciences Credits: 3
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PH 103 - Pharmaceutical Sciences Orientation I Credits: 1
- PH 203 - Pharmaceutical Sciences Orientation II Credits: 1
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 317 - Pharmaceutics and Biopharmaceutics II Credits: 4
- PH 318 - Pharmaceutics Laboratory Credits: 1
- PH 391 - Pharmaceutical Sciences Seminar I Credits: 1
- PH 400 - Cosmetic Science Credits: 2
- PH 401 - Cosmetic Science Lab Credits: 2
- PH 402 - Controlled-Release Dosage Forms Credits: 2
- PH 450 - Manufacturing Pharmacy Credits: 2
- PH 451 - Manufacturing Pharmacy Laboratory Credits: 1
- PH 491 - Pharmaceutical Sciences Seminar II Credits: 1

Writing

- WR 302 - Scientific Writing Credits: 3

Free Electives (11 credits)

BS in Pharmaceutical Sciences Curriculum Plan

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PH 103 - Pharmaceutical Sciences Orientation I Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- General Education Social Science Discipline Requirement Credits: 3
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Second Year

- General Education Social Science Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- PY 201 - Introductory Physics I Credits: 4

Credits/Semester: 17

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1

- PH 203 - Pharmaceutical Sciences Orientation II Credits: 1
- PY 202 - Introductory Physics II Credits: 4

Credits/Semester: 15

Third Year

Fall Semester

- Free Elective Credits: 6
- CH 346 - Biochemistry Credits: 4
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 318 - Pharmaceutics Laboratory Credits: 1
- WR 302 - Scientific Writing Credits: 3

Credits/Semester: 17

Spring Semester

- CH 356 - Molecular Biology and Genetics Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- PH 317 - Pharmaceutics and Biopharmaceutics II Credits: 4
- PH 330 - Research Techniques in Pharmaceutical Sciences Credits: 3
- PH 391 - Pharmaceutical Sciences Seminar I Credits: 1

Credits/Semester: 14

Fourth Year

- Free Elective Credits: 3
- General Education Humanities Discipline Requirement Credits: 3
- PB 452 - Legal Aspects of Drug Development, Production, and Marketing Credits: 2
- PH 402 - Controlled-Release Dosage Forms Credits: 2
- PH 450 - Manufacturing Pharmacy Credits: 2
- PH 451 - Manufacturing Pharmacy Laboratory Credits: 1
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Spring Semester

- Free Elective Credits: 2
- General Education Humanities Discipline Requirement Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PH 400 - Cosmetic Science Credits: 2
- PH 401 - Cosmetic Science Lab Credits: 2
- PH 491 - Pharmaceutical Sciences Seminar II Credits: 1

Credits/Semester: 17

Total Minimum Credits: 129

Notes:

- a. General Education Social Sciences Discipline Requirement: SO 101 recommended; SO 111 recommended for Medical School track
- b. ONE of these Multidisciplinary Inquiry courses should meet the General Education Ethics skills requirement.
- c. Public Speaking (CO204) is an alternative to Intro to Communications (CO101).

BS/MS Program

A BS/MS (in pharmaceuticals) program is available for students who complete the requirements of the BS degree in pharmaceutical sciences. Students may finish a thesis or non-thesis MS degree with an additional calendar year of full-time study. In order to apply, students must maintain a cumulative GPA of 3.00 and have a "B-" or better grades in all PH courses that are being used to fulfill the requirements for graduation.

This challenging program may require more than one additional year if course conflicts occur.

For information about the master of science in pharmaceuticals (thesis or non-thesis), contact the pharmaceuticals program director.

Pharmaceutics – Doctor of Philosophy (PhD)

The requirements for this degree are at least 20 credits of acceptable non-research graduate-level courses and at least 20 research credits. The courses are from the required and program courses listed below and from courses approved by the research advisor/Research Advisory Committee. A minimum of 6 credits of 800-level courses and the remainder at the 700 or 800 level are required. Registration (1 or 0 credits) and participation in PH 890 - Pharmaceutics Seminar is required each semester, but only one credit may be applied toward the 20 non-research credit requirement.

Required

- PH 750 - Advanced Pharmaceutics Credits: 4
- PH 890 - Pharmaceutics Seminar Credits: 2 per semester
1 credit of PH 890 is required, see footnote below for details.
- PH 897 - Research in Pharmaceutics Credits: 2
- PH 899 - Doctoral Research Credits: 12 per semester enrolled in the course
A minimum of 20 credits of PH 899 is required, but PH 899 is not required every semester.

Program Courses

At least one course from the program courses listed below:

- CH 721 - Chemical Kinetics Credits: 3
- PH 755 - Application of Regulatory Sciences in Pharmaceutical Development Credits: 2
- PH 803 - Equilibrium Phenomena Credits: 3
- PH 811 - Drug Diffusion and Controlled Delivery Credits: 2
- PH 813 - Design of Experiments Credits: 2
- PH 875 - Drug Dynamics Credits: 3
- PH 880 - Pharmaceutical Polymers Credits: 3

Footnote:

Students must register for PH 890 every fall and spring semester. Students register for 0 credit hours when not presenting a seminar and for 1 credit hour when presenting a seminar. Students are expected to present 1 seminar each year, but only 1 credit of PH 890 may count toward completion of the degree program.

Pharmaceutics – Master of Science (MS) (Non-Thesis)

This degree is awarded upon completion of at least 30 credits in courses acceptable for the degree. These courses are from the required and program courses listed below and from courses approved by the advisor/program director. A minimum of 6 credits at the 800-level, a maximum of 6 credits at the 300- or 400-level, and the remainder at the 700- or 800-level are required. Registration (for 1 or 0 credits) and participation in PH 890 - Pharmaceutics Seminar is required each semester, but only one credit may be applied toward the 30-credit requirement.

Required

- PH 750 - Advanced Pharmaceutics Credits: 4
- PH 890 - Pharmaceutics Seminar Credits: 2 per semester
1 credit of PH 890 is required, see footnote below for details.

Program Courses

At least two courses from the program courses listed below:

- CH 721 - Chemical Kinetics Credits: 3
- PH 755 - Application of Regulatory Sciences in Pharmaceutical Development Credits: 2
- PH 803 - Equilibrium Phenomena Credits: 3
- PH 811 - Drug Diffusion and Controlled Delivery Credits: 2
- PH 813 - Design of Experiments Credits: 2
- PH 875 - Drug Dynamics Credits: 3
- PH 880 - Pharmaceutical Polymers Credits: 3

Footnote:

Students must register for PH 890 every fall and spring semester. Students register for 0 credit hours when not presenting a seminar and for 1 credit hour when presenting a seminar. Students are expected to present 1 seminar each year, but only 1 credit of PH 890 may count toward completion of the degree program.

Pharmaceutics – Master of Science (MS) (Thesis Option)

This degree is awarded upon completion of at least 20 non-research credits in courses acceptable for the degree and at least 10 research credits. The courses are from the required and program courses listed below and from courses approved by the research advisor/Research Advisory Committee. A minimum of 6 credits at the 800-level, a maximum of 6 credits at the 300- or 400-level, and the remainder at the 700- or 800-level are required. Registration (for 1 or 0 credits) and participation in PH 890 - Pharmaceutics Seminar is required each fall and spring semester, but only one credit may be applied toward the 20 credit requirement.

Required

- PH 750 - Advanced Pharmaceutics Credits: 4
- PH 799 - Master's Research Credits: 12 per semester enrolled in the course

A minimum of 10 credits of PH 799 is required, but PH 799 is not required every semester.

- PH 890 - Pharmaceutics Seminar Credits: 2 per semester
1 credit of PH 890 is required, see footnote below for details.
- PH 897 - Research in Pharmaceutics Credits: 2

Program Courses

At least one course from the program courses listed below:

- CH 721 - Chemical Kinetics Credits: 3
- PH 755 - Application of Regulatory Sciences in Pharmaceutical Development Credits: 2
- PH 803 - Equilibrium Phenomena Credits: 3
- PH 811 - Drug Diffusion and Controlled Delivery Credits: 2
- PH 813 - Design of Experiments Credits: 2
- PH 875 - Drug Dynamics Credits: 3
- PH 880 - Pharmaceutical Polymers Credits: 3

Footnote:

Students must register for PH 890 every fall and spring semester. Students register for 0 credit hours when not presenting a seminar and for 1 credit hour when presenting a seminar. Students are expected to present 1 seminar each year, but only 1 credit of PH 890 may count toward completion of the degree program.

Pharmacology - Minor

Description and Learning Objectives

The minor in Pharmacology will provide students with a foundation in the interdisciplinary pharmacology field. Students will learn the core concepts of pharmacology, including fundamental methods of pharmacological studies, mechanisms of action drugs to treat varieties of diseases, and toxicity and safety assessment in drug development. Pharmacology benefits students who will pursue degrees in health professions and who are interested in drug discovery.

Requirements & Expectations

Students must complete 18 credits beyond the prerequisite courses. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Interested students should apply to the pharmacology minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Coursework & Duration

Prerequisite courses:

- CH 101 and CH 102 or CH 111 and CH 112
- CH 103 and CH 104 or CH 113 and CH 114
- MA 107 and MA 110 or MA 122
- CH 201 and CH 202 or CH 211 and CH 212
- CH 203 and CH 204 or CH 213 and CH 214
- BS 205 or BS 310
- BS 206 or BS 311

Required courses: 12-13 Credits

- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PC 315 - Introduction to Toxicology Credits: 2
- PC 421 - Advanced Medicinal Chemistry and Pharmacology Credits: 4

Elective courses: minimum of 6 credits

- BS 306 - Human Molec & Cell Bio Credits: 3
- BS 336 - Pharmacognosy Credits: 2
- BS 358 - Principles and Applications of Immunology Credits: 3
- CH 356 - Molecular Biology and Genetics Credits: 3
or
- BS 466 - Genetics Credits: 4
or
- BS 475 - Molecular Biology Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
or
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1
- PC 330 - Biomethods in Pharmacology and Toxicology Credits: 3
- PC 340 - Introduction to Neuropsychopharmacology Credits: 3
- PC 350 - Toxicology of Drug Abuse Credits: 2
- PC 422 - Special Topics in Pharmacology Credits: 4
- PC 431 - Advanced Toxicology Credits: 3
- PC 432 - Special Topics in Toxicology Credits: 3
- PC 450 - Analysis of Scientific and Medical Publications: Retractions, Publication Ethics, and Adverse Consequences Credits: 2

Total Minimum Credits: 18

Pharmacology and Toxicology – Major

The impact of drugs and chemicals on our society is widely recognized. Advances in drug therapy have led to new methods for reduction of high serum cholesterol; improved treatment of heart attacks with clot-dissolving drugs; advances in the care of diabetics through the use of human insulin; and production of chemical agents that suppress the immune system, allowing successful organ transplantation. Many breakthroughs in science and technology have occurred as a result of research in pharmacology. In its simplest definition, pharmacology is the study of the actions and effects of chemicals intended primarily for the prevention, treatment, or diagnosis of disease.

Yet, nothing is without risk. The Greek root "pharmakon" (from which pharmacology is derived) can be translated as "drug," "medicine," or "poison." The derivation emphasizes the dual nature of chemicals: the ability of chemicals to produce beneficial as well as lethal effects. Toxicology is the study of the poisonous or injurious effects of drugs and chemical agents on living organisms. Toxicologists extend the work of pharmacologists by examining the adverse effects of chemicals on living organisms to assess the risks associated with various chemicals. Examples of these chemicals may include drugs, cosmetics, agricultural products, food ingredients, and household products. Pharmacologists and toxicologists determine the immediate and long-term effects of chemicals on the health of individuals. Scientists are continually searching for new or more specific methods to treat

diseases and improve the quality of life. However, potential risks involved in any therapy must always be carefully evaluated.

The scientific community has experienced an explosion in research. Consequently, the demands for pharmacologists and toxicologists have increased, and career options have expanded tremendously. In addition to advancements in drug therapy in the battles against AIDS, heart disease, cancer, and other diseases, our society has been faced with the reality of the toxic effects of many chemicals, such as food additives and environmental pollutants. Pharmacologists and toxicologists play important roles in the various aspects of discovery, development, testing, and control of chemicals. Positions in these areas are available in the pharmaceutical and chemical industries, biomedical research and forensic laboratories, and government and environmental agencies.

Few universities in the United States offer pharmacology undergraduate programs. The BS in pharmacology and toxicology program at Philadelphia College of Pharmacy, one of the first of its kind in the nation, was designed in consultation with government and industry advisors to meet their needs as potential employers. Industry representatives continue to advise the University to ensure that the program remains current with changes in the practices of pharmacology and toxicology.

The focus of the pharmacology and toxicology program is to provide a solid foundation of basic sciences as well as a comprehensive understanding of theoretical and practical aspects of pharmacology and toxicology. An emphasis is placed on encouraging students to develop problem-solving skills and strong thought processes. Sound training is provided in research design, analytical methodology, and data analysis as well as interpretation of scientific literature and verbal and written scientific communication. These skills and competencies are necessary for effective functioning in the broad and challenging disciplines of pharmacology and toxicology.

Learning Outcomes: At completion of the BS in pharmacology/toxicology, every student will be able to:

- Conduct experiments using standard laboratory protocols.
- Analyze and interpret data from ADME (absorption/distribution/metabolism/excretion).
- Predict the biochemical and physiologic consequences of drug-receptor interactions.
- Predict the biochemical and physiologic consequences of chemical toxicities.
- Identify, search for, analyze, and critique the biomedical literature, both in writing and orally.

In addition to the intensive instruction in basic and applied sciences, students are provided with hands-on laboratory experience through required lab courses and electives. Students are encouraged to do independent research with faculty and to publish or present the results in science journals or at local science meetings (e.g., the Mid-Atlantic Chapter of the Society of Toxicology). Students may obtain industrial, governmental, or private agency traineeships that provide valuable opportunities to gain practical experience and can lead to job opportunities upon graduation.

For students seeking to continue their education, graduates of the BS in pharmacology and toxicology program are well-prepared to enter graduate programs (MS, PhD) in a variety of disciplines, including biochemistry, bioengineering, forensic sciences, genetics/genomics, microbiology, molecular and cell biology, immunology, neuroscience, pharmaceutical sciences, physiology, pharmacology, or toxicology, as well as professional degree programs in medicine, dentistry, veterinary medicine, and law. A high percentage of our graduates pursue advanced study.

Program graduates at the BS level are highly qualified for good-paying, entry-level positions in the pharmaceutical and chemical industries as well as research and government laboratories. In addition, well-trained pharmacology/toxicology graduates are highly sought after by industry as well as government and regulatory agencies in the areas of risk assessment and quality control.

The pharmacology and toxicology program is designed to accommodate small classes and laboratory sessions, thus providing students with personalized education from the professors.

Degree Requirements

A minimum of 128 credits must be completed, of which at least 36 credits are taught wholly by department faculty.

Residency Requirements for the BS in Pharmaceutical Sciences (Pharmacology and Toxicology) Program

Completing the BS in pharmacology and toxicology program requires that students enroll at the university for at least half of the total number of credits required for graduation or that students enroll at the university for a minimum of four fall and/or spring semesters of full-time (at least 12 credits per semester) study.

BS in Pharmacology/Toxicology

General Education

- General Education Humanities Discipline Requirements Credits: 6
- General Education Social Science Discipline Requirements Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- CO 101 - Introduction to Communication Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Science and Math

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 202 - Organic Chemistry II Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CH 204 - Organic Chemistry Lab II Credits: 1
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4

Pharmacology, Toxicology, and Biomedical Sciences

- BS 205 - Human Structure and Function I Credits: 3
or
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
or
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 358 - Principles and Applications of Immunology Credits: 3
- CH 346 - Biochemistry Credits: 4
- CH 356 - Molecular Biology and Genetics Credits: 3
- PC 181 - Pharmacology/Toxicology Orientation I Credits: 1
- PC 282 - Pharmacology/Toxicology Orientation II Credits: 1
- PC 305 - Fundamentals of Pharmacology Credits: 3

- PC 315 - Introduction to Toxicology Credits: 2
- PC 320 - Techniques in Pharmacology and Toxicology Credits: 2
- PC 330 - Biomethods in Pharmacology and Toxicology Credits: 3
- PC 324 - Pharmacology and Toxicology Seminar I Credits: 1
- PC 421 - Advanced Medicinal Chemistry and Pharmacology Credits: 4
- PC 422 - Special Topics in Pharmacology Credits: 4
- PC 424 - Pharm-Tox Seminar II Credits: 1
- PC 431 - Advanced Toxicology Credits: 3
- PC 432 - Special Topics in Toxicology Credits: 3
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 318 - Pharmaceutics Laboratory Credits: 1

Free Electives (9 credits)

Writing

- WR 302 - Scientific Writing Credits: 3

BS in Pharmacology and Toxicology Sample Curriculum Plan

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- MA 107 - Precalculus Credits: 3
- PC 181 - Pharmacology/Toxicology Orientation I Credits: 1
- PE 101 - Physical Education I Credits: 0
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 15

Spring Semester

- General Education Social Science Discipline Requirement Credits: 3
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Second Year

Fall Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- or
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- CH 201 - Organic Chemistry I Credits: 3
- CH 203 - Organic Chemistry Lab I Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- PY 201 - Introductory Physics I Credits: 4

Credits/Semester: 18

Spring Semester

- Multidisciplinary Inquiry Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- or
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- CH 202 - Organic Chemistry II Credits: 3
- CH 204 - Organic Chemistry Lab II Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- PC 282 - Pharmacology/Toxicology Orientation II Credits: 1
- PY 202 - Introductory Physics II Credits: 4

Credits/Semester: 16

Third Year

Fall Semester

- General Education Humanities Discipline Requirement Credits: 3
- BS 243 - Microbial Science Credits: 3
- BS 244 - Microbial Science Lab Credits: 1
- or
- BS 358 - Principles and Applications of Immunology Credits: 3
- CH 346 - Biochemistry Credits: 4
- PC 320 - Techniques in Pharmacology and Toxicology Credits: 2
- WR 302 - Scientific Writing Credits: 3

Credits/Semester: 15-16

Spring Semester

- Free Electives Credits: 3
- CH 356 - Molecular Biology and Genetics Credits: 3
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PC 315 - Introduction to Toxicology Credits: 2

- PC 324 - Pharmacology and Toxicology Seminar I Credits: 1
- PC 330 - Biomethods in Pharmacology and Toxicology Credits: 3

Credits/Semester: 15

Fourth Year

Fall Semester

- Free Elective Credits: 2
- General Education Humanities Discipline Requirement Credits: 3
- PC 421 - Advanced Medicinal Chemistry and Pharmacology Credits: 4
- PC 431 - Advanced Toxicology Credits: 3
- PH 316 - Pharmaceutics and Biopharmaceutics I Credits: 3
- PH 318 - Pharmaceutics Laboratory Credits: 1

Credits/Semester: 16

Spring Semester

- Free Elective Credits: 4
- General Education Social Sciences Discipline Requirement Credits: 3
- PC 422 - Special Topics in Pharmacology Credits: 4
- PC 424 - Pharm-Tox Seminar II Credits: 1
- PC 432 - Special Topics in Toxicology Credits: 3

Credits/Semester: 15

Total Minimum Credits: 128

Notes:

- General Education Social Sciences Discipline Requirement: SO 101 recommended; SO 111 recommended for Medical School track.
- ONE of these Multidisciplinary Inquiry courses should meet the General Education Ethics skills requirement.
- Public Speaking (CO204) is an alternative to Intro to Communications (CO101).

Pharmacology and Toxicology – Master of Science (MS) and Doctor of Philosophy (PhD)

Programs of advanced study and laboratory research in the disciplines of pharmacology and toxicology, leading to the master of science and doctor of philosophy degrees, are intended to prepare qualified students for professional careers as pharmacologists or toxicologists in academia, private industry, or public service. At the completion of the MS or PhD in pharmacology and toxicology, every student will be able to carry out the following:

- Conduct experiments using standard written laboratory protocols.
- Analyze and interpret data from experiments and publications.
- Design experiments to investigate a question.

- Present laboratory findings orally as in seminar format and in writing as in a manuscript for publication.
- As applicable, defend a thesis or dissertation in a public forum.

Graduate coursework emphasizes integration of biochemistry, cell and molecular biology, physiology, pharmacology, toxicology, statistics, and experimental design. Theory and methodologic aspects are considered within the context of current research literature in these fields. At least 20 didactic credits of graduate coursework (700 and 800 level) are required for either degree. Students propose, develop, and perform an independent research project under the guidance of a faculty Advisory Committee and defend their master's or doctoral thesis before an examination committee of graduate faculty and other expert scientists. Predoctoral students must pass written and oral comprehensive qualifying exams. Publication of research results in peer-reviewed journals is expected. Current research interests of the pharmacology and toxicology faculty encompass cancer pharmacology, metabolism and cellular mechanisms of toxicity of drugs and xenobiotics, cancer cell motility and signaling, and cardiovascular pharmacology and neuropharmacology.

Pharmacology and Toxicology MS Program Requirements

Award of MS degree in pharmacology and toxicology depends on successful completion of both didactic course study and independent research.

The didactic course requirement for the MS degree is to complete a minimum of 20 credits coursework. Courses fulfilling this requirement primarily should be core courses at the 700 or 800 level required by the program and research advisor/advisory committee. A maximum of 6 credits of courses at the 300 or 400 level can be accounted for this requirement.

Courses can be waived or replaced by other courses by the program director.

Required Courses

- PC 801 - Research Literature in Pharmacology and Toxicology Credits: 1 (required in each semester except the final one)
- PC 811 - Research Techniques Laboratory Credits: 3
- PC 821 - Molecular Pharmacology Credits: 3
- PC 880 - Pharmacology and Toxicology Graduate Seminar Credits: 1 (required in each semester except the final one)

Research

All MS degree students are required to satisfactorily complete a minimum of 10 research credits and defend Master's thesis. Submission of peer-reviewed manuscript is strongly recommended.

- PC 799 - Research Credits: 12 (minimum of 10 credits)

Elective Courses

Students may take the following courses in the program or courses from other programs as electives. Elective courses may be required by research advisors or program director if it is determined to be necessary for the progression of students.

- BS 750 - Virology Credits: 3
- BS 761 - Advanced Cell Biology Credits: 3
- BS 764 - Biotechnology Credits: 3
- BS 767 - Cell Biology Methods Lab Credits: 2
- BW 701 - Professional Writing in Science Credits: 3
- CB 880 - Molecular Screening Credits: 2
- CH 714 - Structure-Activity Relationships Credits: 3
- CH 728 - Advanced Biochemistry Credits: 3
- PC 440 - Pharmacology Credits: 4
- PC 760 - Biopharmaceutical Proteins: Principles and Applications Credits: 3
- PC 822 - Drug Discovery for Neurodegenerative Disorders Credits: 3
- PC 851 - Advanced Pharmacology I Credits: 3

- PC 852 - Advanced Pharmacology II Credits: 3
- PC 853 - Advanced Pharmacology III Credits: 3
- PC 854 - Advanced Pharmacology IV Credits: 3

Pharmacology and Toxicology PhD Program Requirements

Award of PhD degree in pharmacology and toxicology depends on successful completion of didactic course study, comprehensive exams and independent research.

The didactic course requirement for the PhD degree is to complete a minimum of 20 credits coursework. Courses fulfilling this requirement primarily should be core courses at the 700 or 800 level required by the program and research advisor/advisory committee. A maximum of 6 credits of courses at the 300 or 400 level can be accounted for this requirement.

Courses can be waived or replaced by other courses by the program director.

Required Courses

- PC 801 - Research Literature in Pharmacology and Toxicology Credits: 1 (required for each semester except in the final one)
- PC 811 - Research Techniques Laboratory Credits: 3
- PC 821 - Molecular Pharmacology Credits: 3
- PC 880 - Pharmacology and Toxicology Graduate Seminar Credits: 1 (required for each semester except in the final one)

Research

All PhD degree students are required to satisfactorily complete a minimum of 20 research credits and defend doctoral thesis. Submission of at least one peer-reviewed manuscript is required.

- PC 899 - Doctoral Research Credits: 12 (minimum of 20 credits)

Elective Courses

Students may take the following courses in the program or courses from other programs as electives. Elective courses may be required by research advisors or program director if it is determined to be necessary for the progression of students.

- BS 750 - Virology Credits: 3
- BS 761 - Advanced Cell Biology Credits: 3
- BS 764 - Biotechnology Credits: 3
- BS 767 - Cell Biology Methods Lab Credits: 2
- BW 701 - Professional Writing in Science Credits: 3
- CB 880 - Molecular Screening Credits: 2
- CH 728 - Advanced Biochemistry Credits: 3
- PC 440 - Pharmacology Credits: 4
- PC 760 - Biopharmaceutical Proteins: Principles and Applications Credits: 3
- PC 822 - Drug Discovery for Neurodegenerative Disorders Credits: 3
- PC 851 - Advanced Pharmacology I Credits: 3
- PC 852 - Advanced Pharmacology II Credits: 3
- PC 853 - Advanced Pharmacology III Credits: 3
- PC 854 - Advanced Pharmacology IV Credits: 3
- ST 701 - Design and Analysis of Experiments Credits: 3
- ST 702 - Statistical Principles in Bioassay Credits: 3
- ST 704 - Statistics for Research Credits: 3
- CH 714 - Structure-Activity Relationships Credits: 3

Toxicology - Minor

Description and Learning Objectives

The minor in Toxicology will provide students with a foundation in the interdisciplinary toxicology field. Students will learn the core concepts of the science of toxicology, including fundamental methods of toxicology studies, and toxicity and safety assessment in preclinical, environmental, and forensic studies and practices. Students will understand the mechanisms of action and effects of toxicants at multiple levels of biological organization.

Requirements & Expectations

Students must complete 18 credits beyond the prerequisite courses. Of these 18 credits, a minimum of 12 credits of minor coursework must be completed in addition to any courses (required courses or program electives) included in the major curriculum. Interested students should apply to the toxicology minor program early in their academic career, usually by the fifth semester of college work, but no later than the end of the drop/add period of the first semester of their last year of didactic work.

Prerequisite courses:

- BS 205 or BS 310
- BS 206 or BS 311
- CH 101 /CH 102 or CH 111 /CH 212
- CH 103 /CH 104 or CH 113 /CH 114
- CH 201 /CH 202 or CH 213 /CH 214
- CH 203 or CH 213 /CH 214
- MA 107 and MA 110

Required courses: 11-12 Credits

- CH 340 - Survey of Biochemistry Credits: 3
or
- CH 341 - Molecular Structure in Biochemistry Credits: 3
or
- CH 346 - Biochemistry Credits: 4
- PC 305 - Fundamentals of Pharmacology Credits: 3
- PC 315 - Introduction to Toxicology Credits: 2
- PC 431 - Advanced Toxicology Credits: 3

Elective courses: minimum of 7 credits

- BS 336 - Pharmacognosy Credits: 2
- BS 440 - Environmental Toxicology Credits: 3
- CH 356 - Molecular Biology and Genetics Credits: 3
or
- BS 466 - Genetics Credits: 4
or
- BS 475 - Molecular Biology Credits: 3
- CH 361 - Analytical Chemistry Credits: 3
or
- CH 366 - Principles of Analytical Chemistry Credits: 3
- CH 363 - Analytical Chemistry Lab Credits: 1

- PC 330 - Biometrics in Pharmacology and Toxicology Credits: 3
- PC 340 - Introduction to Neuropsychopharmacology Credits: 3
- PC 350 - Toxicology of Drug Abuse Credits: 2
- PC 421 - Advanced Medicinal Chemistry and Pharmacology Credits: 4
- PC 422 - Special Topics in Pharmacology Credits: 4
- PC 432 - Special Topics in Toxicology Credits: 3

Total Credits: 18

Pharmacy Practice and Pharmacy Administration

Mission

The mission of the department of pharmacy practice and pharmacy administration is to educate students, develop professionals and leaders, and perform innovative research and service in the practice and administration of pharmacy to advance the profession.

Optimal drug therapy can improve a patient's quality of life by curing or slowing the disease process, eliminating or reducing the disease symptoms, or preventing the disease or its symptoms. Assuming responsibility for a patient's drug therapy in order to achieve these goals is termed "pharmaceutical care." Through their understanding of drug actions and disease state management and the professional standards of pharmacy practice, doctor of pharmacy graduates will be able to collaborate with other healthcare professionals to ensure optimal drug therapy for all patients.

The department is dedicated to continually improving drug therapy and pharmaceutical care through the discovery, application, and dissemination of knowledge about drugs and drug use. Faculty members maintain a balance of teaching, advising, research, and service to the profession and to society. Innovative approaches to teaching emphasize problem solving and utilize state-of-the-art technology both in the classroom and in real patient care and other professional environments. The pharmacy practice and pharmacy administration curricula focus on enabling students to integrate knowledge of the biosciences, drugs, and diseases with that of social and administrative sciences in order to develop the requisite skills for ethical and effective contemporary pharmacy practice, or similar applications in the healthcare industry, and to stimulate a commitment to lifelong learning and service.

To facilitate their progression into the pharmacy administration graduate program, undergraduates may take graduate-level courses with permission of the graduate course instructors.

Pharmacy Practice

Description

Drug therapy is integral to both the prevention and treatment of diseases. Thousands of prescription and nonprescription drugs are available in the United States with more new drugs licensed every year. Advances in science and technology continuously lead to more complex drug entities. Although many drugs have a very positive impact on disease states, they also have the potential to be very toxic. Today, more than ever before, pharmacists play a crucial role in drug therapy management—collaborating with physicians, nurses, and other health professionals to ensure that every patient experiences a positive response without serious toxicity.

Innovative and expanded curricula in pharmacy schools prepare graduates to solve difficult therapeutic problems, prevent adverse drug effects, avoid medication errors and drug interactions, and ensure the integrity of pharmaceutical products. Pharmacists work with individual patients to educate them about their medications. Pharmacists are also responsible for monitoring patients for both desirable therapeutic effects and undesirable toxic effects, screening for health problems, assisting patients in the selection of over-the-counter medications, and answering medication and general healthcare-related questions. Many pharmacists also develop focused expertise in specialty areas such as geriatrics, pediatrics, nutrition, or cardiology. Others apply their expertise in pharmacotherapeutics to planning for the pharmaceutical care of large populations. Advanced academic degree programs available to pharmacists at USciences include graduate study leading to master's degrees in business administration,

public health, or biomedical writing, master of science degrees, or doctor of philosophy degrees.

Faculty

Does not include adjunct faculty.

A list is available from the department chair.

Cathy Y. Poon

BS (St. John's University); PharmD (Medical University of South Carolina)
Barbara H. Korberly Professor of Women's Leadership and Health
Chair, Department of Pharmacy Practice and Pharmacy Administration
Associate Dean, Interprofessional Education

Jessica Adams

PharmD (Albany College of Pharmacy)
Associate Professor of Clinical Pharmacy

Danielle M. Alm

PharmD (Rutgers University)
Assistant Professor of Clinical Pharmacy

Angela Bingham

PharmD (University of South Carolina)
Associate Professor of Clinical Pharmacy

Jane Bowen

PharmD (Rutgers University)
Associate Professor of Clinical Pharmacy

Lisa Charneski

PharmD (Wilkes University)
Associate Professor of Clinical Pharmacy
Assistant Dean, Curriculum

John E. Connors

BS (University of Wisconsin); PharmD (University of Kentucky)
Associate Professor of Clinical Pharmacy
Associate Provost, Academic Affairs

Justin Delic

PharmD (Duquesne University)
Assistant Professor of Clinical Pharmacy

George E. Downs

BS (University of New Mexico); PharmD (Philadelphia College of Pharmacy and Science)
Linwood F. Tice Professor of Clinical Pharmacy
Dean Emeritus, Pharmacy

Edward F. Foote

BS, PharmD (Philadelphia College of Pharmacy and Science)
Professor of Clinical Pharmacy
John Wyeth Dean, Philadelphia College of Pharmacy

Islam Ghazi

BS (Alexandria University); PharmD (University of Florida)
Assistant Professor of Clinical Pharmacy

Scott D. Greene

BS (Philadelphia College of Pharmacy and Science); MS (University of the Sciences)
Instructor of Clinical Pharmacy
Director, Experiential Programs

Diane Hadley

PharmD (Wilkes University)
Associate Professor of Clinical Pharmacy

Elizabeth M. Harris

BS; PharmD (University of Pittsburgh)
Assistant Professor of Clinical Pharmacy

James Hollands

PharmD (Wilkes University)
Associate Professor of Clinical Pharmacy
Vice Chair, Department of Pharmacy Practice and Pharmacy Administration

Madeline King

BA (University of Texas, Austin); PharmD (Texas A&M University)
Assistant Professor of Clinical Pharmacy

Katherine Koffer

BS (University of Pittsburgh); PharmD (Philadelphia College of Pharmacy and Science)
Assistant Professor of Clinical Pharmacy

Laura A. Mandos

BS (Ohio Northern University); PharmD (Northeastern University)
Professor of Clinical Pharmacy
Associate Dean, Student Affairs and Admissions, Philadelphia College of Pharmacy
Director, BS Program in Pharmaceutical and Healthcare Studies

Thaddeus McGinness

BS (Saginaw Valley State University); PharmD (University of Tennessee, Memphis/Knoxville)
Assistant Professor of Clinical Pharmacy

Karleen T. Melody

BS, PharmD (University of Pittsburgh)
Associate Professor of Clinical Pharmacy

Nicholas Owens

PharmD (University of Pittsburgh)
Assistant Professor of Clinical Pharmacy

Andrew M. Peterson

BS (Rutgers University); PharmD (Medical College of Virginia); PhD (University of the Sciences)
Professor of Clinical Pharmacy and Professor of Health Policy
Executive Director, Substance Use Disorders Institute and The John Wyeth Dean, Emeritus

Charrell Porter

BS, PharmD (Virginia Commonwealth University)
Assistant Professor of Clinical Pharmacy

Benjamin M. Pullinger

BS (Grove City College); PharmD (Temple University)
Assistant Professor of Clinical Pharmacy

Alice L. Scaletta

PharmD (Rutgers University)
Associate Professor of Clinical Pharmacy

Tyan Thomas

PharmD (University of Maryland, Baltimore)
Associate Professor of Clinical Pharmacy

Karen J. Tietze

BS (University of Kansas); PharmD (Philadelphia College of Pharmacy and Science)

Professor of Clinical Pharmacy

Daniel Ventricelli

PharmD (University of Connecticut)
Assistant Professor of Clinical Pharmacy

Laura H. Waite

PharmD (University of Texas, Austin)
Associate Professor of Clinical Pharmacy
Vice Chair, Department of Pharmacy Practice and Pharmacy Administration and Director, Student Recruitment and Engagement

Jason Zupec

PharmD (University of Cincinnati)
Assistant Professor of Clinical Pharmacy

Professional Staff

Kristin Motley

Coordinator, Experiential Education Compliance and Field Supervisor

Sondra Schultz

Experiential Field Supervisor

Michael Thomson

Coordinator, Introductory Pharmacy Practice Experience and Experiential Field Supervisor

Pharmacy – Postgraduate Training

Residencies

Residencies are organized, directed training programs in a defined area of pharmacy practice. Programs are generally for doctor of pharmacy graduates. The resident, under the supervision of a faculty preceptor, provides clinical pharmacy services while developing enhanced teaching and research abilities.

Fellowships

Fellowships, which are available for doctor of pharmacy graduates, are directed, highly individualized training programs to prepare the fellow to become an independent researcher. Training and limited service activities are incorporated into the program.

Positions

The residency position is a full-time commitment for one calendar year, typically beginning July 1. The fellowship position is a full-time commitment for two calendar years, typically beginning July 1. A competitive stipend is provided; fringe benefits and provisions for annual leave are also included.

Application

Applicants are required to submit a detailed curriculum vitae, three reference letters, college transcripts, and a statement of career goals. All applications are screened, and selected individuals are invited to personal interviews.

Further information on the Philadelphia College of Pharmacy postgraduate training programs may be obtained by writing to the director of residency and fellowship programs. See our website for more information.

Samson College of Health Sciences

Overview

The Samson College of Health Sciences provides six educational options. The mission of the Samson College of Health Sciences at USciences is to:

- Ensure high-quality standards in educational programs.
- Develop faculty expertise and excellence in areas of teaching, research and/or scholarly activities, and service.
- Assist students in acquiring the scientific and technological knowledge, competencies, and skills required for successful practice and advancement in their chosen profession.
- Provide an education that prepares students intellectually, culturally, and ethically for their professional and personal lives.
- Create an environment that fosters student-centered learning and living, as well as respect for individuals from diverse cultures.
- Cultivate a commitment to service for professionals and the community. Develop new academic programs consistent with the University's vision.
- Continually improve student learning and program quality through systematic assessment and quality improvements. Create, implement, and promote programs and treatments that maximize individual function in daily life.
- Create and disseminate new knowledge and skills in selected areas of inquiry in the health sciences.

The Samson College of Health Sciences educational options are:

- **BS in Exercise Physiology**—This bachelor's degree program combines a foundation in natural and social sciences with a concentration on clinical exercise physiology and training for athletic performance.
- **BS in Health Science**—The bachelor's degree in health science has two purposes: to offer an opportunity for students to gain knowledge and skills in a chosen aspect of healthcare and to serve as the academic foundation for occupational therapy, physical therapy, and physician assistant studies or other health profession programs.
- **Occupational Therapy**—The Department offers a clinical doctorate (drOT) and a Master's in occupational therapy (MOT). Students may enter a six-year program that provides an accelerated pathway via a bachelor's degree in health sciences (BSHS) into the clinical doctorate of occupational therapy (DrOT). Those students who hold a baccalaureate degree may enter into the three-year DrOT program or into the 2 1/2-year MOT program.
- **Physical Therapy**—The Department offers a clinical doctorate in physical therapy (DPT). Students may enter as freshmen and complete a six-year program, or enter after earning a bachelor's degree and finish the DPT in three years. Freshman students will earn both a bachelor's in health sciences as well as a DPT at the conclusion of six years.
- **Physician Assistant Studies Undergraduate**—This five-year program of study leads to a BS in Biomedical Sciences and a Master's in Physician Studies (MSPAS). A two-year program is offered for individuals with Bachelor's degrees who enroll in the MSPAS program.

Kinesiology

The Department of Kinesiology embraces the physical, practical, and behavioral aspects of wellness, sport, and exercise. Professionals in kinesiology apply this knowledge to educate clients, patients, and athletes in how to employ the best kind of exercise to improve health, well-being, and/or performance in exercise and sport. The department educates students in promoting healthy lifestyles through teaching, research, and service around the University and in the community. The Department of Kinesiology values diversity in all forms by appreciating people from all backgrounds, understanding movement from a wide range of perspectives, and fostering different types of thinking.

The Department of Kinesiology offers two bachelor of science programs. They are:

- Exercise Physiology
- Health Science

Faculty

Karin Richards

BS (North Carolina Wesleyan College); MS (Slippery Rock University); PhD (University of the Sciences)

Assistant Professor of Health Science
Chair, Department of Kinesiology

Patrick Davitt

BA (Rowan University); PhD (Rutgers University)
Assistant Professor of Kinesiology
Director, Health Science Program

Sinclair Smith

BS, MS (Virginia Polytechnic Institute & State University); ScD (Boston University)
Professor of Health Sciences
Dean, Samson College of Health Sciences

Monica Taylor

BS (University of Maine); MS (East Stroudsburg University); PhD (University of Pittsburgh)
Assistant Professor of Kinesiology
Director, Exercise Physiology

Exercise Physiology – Major

Mission

The mission of the bachelor of science in exercise physiology is to provide a foundation for students who want to learn about fitness, health, sports, recreation program management, exercise, and health and wellness promotion.

Vision

The vision is to prepare students to work in the fitness and health industry, helping individuals to use exercise, diet, and activities to create wellness and balance in living.

Goals

The exercise physiology program combines a strong foundation in the natural and social sciences with concentrated studies in how physical activity programs and wellness can improve health and well-being in a variety of individual lives. The program goals are to prepare graduates who can:

- Demonstrate knowledge of the sport, fitness, and recreation management fields.
- Apply knowledge and skills to real-life wellness, sport, wellness, fitness, and recreation programs.
- Communicate in a professional manner, using written, oral, and electronic methods.
- Demonstrate planning and organizational skills.
- Demonstrate awareness and appreciation of the humanistic and ethical aspects of fitness, wellness, and health service delivery.

Students who satisfy all curriculum requirements will earn a bachelor of science with a major in exercise science and wellness management. Exercise science and wellness management students must complete 124 credits for their degree. The curriculum includes an opportunity for independent work under the guidance of a faculty advisor. Students in other majors may minor in exercise science and wellness management if they meet USciences criteria for a 19-credit minor.

Overview of Major

The demand for exercise science and wellness management majors is expected to grow faster than average for all occupations through 2018, as individuals recognize the value of fitness, wellness, recreation, and leisure services. Demand will also increase because of attrition and retirement of present workers. As more employers recognize the benefits of fitness and wellness programs, they will demand more fitness and health managers to design and manage programs for their workers (www.bls.gov).

You will be prepared to pursue employment in positions such as:

- Medical fitness

- Corporate wellness
- Team marketing or management
- Activities, sport, and recreation director
- Fitness trainer or director
- Strength and conditioning coach
- Sport or recreation coach
- Health educator
- Health-related product sales
- Sport equipment sales

The program also serves as a preparation for further studies in a wide range of graduate educational curricula, including USciences' MS and PhD in health policy, MS in biomedical writing, DrOT, DPT, and MBA in pharmaceutical business programs.

Program Objectives:

- Knowledge of field:
 - Describe structure and function of the body.
 - Understand the multidimensional nature of wellness, including physical, social, emotional, spiritual, environmental, career, and community aspects of wellness.
 - Design programs that help individuals prevent illness and injury and maintain their health.
 - Design programs that promote health and active living.
- Communication:
 - Communicate in a professional manner, using written, oral, and electronic methods.
- Planning and learning:
 - Use information technology to seek information and skills.
 - Utilize effective planning and organizational skills.
- Human dimension:
 - Demonstrate awareness and appreciation of the humanistic and ethical aspects of fitness and health service delivery.
 - Demonstrate awareness and appreciation of 'soft skills' such as building rapport, expressing empathy, motivating others, and building individual and community engagement.
- Application of knowledge and skills:
 - Select a target area or project and design appropriate services for the population and a strategy for marketing and funding the program.

Program Description

The exercise physiology major is a unique combination of fitness, health, and management courses. Learning will begin with a foundation in science and a consideration of how the body works. Wellness is emphasized rather than illness and pathology. An internship experience facilitates the integration of all program requirements. The program prepares students for a career in a variety of health and fitness settings. For specialized and advanced practice areas, students can seek additional certifications under the supervision of their advisor and instructors.

Requirements for the Bachelor of Science in Exercise Physiology Degree

Exercise science and wellness management majors must complete a minimum of 124 credit hours and satisfy requirements for a BS degree. The credit hours will be distributed as follows:

General Education and Other Foundational Courses (62 credits)

Exercise science and wellness management students complete the following general education and other foundational courses:

- Free Electives Credits: 12
- General Education Humanities Discipline Requirements Credits: 6
- Multidisciplinary Inquiry Requirements Credits: 6

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- MA 110 - General Calculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Foundational Courses in Health Sciences (15 credits)

Students must complete 15 credits in foundational courses in or related to health sciences. These credits will be distributed as follows:

- HS 110 - Seminar for Health Sciences Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1

Natural Science (8 Credits)

Courses must be numbered 200 or above. Recommended courses include:

- BS 205 - Human Structure and Function I Credits: 3
and
- BS 206 - Human Structure and Function II Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
and
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- PY 200 - Survey of Physics Credits: 4
or
- PY 201 - Introductory Physics I Credits: 4

Research (6 Credits)

Courses may include:

- FT 350 - Research Methods in Kinesiology Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
and
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- SS 400 - Qualitative Methods in Social Science Credits: 3
- ST 310 - Biostatistics I Credits: 3

Fieldwork (3 credits)

- HS 410 - Fieldwork Credits: 3

Health Science Courses (24 credits)

Exercise science and wellness management majors will be required to take 24 credits from courses relevant to health science.

Suggested courses include but are not limited to:

- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- FT 360 - Fitness and Sports Nutrition Credits: 3
- HS 400 - Interprofessional Education Credits: 2
- PS 200 - Psychology of Human Development Credits: 3
- SO 322 - Sociology of Health Credits: 3
- SO 344 - Drugs, Society, and Behavior Credits: 3
- SO 347 - Death and Dying Credits: 3
- SO 348 - AIDS and Society Credits: 3

Concentration (20 credits)

Exercise science and wellness management students are required to choose 20 credits from the following courses:

- FT 190 - CPR/AED/First Aid Professional Rescuer Credits: 3
- FT 310 - Ethics in Sport Credits: 3
- FT 320 - Sport Psychology Credits: 3
- FT 360 - Fitness and Sports Nutrition Credits: 3
- FT 380 - Intro to Kinesiology Credits: 3
- FT 400 - American Council on Exercise Personal Trainer Certification Credits: 3
- FT 450 - Prevention and Care of Athletic Injuries Credits: 3
- FT 460 - Health and Wellness Credits: 3
- FT 480 - Fitness, Sport and Health Management Credits: 3
- FT 481 - Fitness and Health Management Internship I Credits: 3
- FT 482 - Fitness and Health Management Internship II Credits: 3

Special Certification/Special Requirements

- Students will be highly encouraged to complete First Aid and CPR certification.
- Students are required to seek certification in a specialty area that is congruent with their interests and field experiences. Examples are Certified Strength and Conditioning Specialist (CSCS), Certified Wellness Practitioner (CWP), or Human Fitness Specialist (HFS).

Sample Exercise Physiology (BS) Curriculum Plan

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PS 101 - Introduction to Psychology Credits: 3

- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- SO 101 - Introduction to Sociology Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Year

Fall Semester

- Free Elective Credits: 3
- General Education Humanities Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- BS 205 - Human Structure and Function I Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1

Credits/Semester: 16

Spring Semester

- Free Elective Credits: 6
- General Education Humanities Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- BS 208 - Human Structure and Function II Laboratory Credits: 1

Credits/Semester: 16

Third Year

Fall Semester

- Health Science Elective Credits: 3
- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- FT 190 - CPR/AED/First Aid Professional Rescuer Credits: 3
- FT 460 - Health and Wellness Credits: 3
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Spring Semester

- Free Elective Credits: 3
- FT 350 - Research Methods in Kinesiology Credits: 3
- FT 360 - Fitness and Sports Nutrition Credits: 3
- FT 480 - Fitness, Sport and Health Management Credits: 3

Credits/Semester: 19

Fourth Year

Fall Semester

- Health Science Elective Credits: 6
- FT 481 - Fitness and Health Management Internship I Credits: 3
- HS 400 - Interprofessional Education Credits: 2
- PY 200 - Survey of Physics Credits: 4
- or
- PY 201 - Introductory Physics I Credits: 4

Credits/Semester: 15

Spring Semester

- Health Science Elective Credits: 9
- FT 482 - Fitness and Health Management Internship II Credits: 3
- HS 410 - Fieldwork Credits: 3

Credits/Semester: 15

Total Minimum Credits: 124

Exercise Physiology – Minor

The minor in Exercise Physiology is one of the University's most popular minors. Many physical therapy, occupational therapy, pharmacy, and other majors find the minor rounds out what they are learning by adding to their skill set and diversifying what they are able to present to potential employers. With its focus on overall well-being, the minor is a natural complement to many of the University's health sciences-related majors.

The minor in Exercise Physiology requires 18 credits, earned in six courses. We offer a flexible program - students can fulfill the requirements by combining any of the Exercise Science (FT) courses. Students are encouraged to work with their minor advisor to create a program of study that complements their major and furthers their career goals. Students must also consult with their major advisor to determine a timeline for completion.

For more information on applying for and completing a minor, please see Minors in the Academics section of this catalog.

Required Courses (13 credits)

- FT 360 - Fitness and Sports Nutrition Credits: 3

- FT 460 - Health and Wellness Credits: 3

Elective Courses (6 credits)

Select six additional credits from exercise sciences courses.

Health Science – Major

Mission

The mission of the health science program is to provide a broad foundation for a career in healthcare and science. The program has two purposes: to offer an opportunity for students to gain knowledge and skills in a chosen aspect of healthcare and to serve as the academic foundation for occupational therapy, physical therapy, and physician assistant studies program.

Overview

This program combines a strong foundation in natural and social sciences with concentrated studies applying these principles to the health sciences. Students who complete this program can seek employment as members of the administrative staff of hospital and health system clinics, medical offices, health maintenance organizations and other medical insurers, and community health programs. They will also be prepared to continue their studies in the full range of health science graduate educational curricula.

While a portion of the curriculum for the bachelor of science in health science is based on required courses, the student is given the opportunity to establish, under the guidance of an academic advisor, an individualized curriculum focused in an area of health science. Students may enter this program as freshmen or as transfer students from other health and science-related programs at USciences or from other colleges or universities.

Program Description

The broad-based curriculum in health science offers a range of educational experiences that can be tailored to support a student's personal goals or prepare a student for a post-baccalaureate degree program in another field. Students may enter the BSHS program in the freshman year or transfer into the program at any point but must meet the program's University's requirements for graduation. Students who complete the bachelor of science in health science will have successfully completed educational experiences that prepare them to:

- Communicate in a professional manner, using written, oral, and electronic methods.
- Display professional behavior.
- Use medical terminology accurately and appropriately.
- Identify components of wellness, prevention, and health promotion.
- Describe the normal structure and function of the major body systems and the impact of diseases.
- Demonstrate awareness and appreciation of the humanistic and ethical aspects of health service delivery.
- Use bibliographic services and information technology to locate resources.
- Critically analyze research design and methodology and interpret research findings with regard to case study analysis.
- Discuss the current societal, governmental, and business issues concerning their selected area of study in health science.
- Provide services in their selected area of study as a health educator, health administration manager, researcher/scientist or in other health-related careers.

The health science degree program offers a flexible but directed opportunity for students to complete their bachelor's degree. Qualified students admitted to the freshman year may identify the health science degree program as their major field of study.

Students may transfer into the program at any point but must meet the program requirements to be eligible for graduation. Students are required to complete all other University requirements for graduation.

Program Policies

- All students enrolled in the BSHS in health science program must fulfill a residency requirement of a minimum of two years (4 full semesters) at the University, including a minimum of one full semester as a BSHS major, in order to graduate. Students enrolled in integrated BSHS OT/PA/PT programs are exempt from this requirement.
- All students enrolled in the BSHS in health science program must complete a minimum of 30 credits at the University in order to graduate. A minimum of 124 approved credits is required to earn a bachelor's degree.

Health Science (BSHS) Requirements

General Education and Electives (62 credits)

All USciences students must complete the general education curriculum, including 12 credits of free electives. A description of the general education curriculum may be found elsewhere in this catalog.

Health Science Electives (45 credits)

Health science courses deal with topics that directly relate to normal and abnormal human development, structure, and function. These courses may also relate to healthcare delivery, or they may be approved courses that facilitate the development of health science competencies.

Students currently enrolled in a health science professional program at USciences who transfer to the bachelor of science in health science program may be able to fulfill all or part of this requirement with courses already completed toward their former USciences major. Some examples are:

- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- FT 360 - Fitness and Sports Nutrition Credits: 3
- HS 210 - Health and Social Participation Credits: 3
- HS 320 - Leadership in Service to the Community Credits: 3
- PS 200 - Psychology of Human Development Credits: 3
- PS 201 - Adolescent Psychology Credits: 3
- SO 206 - Alcohol-Chemical Dependency Credits: 3
- SO 310 - Sociology of Work and Professions Credits: 3
- SO 321 - Health Care Admin Credits: 3
- SO 322 - Sociology of Health Credits: 3
- SO 346 - Social Gerontology Credits: 3
- SO 347 - Death and Dying Credits: 3
- SO 348 - AIDS and Society Credits: 3
- SS 300 - Social Epidemiology Credits: 3
- SS 305 - Intercultural Communication Credits: 3

Fieldwork (3 credits)

- HS 410 - Fieldwork Credits: 3

Additional Foundational Courses for BSHS

Natural/Social Sciences (8 credits)

- To include a two-course, 8 credit sequence

Research Design/Methods (6 credits)

- FT 350 - Research Methods in Kinesiology Credits: 3
- SS 221 - Research Design & Statistical Analysis I Credits: 4
- SS 222 - Research Design & Statistical Analysis II Credits: 4
- SS 400 - Qualitative Methods in Social Science Credits: 3
- ST 310 - Biostatistics I Credits: 3

Plan of Study

Students who are enrolled in the program must develop a comprehensive plan of study in conjunction with their academic advisor by the end of their third year of study. The plan must include a proposed timeline and specific list of courses to meet all requirements. The plan of study must be approved by the director of the BSHS program in health science. The student must also develop a proposal for fieldwork by the end of their third year of study, which must be approved by the director of the BSHS program in health science.

Sample Health Science (BSHS) Curriculum Plan

First Year

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- SO 101 - Introduction to Sociology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1
- MA 110 - General Calculus Credits: 3
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Year

Fall Semester

- Four-credit science with Lab Credits: 4
- Humanities Discipline Requirement Credits: 3
- HS Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CO 101 - Introduction to Communication Credits: 3

Credits/Semester: 19

Spring Semester

- Free Elective Credits: 6
- Humanities Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- Four-credit science with Lab Credits: 4

Credits/Semester: 16

Third Year

Fall Semester

- HS Natural Science Credits: 4
- HS Research I Credits: 3
- HS Elective Credits: 9

Credits/Semester: 16

Spring Semester

- HS Natural Science Credits: 4
- HS Research II Credits: 3
- HS Electives Credits: 9

Credits/Semester: 16

Fourth Year

Fall Semester

- HS Elective Credits: 16

Credits/Semester: 16

Spring Semester

- HS Elective Credits: 9
- HS Requirement Credits: 3
- HS 410 - Fieldwork Credits: 3

Credits/Semester: 15

Total Minimum Credits: 124

Occupational Therapy

Mission

The USciences' Occupational Therapy Department considers its basic mission to serve the health needs of the community through the preparation of occupational therapy graduates who will practice in a broad range of healthcare settings, including clinics, hospitals, homes, schools, and community settings, in both traditional and emerging practice areas. The department is committed to improving health care by expanding the knowledge base and skills of occupational therapists.

Graduates will use goal-directed occupations or activities to promote an individual's, group's, or population's adaptation to biological, psychological, and/or contextual factors that have interrupted a person's life course.

The Occupational Therapy Department is dedicated to developing therapists who will provide service to others, both in healthcare and in the community, in response to current societal needs. Towards this end, service will be encouraged in the curriculum to give students a model for initiating interventions in the community setting and providing occupational therapy outside of the boundaries of traditional reimbursable service.

Occupational Therapy Department Statement on Diversity, Equity, and Inclusion

From the American Association of Colleges and Universities (AAC&U): Making Excellence Inclusive is AAC&U's guiding principle for access, student success, and high-quality learning. The AAC&U defines inclusion as the active, intentional, and ongoing engagement with diversity—in the curriculum, in the cocurriculum, and in communities.¹

From the American Occupational Therapy Association's (AOTA) Statement on Occupational Therapy's Commitment to Diversity, Equity, and Inclusion: AOTA affirms the inalienable right for every individual to feel welcomed, valued, a sense of belonging, and respected while accessing and participating in society, regardless of the internal or external factors that make every individual unique.²

From The University of the Sciences Department of Occupational Therapy Student Handbook: The foundation of education delivered by the USciences Occupational Therapy Department begins with the humanistic belief in the sanctity and dignity of every individual, and the respect for diversity, equity, and inclusion.³

The University of the Sciences Occupational Therapy Department embraces diversity, equity, and inclusion, and recognizes our responsibility to actively and intentionally foster an open, welcoming environment where students and faculty of all identities can collaboratively learn, work, and serve. You belong here.

References:

1. American Association of Colleges and Universities. (n.d.). Making Excellence Inclusive. <https://www.aacu.org/making-excellence-inclusive>.
2. American Occupational Therapy Association. (2020). Occupational therapy's commitment to diversity, equity, and inclusion. *American Journal of Occupational Therapy*, 74(Suppl. 3). <https://www.aota.org/~media/Corporate/Files/Practice/Manage/ajot74S3002DiversityEquityInclusionStatement.pdf>.
3. University of the Sciences Occupational Therapy Department. (2019). The University of the Sciences Department of Occupational Therapy Student Handbook: Philosophy of the occupational therapy department. Philadelphia, PA.

Overview of Profession

Occupational therapy is a health profession focused on helping clients develop the functional capacity to live independently, care for personal needs, and participate in work, school, or community activities. Occupational therapists provide services to individuals with impaired physical, cognitive, developmental, sensory, or emotional abilities and to individuals, groups, and populations who have or are at risk for dysfunction due to developmental changes or contextual factors. Some of the most common disabling conditions treated by occupational therapists are stroke, spinal cord injuries, and other neurological conditions, arthritis, developmental disabilities, learning disabilities, autism, hand injuries, depression, and mental illness.

Occupational therapists help clients to engage in desired activities more safely and independently. For example, occupational therapists may assist clients to gain/regain the ability to dress, safely prepare a meal, play in an age-appropriate manner, navigate throughout the community, or drive safely. Occupational therapists may help clients improve their motor skills, self-esteem, or social interaction skills. Adaptive equipment and modifications to the home or work environment may also be incorporated into

treatment to enhance performance in personal care, home management, job requirements, and leisure activities.

Occupational therapists work with clients of all ages, from infants to older adults. They use a variety of activities to foster feelings of mastery in their clients, such as preparing a meal using adapted recipes and kitchen tools or setting up a play experience so a child with sensory abnormalities can feel his/her body movements without being overwhelmed.

The work environment of occupational therapists is as varied as the kinds of clients they treat. OT services may take place in a hospital, school, community, work, home, or virtual environment.

These are just a few examples of the types of settings where occupational therapists work:

- In a school situation, an occupational therapist may help a child develop the skills needed to integrate and organize perceptual, motor, and sensory information for learning.
- In a community setting, the therapist may focus on wellness and establish a gardening group for elders or a game group for adults with developmental disabilities that will be led by volunteers.
- Therapists may teach a shelter resident with limited cognitive abilities how to use public transportation so he/she/they can find employment or work with nurses in developing teaching materials to give to cognitively impaired teenagers who need to learn health promotion skills.
- Therapists working in homecare enter the homes of clients and may teach strategies for dressing, cooking, bathing, and social activities that lead to increased independence.

Occupational therapy is a fast-growing profession. The need for occupational therapists is sure to increase as medical science discoveries continue to save and prolong lives. These advances will result in greater numbers of individuals who have functional limitations. The increased recognition of developmental and learning disabilities in children and the increase in the aging population have also increased the demand for occupational therapists.

Primary areas of employment include public or private schools, early intervention programs, facilities for the elderly, rehabilitation and general hospitals, and psychiatric or mental health institutions. Others work for home health agencies, wellness centers, private practices, and colleges and universities.

Department Overview

The Department of Occupational Therapy offers three-degree pathways in occupational therapy: 2 doctoral levels and 1 master level. The accelerated pathway to the Doctor of Occupational Therapy is a six-year program leading to a Bachelor of Science in Health Science and Doctor of Occupational Therapy. The Doctor of Occupational Therapy is also available as a three-year condensed program for students who have already completed a baccalaureate degree. The Master of Occupational Therapy program is available as 2 years of study, and a fieldwork component for students who have already completed a baccalaureate degree.

Courses in the DrOT and MOT Program are delivered primarily onsite, with lab and fieldwork experiences required off-site in the community, and two courses delivered fully online. Students are required to complete two Level II fieldwork courses for a total of 24 full-time equivalent weeks off-site in the community at the completion of the program.

It is required that students have internet access and satisfactory computer skills to complete course requirements. All students are required to complete the specified orientation course to the University's learning management system.

Curriculum Overview

The occupational therapy curriculum is based on active learning. Students will integrate knowledge, skills, and attitudes by experiential learning or "doing." The biopsychosocial foundation of the professional program will encourage graduates to view the occupational nature of humans from four perspectives: the **individual**, groups, and populations with biological, psychological, and sociological abilities and limitations, is central to treatment and must determine the meaning and purpose of care; the **family and caregivers** provide the vital link between the individual and health services; the **home and community** provide a context for treatment and the development of values, beliefs, and interests; and, finally, the **social system** in which care is offered establishes boundaries for delivery, use of resources, available roles and opportunities, and norms and rewards for behavior. Curricular threads include cultural humility, innovations, leadership, engagement, and clinical reasoning.

Students who successfully complete the curriculum will be able to:

- View consumers of occupational therapy services as individuals with unique values, beliefs, and concerns that impact occupational performance.
- Design and deliver humanistic, ethical, and high-quality occupational therapy services to individual clients and their family/caregivers.
- Design occupation-based programs that address unmet and emerging societal needs. Design population-based programs that reflect unmet and emerging community needs.
- Integrate community, technological, and educational resources into treatment and program planning, design, and management.
- Successfully work in partnership with individuals from diverse cultures.
- Collaborate skillfully with clients, professional and nonprofessional colleagues, families, and community members. Effectively communicate ideas, concerns, goals, and plans to colleagues, supervisors, and managers, as well as clients, families, and care providers, using written and spoken language.
- Demonstrate the ability to effectively engage in the supervisory process. Demonstrate the ability to be a reflective individual.
- Understand the influence of the social, political, and environmental climate on the client and practice.
- Understand and successfully practice in complex environments where occupational therapy services are provided. Advance the knowledge base of occupational therapy through participation in scholarly activities.
- Provide service to the community. The community includes the University; national, state, and local occupational therapy organizations; and other institutions and organizations of interest.
- Recognize the need to pursue continual professional development and display the ability to seek out appropriate resources.

Faculty

Wendy E. Walsh

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Chair, Department of Occupational Therapy

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Occupational Therapy – Post-Baccalaureate MOT

The Master of Occupational Therapy (MOT) program is available to students who have already completed a baccalaureate degree. Students may enter this post-baccalaureate professional program if they satisfactorily meet the prerequisite requirements. Upon successful completion of this 2-year full-time program, and a fieldwork component, they are granted the degree of Master of Occupational Therapy (MOT).

The curriculum for the post-baccalaureate MOT degree is based on a broad foundation of natural science, social science, and humanities obtained in the undergraduate years. The professional component of the curriculum utilizes the broader learning base and builds onto it through the theories of occupation and occupational therapy, which emphasize the importance of meaning and purpose in goal-directed activities or occupations. The courses actively engage students in experiential learning so that knowledge, skills, and attitudes are integrated by "doing."

In addition to instruction provided by occupational therapy and other university faculty, the resources of clinical affiliates in community centers, community outreach programs, long-term care facilities, hospitals, rehabilitation centers, and schools in the greater Philadelphia area and other U.S. states will be used for many clinical experiences. Students are required to complete a minimum of 24 weeks full-time equivalent of level II fieldwork that is scheduled throughout the United States.

All states in the United States require a license to practice occupational therapy. Each state also has specific legislation describing the process for obtaining a license to practice and specific licensure application requirements. The primary criterion for obtaining a license in any state is graduating from an accredited OT program and passing the National Board for Certification in Occupational Therapy (NBCOT) examination. In order to be eligible to take the certification exam, you must complete all MOT program requirements and all fieldwork must be satisfied within eighteen months of completion of the academic work. Currently, a master's degree in occupational therapy is the minimum degree level required of those entering the field.

Please note that a felony conviction may delay or prohibit fieldwork placement, certification through NBCOT, and could prevent state licensure.

The post-baccalaureate MOT program is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 6116 Executive Boulevard, Suite 200, North Bethesda, MD, 20852-4929. ACOTE's telephone number c/o AOTA, is 301-652-AOTA, and its web address is WWW.ACOTEONLINE.ORG. ACOTE is recognized by the U.S. Department of Education.

Post-Baccalaureate Admission Criteria to the MOT

Students who have earned a bachelor's degree prior to the start of the program may be eligible for entrance into the MOT program.

Program Admission Criteria

To be considered for admission to the post-baccalaureate MOT program, a student must:

- Have an earned baccalaureate degree from a recognized institution of higher learning. Have completed the following prerequisite course requirements:
 - Anatomy and Physiology, with lab (7 credits)
 - Abnormal Psychology (3 credits)
 - Sociology or Cultural Anthropology (3 credits)
 - Physics, with or without lab (3 credits)
 - Psychology of Human Growth and Development (developmental psychology course that covers the whole human lifespan) (3 credits)
 - Statistics (3 credits)
 - Medical Terminology (2 credits)
- This highly competitive program currently has a minimum cumulative baccalaureate GPA of 3.00 and a 3.00 for prerequisite courses listed above.
- Occupational Therapist Centralized Application Service (OTCAS) application requires 2 letters of recommendation (letters from OT Practitioners are highly preferred).
- Applicants are required to have 50 hours of documented volunteer/observation experience in occupational therapy with a licensed occupational therapy practitioner.
- Provide a statement as to why the student wants to enter the profession of occupational therapy. Within this statement, applicants are expected to demonstrate their knowledge and understanding of occupational therapy gained from observation, reading, and personal or family experiences.

Students may get credit for the above courses through the CLEP process.

Please note that the program begins with a summer session in late May. Prerequisites must be completed by the start of the summer session. Traditionally, courses in the MOT Program are delivered primarily on-campus. Fieldwork experiences are held on and off-campus in the community. It is required that students have internet access and satisfactory computer skills to complete course requirements. All new incoming MOT students are required to complete "D2L – Student orientation" to assist with online learning throughout the program.

Post-Baccalaureate MOT

Program Retention Policy

Students must achieve a minimum grade of "C" (or "P" in pass/fail courses) in all courses with the prefix OT in order to progress in the OT curriculum. If the student earns a "C-" or "D" grade ("D+," "D," "D-") in a course with the prefix OT, the student must

repeat the course, earning a grade of "C" or better. The student will be unable to progress to any course for which that course is a prerequisite until the grade of "C" or better is earned. This may impact full-time status and progression in fieldwork and delay the student's overall progress in the curriculum.

A student may attempt an OT course a maximum of two times to achieve a grade of "C" or higher. An attempt is defined as registered for the course at the end of the drop/add period. If the student does not achieve the required "C" or better grade in the OT course after attempting the course a second time, the student will be dismissed from the program. Students may reattempt no more than two courses with an OT prefix.

If a student receives a grade of "F" in any course with an OT prefix, the student will be administratively withdrawn from the University. Further, if a student receives two grades of "C-" or "D" ("D-," "D," "D+") in one semester, he/she will be administratively withdrawn from the University.

Students must maintain a minimum semester GPA of 3.00 throughout the professional curriculum. Students who fail to achieve a minimum semester GPA of 3.00 will be placed on program probation at the end of the semester. This includes summer semesters in which the student is enrolled in coursework specified in the MOT curriculum plan. A student who received a third program probation will be administratively withdrawn from the University. Students may not participate in Level II fieldwork while on program probation. **Program probation that delays Level II fieldwork will result in a revised schedule, impact financial aid status and cost, and a delay in graduation.**

Administrative Withdrawal

Any student who is administratively withdrawn from the academic portion of the program may petition the faculty, through the Chair, to be readmitted after a period of one year and no more than 2 years. The student must demonstrate a clear rationale as to why they should be readmitted to the program. **There is no obligation for the faculty to readmit a student who has been administratively withdrawn from the program. A student accepted back in the program will be required to complete the failed course(s) and/or an action plan at the discretion of the faculty.**

Fieldwork Withdrawal Policy

A student may withdraw at any point from a level I or II fieldwork course for extenuating circumstances only and at the discretion and consent of the Fieldwork Education Team. In accordance with the University policy, a student who withdraws without prior approval will receive an F for the course. Examples of extenuating circumstances include but are not limited to: accident, injury, illness requiring hospitalization, and distress from bereavement.

Fieldwork Completion Time

Students are required to complete all Level II fieldwork within 18 months of completing didactic coursework.

Graduation Requirements

To qualify for the MOT degree, students must successfully complete all required courses. The MOT program takes 2 1/2 years to complete, including summer courses.

Post-Baccalaureate MOT Major Degree Requirements

- OT 405 - Overview of Occupational Therapy Practice Credits: 2
- OT 500 - Level I Experiences Seminar Credits: 1
- OT 502 - Human Development & Occupational Performance (with Lab) Credits: 3
- OT 508 - Movement Analysis Credits: 3
- OT 510 - Neuroscience Credits: 4
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 531 - Clinical Medicine Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3

- OT 562 - Theories of Occupational Therapy Credits: 3
- OT 572 - Clinical Management and Supervision Credits: 3
- OT 590 - Fieldwork Level 1: Clinical Experience Credits: 1
- OT 615 - Therapeutics Groups Credits: 3
- OT 620 - Fieldwork Level 1: Clinical Fieldwork Credits: 1
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 6XX - Occupational Therapy Interventions V: Rehabilitative Approaches with lab Credits: 4
- OT 660 - Applied Research II Credits: 3
- OT 665 - Applied Research III Credits: 3
- OT 668 - Evidence Based Practice Credits: 3
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2
- OT 682 - Fieldwork Level I: Community Client Credits: 1
- OT 694 - Fieldwork Level IIa Credits: 9
- OT 6XX - Fieldwork Level IIb Credits: 9

MOT Curriculum Plan

For students who have completed a baccalaureate degree.

First Year

Summer Semester

- OT 405 - Overview of Occupational Therapy Practice Credits: 2
- OT 510 - Neuroscience Credits: 4

Credits/Semester: 6

Fall Semester

- OT 500 - Level I Experiences Seminar Credits: 1
- OT 502 - Human Development & Occupational Performance (with Lab) Credits: 3
- OT 508 - Movement Analysis Credits: 3
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 562 - Theories of Occupational Therapy Credits: 3

Credits/Semester: 16

Spring Semester

- OT 531 - Clinical Medicine Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3
- OT 590 - Fieldwork Level 1: Clinical Experience Credits: 1
- OT 615 - Therapeutics Groups Credits: 3
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2

Credits/Semester: 15

Second Year

Summer Semester

- OT 6XX - OT Interventions I: Contextual Approaches with lab Credits: 4
- OT 682 - Fieldwork Level I: Community Client Credits: 1

Credits/Semester: 5

Fall Semester

(Elective courses may be taken at this time or during the following spring, summer, or fall session)

- OT 572 - Clinical Management and Supervision Credits: 3
- OT 623 - Fieldwork I: Community Service Learning Credits: 1
- OT 6XX - Occupational Therapy Interventions III: Psychosocial Issues Credits: 4
- OT 6XX - Occupational Therapy Interventions IV: Developmental Issues with lab Credits: 4
- OT 668 - Evidence Based Practice Credits: 3

Credits/Semester: 15

Spring Semester

- OT 620 - Fieldwork Level 1: Clinical Fieldwork Credits: 1
- OT 6XX - Occupational Therapy Interventions V: Rehabilitative Approaches with lab Credits: 4
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 6XX - OT Elective/Ind. Study Credits: 3

Credits/Semester: 14

Third Year

Summer Semester

- OT 694 - Fieldwork Level IIa Credits: 9

Credits/Semester: 9

Fall Semester

- OT 6XX - OT Fieldwork Level IIb Credits: 9

Credits/Semester: 9

Total Credits: 89

Note:

The program requires the completion of one elective or independent study course. There is some flexibility as to when students may take this course.

Occupational Therapy –Doctor of Occupational Therapy (DrOT: Accelerated Pathway or Post-Baccalaureate Pathway)

University of the Sciences offers a doctor of occupational therapy (DrOT) degree. Students are eligible to begin coursework in the program at one of two entry points: Accelerated Pathway (undergraduate entry; BSHS/DrOT) and Post Baccalaureate (PBDrOT).

NOTE: Beginning Fall of 2019 the DrOT Accelerated Pathway has transitioned to a new format (3 undergraduate years/3 professional years). Post-Baccalaureate Pathway entry in Fall of 2020 will remain in the 4-year completion cycle. In order to align with the DrOT Accelerated Pathway, starting in Fall 2021, the Post-Baccalaureate Pathway will transition to this new curriculum. Please see the curriculum within this section for more information.

The curriculum for the first 3 years of the Accelerated Pathway to the DrOT program (BSHS/DrOT) provides a broad foundation of natural science, social science, and humanities upon which the professional courses are structured. The professional component of the curriculum is based on the theories of occupation and occupational therapy, which emphasize the importance of meaning and purpose in goal-directed activities or occupations. The courses will actively engage the student in experiential learning so that knowledge, skills, and attitudes are integrated by "doing."

The post-baccalaureate doctor of occupational therapy (PBDrOT) program is for students who hold an earned bachelor's degree in one of the sciences, sociology, psychology, or other related fields. Students attend class full-time and must complete 122 hours of coursework dependent on entry year. The professional component of the curriculum is based on the theories of occupation and occupational therapy, which emphasize the importance of meaning and purpose in goal-directed activities or occupations. The courses will actively engage the student in experiential learning so that knowledge, skills, and attitudes are integrated by "doing."

In addition to instruction provided by occupational therapy and other University faculty, the resources of clinical affiliates in community centers, community outreach programs, long-term care facilities, hospitals, rehabilitation centers, and schools in the Greater Philadelphia area and neighboring states will be used for many clinical experiences. Students are required to complete a minimum of 24 weeks of full-time level II fieldwork that may be scheduled throughout the United States. In addition, doctoral students complete a 14-week mentored experience, which may also be scheduled throughout the United States. The student must successfully complete all coursework and level II fieldwork, and pass a competency requirement prior to the commencement of the doctoral component. Please note that prior fieldwork or work experience may not be substituted for the doctoral experiential component. In the event that a current work setting is used to satisfy the 14-week requirement, the student must develop a plan in collaboration with the fieldwork coordinator to ensure that additional experiential activities are conducted at the worksite to meet the requirements of the in-depth doctoral experiential component.

All states in the United States require a license to practice occupational therapy. Each state also has specific legislation describing the process for obtaining a license to practice and specific licensure application requirements. The primary criterion for obtaining a license in any state is passing the National Board of Certification in Occupational Therapy Examination (NBCOT). In order to be eligible to take the certification exam, students must complete DrOT program requirements and all fieldwork must be satisfied within eighteen months of completion of didactic coursework. Part-time completion of the doctoral capstone experience will be considered under extenuating circumstances only and shall delay graduation.

Please note that a felony conviction may delay or prohibit fieldwork placement, certification through NBCOT and could prevent state licensure.

The **doctor of occupational therapy (DrOT)** program is fully accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at 6116 Executive Boulevard, Suite 200, North Bethesda, MD, 20852-4929. ACOTE's telephone number c/o AOTA, is 301-652-AOTA, and its web address is WWW.ACOTEONLINE.ORG. ACOTE is recognized by the U.S. Department of Education.

Program Admission Criteria – Accelerated Pathway

Qualified students admitted to the freshman year will be able to identify occupational therapy as their major field of study. Students in the Accelerated BSHS/DrOT program who achieve a minimum cumulative GPA of 3.0 AND a cumulative GPA of 3.00 in prerequisites for the DrOT program (identified below) by the end of the spring semester of their third undergraduate year are guaranteed a place in the professional phase of the occupational therapy curriculum.

Applicants from other undergraduate majors and transfer students are also welcome. The grade level to which transfer students are assigned will depend on the prerequisites they have completed, but the minimum residency requirement is four years. All conditions regarding guaranteed admission into the professional curriculum also apply to transfer students admitted to the first or second year.

In addition to the academic and personal qualifications required of students applying for the program, transfer applicants will also be expected to demonstrate their knowledge and understanding of occupational therapy gained from observation, reading, and personal or family experiences with occupational therapy practice. Applicants are required to have volunteer/observation experience in occupational therapy.

In order to progress in the DrOT program, students in the accelerated pathway must:

- Earn the BSHS degree at University of the Sciences.
- Obtain a cumulative GPA of 3.0 or higher in University of the Sciences' BSHS program.
- Obtain a cumulative GPA of 3.00 or higher in courses in the BSHS program that serve as prerequisites for the DrOT program.

Courses in the DrOT Program are delivered primarily onsite, with lab and fieldwork experiences required off-site in the community.

It is required that students have internet access and satisfactory computer skills to complete course requirements. As of 2020, all new incoming DrOT students are required to complete "D2L – Student orientation" to assist with on-line learning throughout the program.

The following are prerequisite courses for the DrOT program:

- Medical Terminology Credits: 2
- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- OT 112 - Overview of OT Practice I Credits: 1
- OT 115 - Overview of OT Practice II Credits: 1
- PS 200 - Psychology of Human Development Credits: 3
- PS 347 - Abnormal Psychology Credits: 3
- PY 200 - Survey of Physics Credits: 4
- SO 101 - Introduction to Sociology Credits: 3
- ST 310 - Biostatistics I Credits: 3
- WR 308 - Writing for the Health Professions Credits: 3
- or
- WR 302 - Scientific Writing Credits: 3

Program Admission Criteria – Post-Baccalaureate Pathway

Applicants with a bachelor's degree will be required to enter the program with some basic preparation for the professional Doctorate in Occupational Therapy (DrOT) program. This includes the following prerequisite courses:

- 2 semesters of anatomy and physiology
- 1 semester of abnormal psychology

- 1 semester of either sociology or cultural anthropology
- 1 semester of physics (with or without a lab)
- 1 semester of statistics
- 1 semester of human growth and development through the life span
- Medical terminology course – minimum 2 credits
- Obtain a minimum cumulative GPA of 3.00 in the baccalaureate degree program AND in the prerequisite requirements.
- 50 hours of shadowing experience in OT
- Minimum of 2 letters of recommendation (OT practitioner recommendations are most favorable)

Please note that the program begins with an intensive neuroscience course, which starts in late May. Prerequisites must be completed before the start of the program.

Traditionally, courses in the DrOT Program are delivered primarily onsite, with lab and fieldwork experiences required off-site in the community, and two courses delivered fully online.

It is required that students have internet access and satisfactory computer skills to complete course requirements. As of 2020, all new incoming DrOT students are required to complete "D2L – Student orientation" to assist with on-line learning throughout the program.

Fieldwork Completion Time

Students must complete all Level II fieldwork and the doctoral capstone within 18 months following completion of the didactic portion (end of fall P3 year) of the program.

Fieldwork Withdrawal Policy

A student may withdraw at any point from a level I or level II fieldwork course for extenuating circumstances only and at the discretion and consent of the Fieldwork Education Team. In accordance with the University policy, a student who withdraws without prior approval will receive an F for the course. Examples of extenuating circumstances include, but are not limited to: accident, injury, illness, illness requiring hospitalization, and distress from bereavement.

Administrative Withdrawal

Any student who is administratively withdrawn from the academic portion of the program may petition the faculty, through the Chair, to be readmitted after a period of one year and no more than 2 years. The student must demonstrate a clear rationale as to why they should be readmitted to the program. **There is no obligation for the faculty to readmit a student who has been administratively withdrawn from the program. A student accepted back in the program will be required to complete the failed course(s) and/or an action plan at the discretion of the faculty.**

Program Retention Policy

Students must achieve a minimum grade of "C" (or "P" in pass/fail courses) in all courses with the prefix OT in order to progress in the occupational therapy curriculum. If the student earns a "C-" or "D" grade ("D+," "D," "D-") in a course with the prefix OT, the student must repeat the course, earning a grade of "C" or better. The student will be unable to progress to any course for which that course is a prerequisite until the grade of "C" or better is earned. This may impact full-time status and progression in fieldwork and delay the student's overall progress in the curriculum.

A student may attempt an OT course a maximum of two times to achieve a grade of "C" or higher. An attempt is defined as registered for the course at the end of the drop/add period. If the student does not achieve the required "C" or better grade in the OT course after attempting the course a second time, the student will be dropped from the program. Students may reattempt no more than two courses with an OT prefix.

If a student receives a grade of "F" in any course with an OT prefix (exclusive of FW) during the professional phase of the curriculum, the student will be administratively withdrawn from the University. Further, if a student in the professional phase of the curriculum receives two "C-" or "D" grades ("D-," "D," "D+") in one semester, he/she will be administratively withdrawn from the University.

Students must maintain a minimum cumulative GPA of 3.00 in courses with an OT prefix and program prerequisite courses (defined above) during the P1–P4 years. Students who fail to achieve a minimum cumulative GPA of 3.00 will be placed on program probation at the end of the semester. This includes summer semesters in which the student is enrolled in coursework specified in the BSHS/DrOT accelerated program curriculum plan. A student who receives a third program probation will be administratively withdrawn from the university.

Students cannot participate in Level II fieldwork while on program probation. **Program probation that delays Level II fieldwork will result in a revised schedule, impact financial aid status and cost, and a delay in graduation.**

BSHS/DrOT Accelerated Program Degree Requirements

General Education and Foundation Courses

- Free Elective Credits: 3
- General Education Humanities Discipline Requirement Credits: 6
- Medical Terminology Credits: 2
- Multidisciplinary Inquiry Requirement Credits: 6
- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 205 - Human Structure and Function I Credits: 3
- BS 206 - Human Structure and Function II Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- CO 101 - Introduction to Communication Credits: 3
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- PS 347 - Abnormal Psychology Credits: 3
- PY 200 - Survey of Physics Credits: 4
- SO 101 - Introduction to Sociology Credits: 3
- ST 310 - Biostatistics I Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3
- WR 308 - Writing for the Health Professions Credits: 3
- or
- WR 302 - Scientific Writing Credits: 3

Occupational Therapy Courses

- OT 6XX - Doctoral Seminar 2 Credits: 1
- OT 6XX - Occupational Therapy Interventions I: Contextual Approaches Credits: 4
- OT 6XX - Occupational Therapy Interventions II: Developmental Issues Credits: 4
- OT 6XX - Occupational Therapy Interventions III: Psychosocial Issues Credits: 4
- OT 6XX - Occupational Therapy Interventions V: Rehabilitative Approaches Credits: 4
- OT 6XX - Fieldwork level IIb Credits: 9
- OT 7XX - Doctoral Seminar 3 Credits: 1
- OT 7XX - Doctoral Capstone Project Credits: 3
- HS 110 - Seminar for Health Sciences Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1

- OT 112 - Overview of OT Practice I Credits: 1
- OT 115 - Overview of OT Practice II Credits: 1
- OT 500 - Level I Experiences Seminar Credits: 1
- OT 501 - Doctoral Seminar 1 Credits: 1
- OT 502 - Human Development & Occupational Performance (with Lab) Credits: 3
- OT 508 - Movement Analysis Credits: 3
- OT 510 - Neuroscience Credits: 4
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 531 - Clinical Medicine Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3
- OT 562 - Theories of Occupational Therapy Credits: 3
- OT 620 - Fieldwork Level 1: Clinical Fieldwork Credits: 1
- OT 623 - Fieldwork I: Community Service Learning Credits: 1
- OT 636 - Clinical Leadership Credits: 3
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 660 - Applied Research II Credits: 3
- OT 665 - Applied Research III Credits: 3
- OT 668 - Evidence Based Practice Credits: 3
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 675 - Research Independent Study Credits: 6
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2
- OT 682 - Fieldwork Level I: Community Client Credits: 1
- OT 687 - Fieldwork I: Program Development Credits: 2
- OT 694 - Fieldwork Level IIa Credits: 9
- OT 697 - Doctoral Experiential Component Credits: 12

BSHS/DrOT Accelerated Program Curriculum Plan

First Year (U1)

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- PS 101 - Introduction to Psychology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- General Education Humanities or Free Elective Credits: 3
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1
- PE 102 - Physical Education II Credits: 1

- SO 101 - Introduction to Sociology Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Year (U2)

Fall Semester

- General Education Humanities or Free Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CH 101 - General Chemistry I Credits: 3 *recommended
- CH 103 - General Chemistry Lab I Credits: 1 *recommended
- PS 200 - Psychology of Human Development Credits: 3
- ST 310 - Biostatistics I Credits: 3

Credits/Semester: 16

Spring Semester

- Free Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- PS 347 - Abnormal Psychology Credits: 3
- PY 200 - Survey of Physics Credits: 4

Credits/Semester: 16

Third Year (U3)

Fall Semester

- Ethics Elective Credits: 3
- BSHS Elective Credits: 3
- OT 112 - Overview of OT Practice I Credits: 1
- BS 205 - Human Structure and Function I Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- WR 308 - Writing for the Health Professions Credits: 3
- or
- WR 302 - Scientific Writing Credits: 3

Credits/Semester: 14

Spring Semester

- BSHS Credits: 9
- Medical Terminology Credits: 2
- BS 206 - Human Structure and Function II Credits: 3
- OT 115 - Overview of OT Practice II Credits: 1

Credits/Semester: 15

Note:

All program prerequisite courses must be successfully completed, and, it is recommended that minor coursework be completed, prior to advancing into the professional years.

Fourth Year (P1)

Summer Semester

- OT 405 - Overview of Occupational Therapy Practice Credits: 2
- OT 510 - Neuroscience Credits: 4

Credits/Semester: 6

Fall Semester

- OT 500 - Level I Experiences Seminar Credits: 1
- OT 502 - Human Development & Occupational Performance (with Lab) Credits: 3
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 562 - Theories of Occupational Therapy Credits: 3

Credits/Semester: 16

Spring Semester

- OT 501 - Doctoral Seminar 1 Credits: 1
- OT 531 - Clinical Medicine Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3
- OT 590 - Fieldwork Level 1: Clinical Experience Credits: 1
- OT 615 - Therapeutics Groups Credits: 3
- OT 636 - Clinical Leadership Credits: 3
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2

Credits/Semester: 19

Total credits to receive a BSHS degree: 131

Fifth Year (P2)

Summer Semester

- OT 6XX - Doctoral Seminar 2 Credits: 1
- OT 6XX - Occupational Therapy Interventions I: Contextual Approaches Credits: 4
- OT 660 - Applied Research II Credits: 3
- OT 682 - Fieldwork Level I: Community Client Credits: 1

Credits/Semester: 9

Fall Semester

- Elective Credits: 3
- OT 6XX - Occupational Therapy Interventions II: Developmental Issues Credits: 4
- OT 6XX - Occupational Therapy Interventions III: Psychosocial Issues Credits: 4
- OT 7XX - Doctoral Seminar 3 Credits: 1
- OT 623 - Fieldwork I: Community Service Learning Credits: 1
- OT 665 - Applied Research III Credits: 3

Credits/Semester: 16

Spring Semester

- OT 6XX - Occupational Therapy Interventions V: Rehabilitative Approaches Credits: 4
- OT 620 - Fieldwork Level 1: Clinical Fieldwork Credits: 1
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 668 - Evidence Based Practice Credits: 3
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 687 - Fieldwork I: Program Development Credits: 2

Credits/Semester: 16

Sixth Year (P3)

Summer Semester

- OT 694 - Fieldwork Level IIa Credits: 9

Credits/Semester: 9

Fall Semester

- OT 6XX - Fieldwork level IIb Credits: 9
- OT 675 - Research Independent Study Credits: 6

Credits/Semester: 15

Spring Semester

- OT 7XX - Doctoral Capstone Project Credits: 3
- OT 697 - Doctoral Experiential Component Credits: 12

Credits/Semester: 15

Total minimum credits to receive a BSHS/DrOT: 217

Post-Baccalaureate DrOT Degree Requirements

Students are required to maintain an overall 3.0 GPA with all grades above a C- throughout the professional phase of the program.

- OT 405 - Overview of Occupational Therapy Practice Credits: 2
- OT 500 - Level I Experiences Seminar Credits: 1
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 531 - Clinical Medicine Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3
- OT 590 - Fieldwork Level 1: Clinical Experience Credits: 1
- OT 615 - Therapeutics Groups Credits: 3
- OT 636 - Clinical Leadership Credits: 3
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 660 - Applied Research II Credits: 3
- OT 665 - Applied Research III Credits: 3
- OT 668 - Evidence Based Practice Credits: 3
- OT 501 - Doctoral Seminar 1 Credits: 1
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 675 - Research Independent Study Credits: 6
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2
- OT 682 - Fieldwork Level I: Community Client Credits: 1
- OT 687 - Fieldwork I: Program Development Credits: 2
- OT 694 - Fieldwork Level IIa Credits: 9
- OT 697 - Doctoral Experiential Component Credits: 12
- OT 6XX - OT Interventions I: Contextual Approaches with lab Credits: 4
- OT 6XX - OT Interventions II: Developmental Issues Credits: 4
- OT 6XX - OT Interventions III: Psychosocial Issues Credits: 4
- OT 6XX - OT Interventions V: Rehabilitation Approaches Credits: 4
- OT 6XX - Fieldwork Level IIb Credits: 6
- OT 7XX - Doctoral Seminar III Credits: 1
- OT 7XX - Doctoral Capstone Project Credits: 3

First Year (P1)

Summer Semester

- OT 405 - Overview of Occupational Therapy Practice Credits: 2
- OT 510 - Neuroscience Credits: 4

Credits/Semester: 6

Fall Semester

- OT 500 - Level I Experiences Seminar Credits: 1
- OT 502 - Human Development & Occupational Performance (with Lab) Credits: 3
- OT 519 - Introduction to Clinical Skills with Lab Credits: 3
- OT 551 - Human Occupation: Concepts & Practice w/Lab Credits: 3
- OT 562 - Theories of Occupational Therapy Credits: 3

Credits/Semester: 16

Spring Semester

- OT 501 - Doctoral Seminar 1 Credits: 1
- OT 531 - Clinical Medicine Credits: 3
- OT 555 - Evaluation and Assessment in Occupational Therapy Credits: 3
- OT 590 - Fieldwork Level 1: Clinical Experience Credits: 1
- OT 615 - Therapeutics Groups Credits: 3
- OT 636 - Clinical Leadership Credits: 3
- OT 650 - Introduction to Applied Research Methods Credits: 3
- OT 681 - Occupational Therapy: Past, Present, & Future Credits: 2

Credits/Semester: 19

Second Year (P2)

Summer Semester

- OT 682 - Fieldwork Level I: Community Client Credits: 1

Credits/Semester: 4

Fall Semester

- Elective Credits: 3
- OT 6XX - Occupational Therapy Interventions II: Developmental Issues Credits: 4
- OT 6XX - Occupational Therapy Interventions III: Psychosocial Issues Credits: 4
- OT 7XX - Doctoral Seminar 3 Credits: 1
- OT 623 - Fieldwork I: Community Service Learning Credits: 1
- OT 665 - Applied Research III Credits: 3

Credits/Semester: 16

Spring Semester

- OT 6XX - Interventions V: Rehabilitative Approaches Credits: 4
- OT 620 - Fieldwork Level 1: Clinical Fieldwork Credits: 1
- OT 652 - Occupational Therapy Interventions IV: Cognitive Issues Credits: 3
- OT 668 - Evidence Based Practice Credits: 3
- OT 672 - Occupational Therapy Interventions VI: Assistive Technology Credits: 3
- OT 687 - Fieldwork I: Program Development Credits: 2

Credits/Semester: 16

Third Year (P3)

Summer Semester

- OT 694 - Fieldwork Level IIa Credits: 9

Credits/Semester: 9

Fall Semester

- OT 6XX - Fieldwork Level IIb Credits: 9
- OT 675 - Research Independent Study Credits: 6

Credits/Semester: 15

Spring Semester

- OT 7XX - Doctoral Capstone Project Credits: 3
- OT 697 - Doctoral Experiential Component Credits: 12

Credits/Semester: 15

Total minimum credits to receive a DrOT: 121

Physical Therapy

USciences Department of Physical Therapy Mission

To educate Doctor of Physical Therapy students to practice autonomously, yet collaboratively, within evolving, complex, and diverse healthcare environments. The program will prepare students to be lifelong learners and movement specialists that are informed by evidence to optimize patient/client function and health.

USciences Department of Physical Therapy Vision

The USciences DPT program will be recognized as a leader of physical therapy education and research. Our graduates will be pursued because they are compassionate healthcare providers, critical thinkers, and skilled practitioners that optimize human movement to the betterment of a diverse society.

Goals

- **Professional Practice:** Graduates will use the best evidence to demonstrate reflective clinical decision making and skill performance in all aspects of patient/client management to achieve optimal outcomes.
- **Practice Management:** Students, at the time of graduation, will be able to practice autonomously, yet collaboratively, within evolving, complex, and diverse healthcare environments.
- **Lifelong Learning & Engagement:** Students at the time of graduation will be prepared to practice in a manner that demonstrates a commitment to professional development and lifelong learning through engagement with; evidence-based clinical decision-making, mentorship/teaching of students and/or coworkers, community health, leadership, and promotion of the profession of physical therapy.

Faculty

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Professor of Physical Therapy
Chair, Department of Physical Therapy

Woei-Nan Bair

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Assistant Professor of Physical Therapy

Sylvester Carter

Diploma in Physical Therapy (School of Physical Therapy, Jamaica), BSc (University of West Indies), MHS (University of Indianapolis), PhD (New York University)
Assistant Professor of Physical Therapy

Kevin Cody

Professor Emeritus

Michelle E. Cohen

Professor Emeritus

Eric Folkins

BS (University of Minnesota); MPT (University of Southern California); DPT (Western University of Health Sciences)
ABPTS Board-Certified Clinical Specialist in Orthopaedic Physical Therapy
Assistant Professor of Physical Therapy

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ABPTS Board-Certified Clinical Specialist in Neurologic Physical Therapy
Associate Professor of Physical Therapy

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Assistant Professor of Physical Therapy
Co-Director, Clinical Education

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BS (University of Montana); MA (University of North Carolina); MPT (East Carolina University); PhD (University of Delaware)
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Professor of Physical Therapy
Vice Chair, Department of Physical Therapy

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BA (University of Pennsylvania); MS (Widener University); EdD (Arcadia University)
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Director, Patricia Leahy Research Laboratory

Shaun N. Varrecchia

BS (Rutgers University); DPT (Temple University)
ABPTS Board-Certified Clinical Specialist in Geriatric Physical Therapy
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Physical Therapy – DPT

Physical therapists are health professionals who work with other members of the healthcare team to ensure optimal health and function of patients and clients. Physical therapists provide interventions to facilitate the recovery process of people of various ages with physical and activity limitations or participation restrictions/disability resulting from injury or disease. Examples of individualized interventions include therapeutic exercise, manual techniques, patient and family education, electrotherapy, and functional training. Physical therapists also provide prevention and wellness services, including screening and health promotion. These activities include conducting prenatal exercise classes, analyzing work settings, recommending changes to reduce activity-related injury, developing exercise programs for people with chronic conditions such as spinal cord injury, and screening of community-dwelling older adults for fall risk. Physical therapists interact with and practice in collaboration with a variety of professionals and engage in consultation, education, critical inquiry, and administration.

Statistics from the American Physical Therapy Association indicate that many physical therapists practice in acute care or subacute care hospitals, private physical therapy offices, community health centers, industrial health centers, sports facilities, rehabilitation centers, nursing homes, home health agencies, schools, or pediatric centers. Others work in research institutions or teach in colleges and universities.

There are three entry points for the DPT program. A student can be admitted into the program as a freshman, transfer into the undergraduate years, or enter the program after earning a bachelor's degree. To maintain guaranteed admission into the professional phase of the Physical Therapy curriculum, DPT majors in catalog years 2016 and beyond must earn a combined required math and science courses GPA of 3.00 by the end of the fall semester of the U3 year and maintain that minimum GPA through the spring semester of the U3 year in addition to having an overall cumulative GPA of 3.00. For typical USciences students this includes: General Chemistry 1 and 2 and the corresponding labs (CH 101, 102, 103, 104); General Biology I and II with the corresponding labs (BS 109, 110, 119, 120), Introductory Physics I and II with lab (PY 201 and 202); Anatomy and

Physiology I and II (BS 310 and 311); Human Structure and Function Lab (BS 207 and 208); Pre-calculus (MA 107); Trigonometry (MA 108) or Calculus (MA 110); Biostatistics (ST 310). Grades for courses taken off campus will not be used to calculate the math/science or overall GPA, consistent with Student Handbook policies on "Grade Point Average" and "Repetition of a Course." Students must also meet the Essential Functions throughout the undergraduate and professional years, and have no academic or conduct sanctions in the spring of U3.

The undergraduate curriculum for the first through third years for DPT students in the program of physical therapy provides the broad foundation of natural science, social science, and the humanities that the professional courses build upon. The professional component of the curriculum is designed to prepare physical therapy practitioners to apply scientific principles and evidence-based data to prevent, identify, assess, correct, or alleviate acute or persistent movement dysfunction. For detailed information about the professional program, see the section "Professional Years (P1-P3)" below.

All students must pass the state-administered National Physical Therapy Examination to become licensed to practice physical therapy. The physical therapy program is accredited by the Commission on Accreditation in Physical Therapy Education of the American Physical Therapy Association.

Transfer Students

Students may apply to transfer into the undergraduate phase of the DPT program (U1-U3). The level in the curriculum to which transfer students are accepted will depend on the prerequisite courses they have completed. All conditions regarding guaranteed admission into the professional program also apply to transfer students. Refer to the policy on Residency Requirements to earn the DPT at the University of the Sciences.

Residency Requirement

In order to earn the DPT degree from USciences, a student must complete all courses in the professional program (P1-P3) offered by the University of the Sciences.

Post-Baccalaureate Students

Students with a bachelor's degree who meet the minimum course requirements (see table) may apply to the USciences DPT program. Accepted students will enter the program in the first professional year and will be held to the academic standards outlined in this catalog. For detailed information about the professional program, see the section "Professional Years (P1-P3)" below. Post-baccalaureate students admitted directly to the first professional year (P1) of the program will earn the DPT degree but will not be eligible to earn the BSHS in health science.

Minimum Course Requirements for Students with aBaccalaureate Degree

Subject Area	Credits Required	Comments
Chemistry w/lab	8 credits	Coursework should be a 2-semester sequence.
Biology w/lab	8 credits	Coursework should be a 2-semester sequence.
Physics w/lab	8 credits	Coursework should be a 2-semester sequence.
Anatomy & Physiology	6 credits	Coursework should be a 2-semester sequence.
Math	6 credits	3 credits of Precalculus or Calculus and 3 credits of statistics.

Social Sciences	12 credits	Include a mix of introductory and advanced coursework; minimum of 6 credits in psychology.
English	6 credits	Inclusive of one writing intensive course.
Basic Nutrition	3 credits	
Medical Terminology	2 credits	Recommended. Those who do not have an approved 2-credit medical terminology course will be required to pass an online proficiency.

Total: 57-59 credits (57 required credits, 2 recommended credits)

Undergraduate Years (U1–U3)

The physical therapy program is an integrated undergraduate/professional graduate degree program leading to the BSHS in health science and doctor of physical therapy (DPT). Admission to the physical therapy program as a freshman student and maintenance of an acceptable academic and conduct record during the three undergraduate years guarantee the student a place in the professional phase of the physical therapy curriculum. Students admitted to the undergraduate years (U1, U2, or U3) of the program who are in good academic standing and who have met all the University requirements for the BSHS in health science will earn this degree after the completion of their first professional year (P1). The DPT will be awarded after the successful completion of the third professional year (P3).

The guarantee of admission into the physical therapy professional phase of the curriculum will be revoked if any of the following occurs:

- A student receives a grade of "D+" or lower in a course and the grade for that course when repeated is not replaced with a grade of "C-" or higher.
- The student is actively on probation during the spring semester of the U3 year as a result of the findings of the Committee on Student Conduct. This includes situations where the committee finds a student "responsible" for misconduct and/or infraction of the University regulations and takes one of the following disciplinary actions: disciplinary suspension, disciplinary expulsion, or disciplinary probation.
- Failure to meet minimum GPA requirements.
- Failure to meet Essential Functions.

Students in catalog years 2016 and beyond must achieve a cumulative GPA of 3.00 and a science/math GPA of 3.00 by the end of the fall semester of their third undergraduate year (U3) and maintain a 3.00 through the spring of the third undergraduate year (U3) to maintain guaranteed admission into the professional phase of the physical therapy curriculum.

Undergraduate Curriculum Requirements

Science and Math

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- CH 101 - General Chemistry I Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- CH 104 - General Chemistry Lab II Credits: 1

- MA 107 - Precalculus Credits: 3
- MA 108 - Trigonometry Credits: 3
- PY 201 - Introductory Physics I Credits: 4
- PY 202 - Introductory Physics II Credits: 4
- ST 310 - Biostatistics I Credits: 3

General Education

- General Education Elective Credits: 3
- General Education Humanities Discipline Requirement Credits: 6
- Multidisciplinary Inquiry Requirement Credits: 6
- FT 360 - Fitness and Sports Nutrition Credits: 3
- or
- BS 219 - Basic Nutrition Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- PE 101 - Physical Education I Credits: 0
- PE 102 - Physical Education II Credits: 1
- PS 101 - Introduction to Psychology Credits: 3
- PS 200 - Psychology of Human Development Credits: 3
- PS 329 - Cognitive Psychology Credits: 3
- SO 101 - Introduction to Sociology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3
- WR 102 - Writing and Rhetoric II Credits: 3
- WR 302 - Scientific Writing Credits: 3
- or
- EN 302 - Scientific Writing Credits: 3

Health Science and Physical Therapy

- HS 110 - Seminar for Health Sciences Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1
- PT 300 - Medical Terminology for Physical Therapy I Credits: 1
- PT 301 - Medical Terminology for Physical Therapy II Credits: 1

Physical Therapy BSHS/DPT Curriculum—Undergraduate Years 1–3

First Undergraduate Year (U1)

Fall Semester

- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- SO 101 - Introduction to Sociology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 14

Spring Semester

- General Education Humanities Discipline Requirement Credits: 3
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- HS 111 - Health Sciences Orientation II Credits: 1
- MA 108 - Trigonometry Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 15

Second Undergraduate Year (U2)

Fall Semester

- General Education Humanities Discipline Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1
- PS 101 - Introduction to Psychology Credits: 3

Credits/Semester: 13

Spring Semester

- General Education Elective Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CO 101 - Introduction to Communication Credits: 3

Credits/Semester: 13

Third Undergraduate Year (U3)

Fall Semester

- BS 207 - Human Structure and Function I Laboratory Credits: 1
- BS 310 - Anatomy and Physiology I Credits: 3
- PS 200 - Psychology of Human Development Credits: 3
- PT 300 - Medical Terminology for Physical Therapy I Credits: 1
- PY 201 - Introductory Physics I Credits: 4
- ST 310 - Biostatistics I Credits: 3
- WR 302 - Scientific Writing Credits: 3
- or
- EN 302 - Scientific Writing Credits: 3

Credits/Semester: 18

Spring Semester

- BS 208 - Human Structure and Function II Laboratory Credits: 1
- BS 219 - Basic Nutrition Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- PS 329 - Cognitive Psychology Credits: 3
- PT 301 - Medical Terminology for Physical Therapy II Credits: 1
- PY 202 - Introductory Physics II Credits: 4

Credits/Semester: 15

Physical Therapy BS in exercise physiology (BSEP)/DPT Curriculum— Undergraduate Years 1–3

The Exercise Physiology major is a unique combination of physiology, applied anatomy, pathophysiology, fitness, health, and management courses. Curriculum includes a foundation in science and a deep understanding of how the body works. General health and wellness along with illness and pathology are also emphasized in the curriculum. The program provides students the opportunity to become leaders and innovators in Exercise Physiology. Our students are able to conduct and disseminate extensive scholarly activity contributing to the existing body of healthcare literature and clinical discoveries. Exercise Physiology provides students with the rigorous clinical foundation needed for several Allied Health professions. Additionally, the Exercise Physiology program prepares students for the American College of Sports Medicine (ACSM) Exercise Physiologist exam and the National Strength and Conditioning Association (NSCA) Certified Strength and Conditioning Specialist exam.

Students who complete a BS in Exercise Physiology will be well prepared for the rigors of graduate school in the Physical Therapy program. The undergraduate curriculum that the U1-U3 DPT students currently take aligns with the timing of the undergraduate curriculum for the Exercise Physiology program. U1-U3 students who decided to major in Exercise Physiology will also have the opportunity to take courses such as Introduction to Kinesiology, Exercise Testing and Prescription, Exercise Pharmacology, and many more. These courses will give students a baseline of knowledge that prepares them for specific course content they will learn in graduate school.

Admission to the physical therapy program as a freshman student and maintenance of an acceptable academic and conduct record during the three undergraduate years guarantee the student a place in the professional phase of the physical therapy curriculum. Students admitted to the combined BSEP/DPT program in years U1-U3 must meet academic and conduct standards by the end of U3 fall semester to progress to the professional phase of the curriculum. Students will earn the BSEP degree after the completion of the first professional year in the DPT program if all requirements for that degree are met. The DPT will be awarded after successful completion of the third professional year (P3).

The guarantee of admission into the physical therapy professional phase of the curriculum will be revoked if any of the following occurs:

- A student receives a grade of "D+" or lower in a course and the grade for that course when repeated is not replaced with a grade of "C-" or higher.
- The student is actively on probation during the spring semester of the U3 year as a result of the findings of the Committee on Student Conduct. This includes situations where the committee finds a student "responsible" for misconduct and/or infraction of the University regulations and takes one of the following disciplinary actions: disciplinary suspension, disciplinary expulsion, or disciplinary probation.
- Failure to meet minimum GPA requirements.
- Failure to meet Essential Functions.

Students in catalog years 2016 and beyond must achieve a cumulative GPA of 3.00 and a science/math GPA of 3.00 by the end of the fall semester of their third undergraduate year (U3) and maintain a 3.00 through the spring of the third undergraduate year (U3) to maintain guaranteed admission into the professional phase of the physical therapy curriculum.

First Undergraduate Year (U1)

Fall Semester

- BS 109 - General Biology I Credits: 3
- BS 110 - General Biology I Lab Credits: 1

- CH 101 - General Chemistry I Credits: 3
- CH 103 - General Chemistry Lab I Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 107 - Precalculus Credits: 3
- PE 101 - Physical Education I Credits: 0
- SO 101 - Introduction to Sociology Credits: 3
- WR 101 - Writing and Rhetoric I Credits: 3

Credits/Semester: 19

Spring Semester

- BS 119 - General Biology II Credits: 3
- BS 120 - General Biology II Lab Credits: 1
- CH 102 - General Chemistry II Credits: 3
- CH 104 - General Chemistry Lab II Credits: 1
- HS 110 - Seminar for Health Sciences Credits: 1
- MA 108 - Trigonometry Credits: 3
- PS 101 - Introduction to Psychology Credits: 3
- PE 102 - Physical Education II Credits: 1
- WR 102 - Writing and Rhetoric II Credits: 3

Credits/Semester: 18

Second Undergraduate Year (U2)

Fall Semester

- General Education Humanities Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- CO 101 - Introduction to Communication Credits: 3
- PY 201 - Introductory Physics I Credits: 4
- ST 310 - Biostatistics I Credits: 3
- WR 302 - Scientific Writing Credits: 3

Credits/Semester: 19

Spring Semester

- General Education Humanities Requirement Credits: 3
- Multidisciplinary Inquiry Requirement Credits: 3
- PY 202 - Introductory Physics II Credits: 4
- FT 350 - Research Methods in Kinesiology Credits: 3
- FT 460 - Health and Wellness Credits: 3

Credits/Semester: 16

Third Undergraduate Year (U3)

Fall Semester

- BS 310 - Anatomy and Physiology I Credits: 3
- BS 207 - Human Structure and Function I Laboratory Credits: 1
- FT 303 - Exercise Testing & Prescrip Credits: 4
- HS 310 - Human Learning Credits: 3
- PT 300 - Medical Terminology for Physical Therapy I Credits: 1
- PS 200 - Psychology of Human Development Credits: 3

Credits/Semester: 14

Spring Semester

- Advanced Psychology Requirement Credits: 3
- BS 311 - Anatomy and Physiology II Credits: 3
- BS 208 - Human Structure and Function II Laboratory Credits: 1
- FT 360 - Fitness and Sports Nutrition Credits: 3
- PT 301 - Medical Terminology for Physical Therapy II Credits: 1
- FT 431 - Exercise Pharmacology Credits: 3
- FT 380 - Intro to Kinesiology Credits: 3

Credits/Semester: 17

Professional Years (P1–P3)

The professional phase of the DPT program is designed to prepare physical therapy practitioners to apply scientific principles and evidence-based data to prevent, identify, assess, correct, or alleviate acute or persistent movement dysfunction. The first professional year contains foundational clinical courses; in the second year, the program concentrates on the four primary systems of the body treated by physical therapists: musculoskeletal, neuromuscular, cardiopulmonary, and integumentary. In the third year, the courses represent a synthesis of classroom knowledge and clinical application. Experiential learning is integrated throughout the curriculum. Students will participate in clinical rotations in a variety of settings that may include acute care, subacute care, orthopedics, sports medicine, pediatrics, rehabilitation, women's health, industrial medicine, long-term care, or outpatient care.

At the end of the program, all students must pass the state-administered National Physical Therapy Examination to become licensed to practice physical therapy. Our program is accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE).

Students admitted to the undergraduate years (U1, U2 or U3) of the program who are in good academic standing and who have met all the University requirements for the BSHS in health science will earn this degree after the completion of their first professional year (P1). Post-baccalaureate students admitted directly to the first professional year (P1) of the program will earn the DPT degree but will not be eligible to earn the BSHS in health science. The DPT degree for all professional students will be awarded after the successful completion of their third professional year (P3).

The following pages contain an outline of the content in the professional curriculum. The University reserves the right to alter this curriculum based on student needs, curricular needs, and CAPTE guidelines, (and government regulation/recommendations, etc. The curriculum for each cohort will be determined prior to the start of its first professional year (P1).

Students in catalog years 2016 and beyond must achieve a cumulative GPA of 3.00 and a science/math GPA of 3.00 by the end of the fall semester of their third undergraduate year (U3) and maintain a 3.00 through the spring of the third undergraduate year (U3) to maintain guaranteed admission into the PT professional phase. For minimal standards in clinical education or for more details about academic standards, repeating professional courses, and re-applying to the DPT program, refer to the departmental policy and procedure manuals which are available on the Department website.

Students in the professional phase must earn a minimum grade of "B-" in all courses in the professional phase of the DPT program. Failure to earn a "B-" or above in any PT course will stop the student's progression in the PT program. Students can opt to reapply to the program per departmental policies. Students must also meet Essential Functions of a physical therapy student. The policies related to clinical education and minimal performance can be found in the Clinical Education Policy and Procedure manual on the Department website.

To qualify for the doctor of physical therapy degree, students must successfully complete all required courses.

Residency Requirement

In order to earn the DPT degree from USciences, a student must complete all courses in the professional program (P1-P3) offered by the University of the Sciences.

Physical Therapy BSHS/DPT or BSEP/DPT Degree Requirements

- HS 400 - Interprofessional Education Credits: 2
- PT 400 - Human Anatomy Credits: 6 or PT 414 – Human Anatomy: Credits: 6
- PT 406 - Physical Therapy Examination Credits: 4
- PT 407 - Physical Therapy Interventions I Credits: 2
- PT 408 - Physical Therapy Interventions II Credits: 4
- PT 409 - Medical Ethics Credits: 2
- PT 410 - Issues in Physical Therapy III: Psychosocial Aspects of Disability and Illness Credits: 2
- PT 415 - Kinesiology and Biomechanics I Credits: 3
- PT 416 - Kinesiology and Biomechanics II Credits: 2
- PT 425 - Neuroscience Credits: 4
- PT 431 - Exercise Physiology Credits: 3
- PT 435 - Pro Bono Experience I Credits: 0
- PT 465 - Physical Therapy Issues II: Health Promotion and Wellness Credits: 2
- PT 470 - Pro Bono Experience II Credits: 0
- PT 485 - Pathophysiology I Credits: 3
- PT 486 - Pathophysiology II Credits: 3
- PT 489 - Research Methods I Credits: 2
- PT 502 - Geriatric Physical Therapy Credits: 2
- PT 505 - Neuromuscular Physical Therapy I Credits: 4
- PT 506 - Neuromuscular Physical Therapy II Credits: 4
- PT 507 - Musculoskeletal Physical Therapy I Credits: 4
- PT 508 - Musculoskeletal Physical Therapy II Credits: 4
- PT 509 - Differential Diagnosis Credits: 3
- PT 536 - Cardiovascular and Pulmonary Physical Therapy I Credits: 3
- PT 537 - Cardiovascular and Pulmonary Physical Therapy II Credits: 3
- PT 544 - Examination and Intervention of Integument Credits: 3
- PT 547 - Physical Therapy Examination & Intervention of Specific Systems Credits: 3
- PT 554 - Clinical Decision Making Credits: 2
- PT 556 - Clinical Education I Credits: 4
- PT 567 - Issues in PT IV: Using Evidence-Based Credits: 2
- PT 575 - Pro Bono Experience III Credits: 0
- PT 580 - Pro Bono Experience IV Credits: 0
- PT 602 - Pediatric Physical Therapy Credits: 2
- PT 603 - Neuromuscular Physical Therapy III Credits: 4
- PT 604 - Musculoskeletal Physical Therapy III Credits: 4
- PT 610 - Leadership in Physical Therapy Credits: 2
- PT 635 - Health & Business Policy Credits: 3
- PT 640 - Pro Bono Experience V Credits: 1
- PT 655 - Clinical Education II Credits: 4
- PT 656 - Clinical Education III Credits: 4
- PT 661 - PT Issues V: Management of Complex Patients Credits: 2
- PT 666 - Seminar in Contemporary Physical Therapy Practice Credits: 2

- PT 680 - Clinical Education IVa Credits: 4
- PT 681 - Clinical Education IVb Credits: 4
- PT 690 - Independent Study in Physical Therapy Credits: 3

Physical Therapy BSHS/DPT or BSEP/DPT Curriculum —Professional Years 1–3

First Professional Year (P1)

Summer Semester

- PT 400 - Human Anatomy Credits: 6

Credits/Semester: 6

Fall Semester

- HS 400 - Interprofessional Education Credits: 2
- PT 406 - Physical Therapy Examination Credits: 4
- PT 415 - Kinesiology and Biomechanics I Credits: 3
- PT 425 - Neuroscience Credits: 4
- PT 431 - Exercise Physiology Credits: 3
- PT 435 - Pro Bono Experience I Credits: 0
- PT 485 - Pathophysiology I Credits: 3

Credits/Semester: 19

Spring Semester

- PT 407 - Physical Therapy Interventions I Credits: 2
- PT 408 - Physical Therapy Interventions II Credits: 4
- PT 409 - Medical Ethics Credits: 2
- PT 416 - Kinesiology and Biomechanics II Credits: 2
- PT 465 - Physical Therapy Issues II: Health Promotion and Wellness Credits: 2
- PT 470 - Pro Bono Experience II Credits: 0
- PT 486 - Pathophysiology II Credits: 3
- PT 489 - Research Methods I Credits: 2

Credits/Semester: 17

Total Credits to receive a BSHS or BSEP degree: 130

Second Professional Year (P2)

Fall Semester

- PT 410 - Issues in Physical Therapy III: Psychosocial Aspects of Disability and Illness Credits: 2
- PT 502 - Geriatric Physical Therapy Credits: 2
- PT 505 - Neuromuscular Physical Therapy I Credits: 4
- PT 507 - Musculoskeletal Physical Therapy I Credits: 4

- PT 536 - Cardiovascular and Pulmonary Physical Therapy I Credits: 3
- PT 554 - Clinical Decision Making Credits: 2
- PT 575 - Pro Bono Experience III Credits: 0

Credits/Semester: 17

Intersession

- PT 556 - Clinical Education I Credits: 4

Credits/Semester: 4

Spring Semester

- PT 506 - Neuromuscular Physical Therapy II Credits: 4
- PT 508 - Musculoskeletal Physical Therapy II Credits: 4
- PT 509 - Differential Diagnosis Credits: 3
- PT 537 - Cardiovascular and Pulmonary Physical Therapy II Credits: 3
- PT 544 - Examination and Intervention of Integument Credits: 3
- PT 567 - Issues in PT IV: Using Evidence-Based Credits: 2
- PT 580 - Pro Bono Experience IV Credits: 0

Credits/Semester: 19

Third Professional Year (P3)

Summer Semester

- PT 655 - Clinical Education II Credits: 4
- PT 656 - Clinical Education III Credits: 4

Credits/Semester: 8

Fall Semester

- PT 602 - Pediatric Physical Therapy Credits: 2
- PT 603 - Neuromuscular Physical Therapy III Credits: 4
- PT 604 - Musculoskeletal Physical Therapy III Credits: 4
- PT 635 - Health & Business Policy Credits: 3
- PT 661 - PT Issues V: Management of Complex Patients Credits: 2
- PT 680 - Clinical Education IVa Credits: 4
- PT 690 - Independent Study in Physical Therapy Credits: 3

Credits/Semester: 20

Spring Semester

- PT 547 - Physical Therapy Examination & Intervention of Specific Systems Credits: 3
- PT 610 - Leadership in Physical Therapy Credits: 2
- PT 640 - Pro Bono Experience V Credits: 1
- PT 666 - Seminar in Contemporary Physical Therapy Practice Credits: 2

- PT 681 - Clinical Education IVb Credits: 4
- PT 690 - Independent Study in Physical Therapy Credits: 3

Credits/Semester: 13

Total Credits: 211

Physician Assistant Studies Vision

The vision of the Department of Physician Assistant Studies is to work across the curricula to create qualified healthcare providers with the qualities of professionalism, lifelong learning, and cultural and socioeconomic competence.

Program Goals

Program Goals

1) Matriculate qualified applicants who will successfully complete the Master of Science in Physician Assistant Studies.

Demonstrated by:

- Demographics of the applicants meeting all admissions criteria
- Graduation rate at or greater than 95%
- Attrition rate less than 5%

2) Prepare students with a foundation in Primary Care with the knowledge, skills, and attitudes to function as entry-level members of the health care team in varied clinical settings and disciplines.

Demonstrated by:

- All students will complete the didactic phase with a minimum 3.0 GPA
- All students will attain a score of 4.0/5.0 average on the Preceptor's Evaluation of Student on each rotation
- All students' rotations will include underserved and diverse populations
- Successful completion of the Summative Examination, OSCEs and Clinical Skills Examination
- Graduation rate at or greater than 95%

3) Engage students in interprofessional medical education that will enable them to adapt to the changing health care environment with a focus on evidence-based practice.

Demonstrated by:

- PA students engage with USciences OT, PT, and Pharmacy students during both the didactic and clinical phases of the program to provide an understanding of the roles and responsibilities of each health profession and engage in the application of those roles and responsibilities during the entire PA Program
- PA students are required to journal additional interprofessional opportunities during each clinical rotation
- Research courses provide the students with the knowledge to participate in evidence-based practice during the clinical phase and the Capstone project

4) Model an interdisciplinary approach to medicine which utilizes effective oral and written communication between members of the healthcare team and patient.

Demonstrated by:

- Oral case presentations to PA faculty and preceptors
- Multiple OSCE presentations in both didactic and clinical phases
- Electronic medical records

5) Facilitate and cultivate the development of professional, moral and ethical attitudes essential to the role of a physician assistant.

Demonstrated by:

- Courses
- Preceptor evaluations of students
- OSCE evaluations
- Student self-reflection

6) Educate students in a patient-centered environment which promotes critical thinking and medical problem-solving skills.

Demonstrated by:

- Providing case-based scenarios/questions throughout the program
- OSCE evaluations
- Preceptor evaluation of critical thinking and medical problem-solving skill

7) Prepare students for the successful completion of the PANCE.

Demonstrated by:

- Goal of first-time pass rate at or above the national average

Faculty

David DeFilippo, PA-C

BS (Pennsylvania State University); MSPAS (Philadelphia College of Osteopathic Medicine)

Associate Professor of Physician Assistant Studies

Chair, Department of Physician Assistant Studies

Maria Long, PA-C

DMsc (University of Lynchburg), MSPAS (Drexel University), MEd (Elmira College)

Assistant Professor of Physician Assistant Studies

Director, Clinical Education

Michelle Reslier, PA-C

BS (Rutgers University); MS (King's College)

Assistant Professor of Physician Assistant Studies

Anthony Roselli, MD

BS; MD (State University of New York, Buffalo)

Assistant Professor of Physician Assistant Studies

Medical Director, Physician Assistant Studies

Deborah Summers, PA-C

BShS (University of the Sciences); MS (Philadelphia College of Osteopathic Medicine)

Assistant Professor of Physician Assistant Studies

Vice Chair, Department of Physician Assistant Studies

Program Director, Physician Assistant Program

Allison Williams, PA-C

BS (Post University); MS (Philadelphia College of Osteopathic Medicine)

Assistant Professor of Physician Assistant Studies

Director, Academic Education

Physician Assistant Studies – MSPAS

Vision

The Mission of the University of the Sciences Physician Assistant Program is to educate future physician assistants with a foundation in primary care, with a focus on interprofessional healthcare and exposure to underserved and diverse populations.

Program Goals

1) Matriculate qualified applicants who will successfully complete the Master of Science in Physician Assistant Studies.

Demonstrated by:

- Demographics of the applicants meeting all admissions criteria
- Graduation rate at or greater than 95%
- Attrition rate less than 5%

2) Prepare students with a foundation in Primary Care with the knowledge, skills, and attitudes to function as entry-level members of the health care team in varied clinical settings and disciplines.

Demonstrated by:

- All students will complete the didactic phase with a minimum 3.0 GPA
- All students will attain a score of 3.0/5.0 average on the Preceptor's Evaluation of Student on each rotation
- All students' rotations will include underserved and diverse populations
- Successful completion of the Summative Examination, OSCEs and Clinical Skills Examination
- Graduation rate at or greater than 95%

3) Engage students in interprofessional medical education that will enable them to adapt to the changing health care environment with a focus on evidence-based practice.

Demonstrated by:

- PA students engage with USciences OT, PT, and Pharmacy students during both the didactic and clinical phases of the program to provide an understanding of the roles and responsibilities of each health profession and engage in the application of those roles and responsibilities during the entire PA Program
- PA students will report on their interprofessional opportunities during each clinical rotation at Call Back Days
- Research courses provide the students with the knowledge to participate in evidence-based practice during the clinical phase and the Capstone project

4) Model an interdisciplinary approach to medicine which utilizes effective oral and written communication between members of the healthcare team and patient.

Demonstrated by:

- Oral case presentations to PA faculty and preceptors
- OSCE Electronic medical records
- Presentations in both didactic and clinical phases

5) Facilitate and cultivate the development of professional, moral and ethical attitudes essential to the role of a physician assistant.

Demonstrated by:

- Courses
- Preceptor evaluations of students OSCE evaluations
- Student self-reflection

6) Educate students in a patient-centered environment which promotes critical thinking and medical problem-solving skills.

Demonstrated by:

- Providing case-based scenarios/questions throughout the program
- OSCE evaluations
- Preceptor evaluation of critical thinking and medical problem-solving skills

7) Prepare students for the successful completion of the PANCE.

Demonstrated by:

- Goal of first-time pass rate at or above the national average

Accreditation Status

The ARC-PA has granted **Accreditation-Provisional** status to the **University of the Sciences Physician Assistant Program** sponsored by the **University of the Sciences**.

Accreditation-Provisional is an accreditation status granted when the plans and resource allocation, if fully implemented as planned, of a proposed program that has not yet enrolled students appear to demonstrate the program's ability to meet the ARC-PA Standards or when a program holding Accreditation-Provisional status appears to demonstrate continued progress in complying with the Standards as it prepares for the graduation of the first class (cohort) of students.

Accreditation-Provisional does not ensure any subsequent accreditation status. It is limited to no more than five years from matriculation of the first class.

Degree Requirements

Students entering the physician assistant program are expected to meet certain technical standards and to continue to meet those standards during the program. Information about these technical standards may be found at

www.physicianassistant.usciences.edu/physician-assistant-studies/physician-assistant-graduate-technical-standards.

Progression and continuance in the physician assistant program are based not only on scholastic achievement, they are also based on professional performance and the ability to meet the requirements of the program. For greater detail about the program's requirements and policies, please see the program's student handbook available from the Department of Physician Assistant Studies.

Academic Standards

Students are required to maintain a cumulative GPA of 3.00 or higher to continue in and/or to graduate from the physician assistant program. In addition, students must obtain a minimum grade of "C" in all courses with the prefix PHA and must successfully complete all other requirements for a specific course as specified in that course's syllabus.

Behavioral Standards

During all phases of training, students are expected to conduct themselves in a professional manner. Appropriate behavior includes attributes such as:

- Ability to work effectively with peers and other members of the healthcare team Personal, academic and professional honesty and integrity
- Concern for privacy of the patient
- Understanding professional roles and limitations
- Consistent attendance and punctuality

Professional Performance Standards

Professional behavior and attitudes are an essential and required part of interaction with patients, peers, supervisors, other health professionals, and the general public. All physician assistant students are expected to maintain the highest standard of professional behavior possible and to comply with the Guidelines for Ethical Conduct for the Physician Assistant developed by the American Academy of Physician Assistants (available at <https://www.aapa.org/download/56983/>) and those in the University of the Sciences Student Handbook (available at www.usciences.edu/studenthandbook/).

Requirements for Progression Within the Didactic Phase

- Remediation of any grade below a "C" on a written, physical, or combination examination may be required.
- Any course with the prefix PHA must be passed with a minimum grade of "C"
- Demonstration of required skills necessary for clinical practice as determined by the program
- Receiving a satisfactory rating from the Student Progress Committee by meeting all the academic and behavioral requirements
- Compliance with the policies of the university and the program

- Compliance with the behavioral standards and professional performance standards, and with the Standards of Conduct for the Physician Assistant Student (see the program's student handbook available from the Department of Physician Assistant Studies)

Requirements for Progression Within the Clinical Phase

In addition to meeting the above Requirements for Promotion within the Didactic Phase, students must complete the following requirements in order to complete the physician assistant program.

- Satisfactory remediation for any grade below "C" in any examination
- Preceptor evaluations must be passed with a minimum grade of "C"
- Each course with the prefix PHA or rotation within a course must be passed with a minimum grade of "C" Satisfactory completion of basic life support (BLS) and advanced cardiac life support (ACLS) training
- Demonstration of required skills necessary for clinical practice
- Receiving a satisfactory rating from the Student Progress Committee by meeting all academic and behavioral requirements
- Compliance with university and program policies and standards

Graduation Requirements

Faculty and staff of the physician assistant program will review all student records prior to graduation. Any outstanding financial balance must be reconciled prior to graduation. Students must fulfill all department and University requirements before being awarded a diploma and must be eligible for the PANCE examination. Specific requirements include:

- Satisfactory completion of all courses in the curriculum with a grade of "C" or better A cumulative GPA of 3.00 or higher throughout the program
- Satisfactory completion of all assignments
- Satisfactory completion of a comprehensive summative written examination
- Satisfactory completion of a comprehensive Objective Structures Clinical Evaluation (OSCE)
- Completion of the Physician Assistant Clinical Knowledge Rating and Assessment Tool (PACKRAT) examination
- Compliance with behavioral and professional performance standards
- Successful completion of comprehensive technical skills evaluation

Academic Program Probation

Any student whose cumulative GPA falls below 3.00 and/or who receives a grade below a "C" in any course with the prefix PHA will be placed on academic program probation. The Student Progress Committee, with approval of the program director, will review the student's case and create a contract with the student setting forth the terms of probation.

The student may be allowed to repeat the failed course once, based on a schedule created by the Student Progress Committee. Repeating a course may cause a delay in starting clinical rotations and/or graduation. All didactic phase courses must be satisfactorily completed before the student is allowed to progress into the clinical phase.

Students who fail to meet the terms of the contract of probation within the designated time frame will be dismissed from the program. Students who do not achieve a grade of "C" or higher after repeating a course with the prefix PHA will be dismissed from the program. Students are required to maintain a cumulative GPA of 3.00 or higher to continue and/or to graduate from the program.

Students may be placed on probation only once during the didactic phase or once during the clinical phase. If a student is eligible to be placed on academic program probation for a second time in either phase of the program, the student will be dismissed from the program.

Behavioral or Professional Program Probation

Students who fail to adhere to the required Behavioral Standards and Professional Performance Standards or whose behavior is disruptive or inappropriate for a medical professional will be required to appear before the Student Progress Committee. Students placed on probation for behavioral or professional reasons who fail to meet the terms of the contract of probation within the designated time frame will be dismissed from the program.

Contract of Program Probation

A contract with the student will set forth the terms and conditions of program probation. These terms and conditions may include, but are not limited to, specific academic and behavioral requirements, remedial sessions, and any other items deemed necessary

by the Student Progress Committee and/or the University's student conduct process to ensure program and University standards as well as the welfare of faculty, peers and, most importantly, patients. Terms may also include a psychological and/or medical evaluation and clearance in order to continue in the physician assistant program.

Removal from Program Probation

A student placed on program probation due to a cumulative GPA of less than 3.00 must acquire a cumulative GPA of 3.00 or greater by the end of the following semester. A student placed on program probation due to a grade of less than "C" in a course with the prefix PHA must retake the course according to the terms of the probation contract and must achieve a passing grade of "C" or higher in order to be removed from program probation. A student placed on program probation for academic and/or behavioral problems must fulfill ALL requirements of the contract of program probation within the designated time frame or the student will be dismissed from the physician assistant program.

Dismissal from the Program

Failure to meet conditions for removal from academic or behavioral/professional program probation or being eligible to be placed on program probation more than once while enrolled in the physician assistant program will result in dismissal from the program.

Students who are dismissed and who wish to be reinstated must petition the Student Progress Committee for readmission to the physician assistant program. In order to be reinstated the student must establish to the satisfaction of the Student Progress Committee that the unsatisfactory performance: 1) was due to extraordinary and non-recurring circumstances, AND 2) was not representative of the student's academic ability and/or usual professional conduct. A student who is reinstated but who fails to satisfy the conditions of any program probation will automatically be dismissed from the program without further review or appeal within the physician assistant program.

MSPAS Curriculum Requirements

- PHA 501 - Human Anatomy Credits: 4
- PHA 502 - Human Physiology Credits: 3
- PHA 503 - History / Physical I Credits: 3
- PHA 504 - Pharmacology I Credits: 3
- PHA 505 - PA History Credits: 1
- PHA 506 - Genetics for PAs Credits: 1
- PHA 507 - Psychosocial Medicine Credits: 2
- PHA 521 - Pathophysiology Credits: 3
- PHA 522 - History/Physical II and Clinical Skills Credits: 3
- PHA 523 - Clinical Medicine I Credits: 4
- PHA 524 - Pharmacology II Credits: 3
- PHA 525 - Diagnostics I Credits: 2
- PHA 526 - Introduction to Research/Evidence-Based Medicine Credits: 2
- PHA 541 - Clinical Medicine II Credits: 4
- PHA 542 - Diagnostics II Credits: 2
- PHA 543 - Research Methods, Designs Credits: 3
- PHA 544 - Pediatrics Credits: 2
- PHA 545 - Emergency Medicine Credits: 2
- PHA 546 - Surgery Credits: 2
- PHA 547 - Women's Health Credits: 2
- PHA 601 - Professional Practice Issues I Credits: 1
- PHA 602 - Issues in Geriatrics I Credits: 1
- PHA 603 - Professional Practice Issues II Credits: 1
- PHA 604 - Capstone Credits: 2
- PHA 605 - Issues in Geriatrics II Credits: 1
- PHA 606 - Professional Practice Issues III Credits: 1
- PHA 651 - Primary Care Rotation I Credits: 4
- PHA 652 - Primary Care Rotation II Credits: 4

- PHA 653 - Internal Medicine Rotation Credits: 4
- PHA 654 - Pediatric Clinical Rotation Credits: 4
- PHA 655 - Women's Health Rotation Credits: 4
- PHA 656 - Behavioral/Mental Health Clinical Rotation Credits: 4
- PHA 657 - Surgery Rotation Credits: 4
- PHA 658 - Emergency Medicine Clinical Rotation Credits: 4
- PHA 660 - Elective Clinical Rotation I Credits: 4

MSPAS Curriculum Plan

First Year

Fall Semester

- PHA 501 - Human Anatomy Credits: 4
- PHA 502 - Human Physiology Credits: 3
- PHA 503 - History / Physical I Credits: 3
- PHA 504 - Pharmacology I Credits: 3
- PHA 505 - PA History Credits: 1
- PHA 506 - Genetics for PAs Credits: 1
- PHA 507 - Psychosocial Medicine Credits: 2

Credits/Semester: 17

Spring Semester

- PHA 521 - Pathophysiology Credits: 3
- PHA 522 - History/Physical II and Clinical Skills Credits: 3
- PHA 523 - Clinical Medicine I Credits: 4
- PHA 524 - Pharmacology II Credits: 3
- PHA 525 - Diagnostics I Credits: 2
- PHA 526 - Introduction to Research/Evidence-Based Medicine Credits: 2

Credits/Semester: 17

Summer Semester

- PHA 541 - Clinical Medicine II Credits: 4
- PHA 542 - Diagnostics II Credits: 2
- PHA 543 - Research Methods, Designs Credits: 3
- PHA 544 - Pediatrics Credits: 2
- PHA 545 - Emergency Medicine Credits: 2
- PHA 546 - Surgery Credits: 2
- PHA 547 - Women's Health Credits: 2

Credits/Semester: 17

Second Year

Note: Clinical Rotations are listed in order of course catalog number, actual rotation schedules may vary, there are three clinical

rotations per semester.

Fall Semester

- PHA 601 - Professional Practice Issues I Credits: 1
- PHA 651 - Primary Care Rotation I Credits: 4
- PHA 652 - Primary Care Rotation II Credits: 4
- PHA 653 - Internal Medicine Rotation Credits: 4

Credits/Semester: 16

Spring Semester

- PHA 602 - Issues in Geriatrics I Credits: 1
- PHA 603 - Professional Practice Issues II Credits: 1
- PHA 654 - Pediatric Clinical Rotation Credits: 4
- PHA 656 - Behavioral/Mental Health Clinical Rotation Credits: 4
- PHA 657 - Surgery Rotation Credits: 4

Credits/Semester: 17

Summer Semester

- PHA 604 - Capstone Credits: 2
- PHA 605 - Issues in Geriatrics II Credits: 1
- PHA 606 - Professional Practice Issues III Credits: 1
- PHA 658 - Emergency Medicine Clinical Rotation Credits: 4
- PHA 660 - Elective Clinical Rotation I Credits: 4

Credits/Semester: 19

Total Credits: 103

USciences ONLINE

USciences ONLINE Admissions

Graduate Degrees:

Eligible applicants:

- Will possess an undergraduate degree from an accredited institution
- Will have earned an undergraduate cumulative GPA of 2.5
- May transfer up to 12 credits of coursework with a 2.5 GPA or better

Students can have official electronic transcripts emailed to successcoach@uscience.edu or mailed to the Admissions Office at:

University of the Sciences
600 South 43rd St
Philadelphia, PA 19104

For International Students:

- TOEFL score of at least 80, OR
- IELTS score of at least 6.5, OR
- Have completed an undergraduate degree from an English-speaking college or university. If the institution is in the U.S., the institution must be regionally accredited.

Graduate Certificates:

Admission Info

Eligible applicants:

- Will possess an undergraduate degree from an accredited institution
- Will have earned an undergraduate cumulative GPA of 2.5
- May transfer up to 3 credits of coursework with a 2.5 GPA or better

Students can have official electronic transcripts emailed to successcoach@uscience.edu or mailed to the Admissions Office at:

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- IELTS score of at least 6.5, OR
- Have completed an undergraduate degree from an English-speaking college or university. If the institution is in the U.S., the institution must be regionally accredited.

Undergraduate Degrees and Certificates:

Admission Info

- Will possess a high school diploma or General Equivalency Diploma (GED)
- Requirement to submit high school diploma or GED is waived if you have completed 10+ college credits as a degree seeking student from a regionally accredited institution prior to your enrollment at USciences.
- May accept a maximum of 90 credits towards a Bachelor's degree transferred from an accredited undergraduate program with the approval of the Director of Online Academics. Transfer credits require a grade of "C" or better. The coursework must meet the specific requirements of your program of study.

USciences ONLINE Tuition and Fees

USciences Online tuition costs are fixed and there are no additional fees.

Program	Cost Per Credit
Graduate Degree	\$750
Undergraduate Degree	\$450
Graduate Certificate	\$750
Undergraduate Certificate	\$450

If you have any questions, reach out to the financial aid office at 215.596.8894 or financialaid@uscience.edu.

USciences ONLINE Refund Policy

Students withdrawing from a course are financially responsible for the tuition charges. Students who remain active with the

University, but drop one or more classes prior to the end of each semester's drop-add period may receive a refund of charges for those classes under certain circumstances. Graduate students billed at a per-credit rate, will be refunded based on the refund schedule.

Segment or Semester Refund for 8 Week USciences Online Courses	
Before the first day of class	100%
During the first week of class	100%
During the second week of class	50%
Beyond the second week of class	No Refund

USciences ONLINE Academic Year 2020 Calendar*

Classes Begin - Spring A 2020	Monday, January 13
Classes End - Spring A 2020	Friday, March 6
Classes Begin - Spring B 2020	Monday, March 9
Classes End - Spring B 2020	Friday, May 1
Classes Begin - Summer A 2020	Monday, May 4
Classes End - Summer A 2020	Friday, June 26
Classes Begin - Summer B 2020	Monday, June 29
Classes End - Summer B 2020	Friday, August 21
Classes Begin - Fall A 2020	Monday, August 31
Classes End - Fall A 2020	Monday, October 23
Classes Begin - Fall B 2020	Monday, October 26
Classes End - Fall B 2020	Friday, December 18

USciences ONLINE Academic Year 2021 Calendar*

Classes Begin - Spring A 2021	Monday, January 11
Classes End - Spring A 2021	Friday, March 5
Classes Begin - Spring B 2021	Monday, March 8
Classes End - Spring B 2021	Friday, April 30
Classes Begin - Summer A 2021	Monday, May 3
Classes End - Summer A 2021	Friday, June 25
Classes Begin - Summer B 2021	Monday, June 28
Classes End - Summer B 2021	Friday, August 20

Classes Begin - Fall A 2021	Monday, August 30
Classes End - Fall A 2021	Friday, October 22
Classes Begin - Fall B 2021	Monday, October 25
Classes End - Fall B 2021	Friday, December 17

USciences ONLINE Academic Year 2022 Calendar*

Classes Begin - Spring A 2022	Monday, January 17
Classes End - Spring A 2022	Friday, March 11
Classes Begin - Spring B 2022	Monday, March 14
Classes End - Spring B 2022	Friday, May 6
Classes Begin - Summer A 2022	Monday, May 9
Classes End - Summer A 2022	Friday, July 1
Classes Begin - Summer B 2022	Monday, July 4
Classes End - Summer B 2022	Friday, August 26
Classes Begin - Fall A 2022	Monday, August 29
Classes End - Fall A 2022	Friday, October 21
Classes Begin - Fall B 2022	Monday, October 24
Classes End - Fall B 2022	Friday, December 16

*Academic calendars are subject to change visit <https://online.usciences.edu/> for the latest information.

USciences ONLINE Academic Policies

Academics

The information, Online academic policies, and procedures outlined below are designed to guide USciences Online students during their studies. They do not constitute a binding contract and may be changed at any time. For assistance with these policies and procedures, speak with your Student Success Coach or Director of Academics.

Please note that some academic programs have additional requirements that are delineated in the *University Catalog*.

Catalog Year for Degree Requirements

Catalog Year is a term that refers to a set of degree requirements as they apply to individual students in their progress toward earning a degree from USciences. Catalog Year starts with the summer term of each academic year. For example, the 2019 Catalog Year starts with the 2019 summer semester (19/SU). For USciences Online courses, each semester contains two terms (A&B).

Generally, students are responsible for the degree requirements in force for their major at the time when the student initially enrolls as a first-year (U1) student. Catalog Year is used by the Degree Audit system to evaluate a student's progress toward meeting the degree requirements that apply to them in their current major. Certain circumstances listed below have special rules governing Catalog Year.

- **Transfer Students**—Catalog Year for Undergraduate Online transfer students will be backdated to the Catalog Year when they would have started attending the University as a first-year student. Students entering with a prior bachelor's degree are considered to have met the requirements of General Education and do not have to satisfy the specific requirements of General Education.
- **Change of Major**—If a student changes his/her major, his/her Catalog Year will remain the same as his/her original entering year.
- **Leave of Absence**—Students who return from an official Leave of Absence retain their original Catalog Year, which is based on their original entrance to USciences.
- **Readmitted Students**—Students who are readmitted after having been separated from the University should have the same Catalog Year as a normally progressing student in the Class Level into which the student is readmitted. This is the same as a transfer student.
- **Readmitted Students (Academic Fresh Start)**—Students who are readmitted under the Academic Fresh Start program are treated as new first-year admissions. They will have the Catalog Year appropriate for a first-year (U1) student entering USciences in the semester in which they reenter the University.

Family Educational Rights and Privacy Act (FERPA) Policy

Access to Education Records

Annual Notice to Students

University of the Sciences fully complies with the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. This law is sometimes referred to as the Buckley Amendment.

The act grants students specific rights and protections with regard to their education records. It governs access to, release of, and corrections to the records kept by the University on current and former students. These rights do not extend to individuals who never actually attend the University.

Students wishing to review or correct their education records should submit a written request to the Registrar indicating which records they wish to review or what corrections they believe are necessary. If the records in question are not in the control of the Registrar, the request will be forwarded to the appropriate University official. While prompt attention is given to all such requests, the University reserves the right to respond no later than 45 days after receiving a request.

Education records are available to University officials and agents with legitimate educational interest. Such interest exists when access to the records is necessary for the official or agent to perform his/her professional duties. An agent may include a person or company (including contractors and consultants) with whom the University has contracted to provide a service that the University would otherwise perform and may include a communication and data service, an attorney, an auditor, a collection agent, etc. This also may include officials at other educational institutions with which USciences has a partnership agreement for student enrollment. Personally identifiable information from students' education records is only released, other than to University officials and agents, upon a specific written and dated request from the student or as provided for by federal or state law.

As of January 3, 2012, the U.S. Department of Education's FERPA regulations expand the circumstances under which a student's education records and personally identifiable information (private information) contained in such records—including Social Security number, grades, or other private information—may be accessed without the student's consent. First, the U.S. Comptroller General, the U.S. Attorney General, the U.S. Secretary of Education, or state and local education authorities ("Federal and State Authorities") may allow access to a student's records and private information without the student's consent to any third party designated by a Federal or State Authority to evaluate a federal- or state-supported education program. The evaluation may relate to any program that is "principally engaged in the provision of education," such as early childhood education and job training, as well as any program that is administered by an education agency or institution. Second, Federal and State Authorities may allow access to a student's education records and private information without the student's consent to researchers performing certain types of studies, in certain cases even when the University objects to or does not request such research. Federal and State Authorities must obtain certain use-restriction and data security promises from the entities that they authorize to receive a student's personally identifiable information, but the Authorities need not maintain direct control over such entities. In addition, in connection with Statewide Longitudinal Data Systems, State Authorities may collect, compile, permanently retain, and share without the student's consent private information from education records, and they may track a student's participation in education and other programs by linking such private information to other personal information about the student that they obtain from other federal or state data sources, including workforce development, unemployment insurance, child welfare, juvenile justice, military service, and migrant student records systems.

The following information related to a student is considered "Directory Information" and under FERPA, the University may

release the following without a student's prior consent: the student's name, USciences ID number, address, e-mail address, telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, enrollment status, degrees and awards received, photograph, class level, undergraduate/graduate status.

The University reserves the right to disclose directory information to anyone inquiring without the student's written consent and will limit information made public to these categories. Students can request that any or all such information not be released by informing the Registrar's Office, in writing before the end of drop/add each semester.

A copy of the University's policy in compliance with FERPA can be obtained upon request from the Registrar's Office. All questions regarding FERPA should be directed to the Registrar. Information is also available from, and students have a right to file a complaint regarding compliance with, the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202-5920.

Taking and Completing Courses Attendance Regulations

There are certain kinds of information and certain intangible values gained by attendance/participation in classes that are not capable of being measured by examinations and which a student will lack as a result of excessive absence. Accordingly, attendance in all classes is strongly encouraged. University-wide attendance regulations for Online students are listed below; additional requirements for attendance are determined by course instructors and will be included in the course syllabus.

All Online students are required to academically participate in their course no later than 11:59 PM EST on the 7th calendar day of class within the session. Academic participation will be determined by completion of the required activities as assigned by your professor in the course. Those students who do not demonstrate any academic participation may be administratively dropped from their course(s) by the Office of the Registrar, with a full reversal of tuition and fees. Students who are dropped from course(s) due to lack of participation will not be eligible to receive disbursements of federal financial aid.

Absence Due to Religious Observations

The University of the Sciences appreciates the religious and spiritual diversity of our campus community, and recognizes that upon specific occasions, reasonable efforts should be made to accommodate the religious observances of faculty, students, and staff.

University policy grants students excused absences from class(es) for observance of religious holy days, unless the accommodation would create an undue hardship for the instructor. Faculty are asked to be responsive to requests when students contact them IN ADVANCE to request such an excused absence. Students are responsible for completing assignments and assessments due during their absence.

Once a student has registered for a class, the student is expected to examine the course syllabus for potential conflicts with holy days and to notify the instructor (by the end of the first week of classes for assignments and assessments during the 8 weeks of instruction and by the end of the fourth week of instruction for final exams) of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class(es) or assessments, and to make arrangements in advance (with the faculty member) to make up any missed assignments or assessments within a reasonable amount of time.

Faculty should keep in mind that religion is a deeply personal and private matter and should make every attempt to respect the privacy of the student when making accommodations.

If a student and course instructor cannot agree on an accommodation, the student may bring the matter to the Director of Academics for a decision prior to the missed class.

Absence from and Makeup of Examinations

- Each instructor must include his/her makeup examination policy in his/her course syllabus. It is the discretion of the instructor to decide which makeup reasons are valid and when the makeup examination or assessment will take place.

- Post-semester makeup examination policy: As during final examinations, students with more than 3 post-semester makeup examinations scheduled within a 24-hour time period who desire a different time and date for one or more than one of the makeup examinations must contact the faculty administering the examination(s) at least one week prior to the makeup examination date to request an alternative date and time.
- Incomplete grades must still be finalized within 21 calendar days of the end of the term.

Rules Governing Examinations and Graded Assessments

Rules governing the administration of examinations and graded assessments, as well as policies related thereto, are determined by course instructors and will be included in the course syllabus. For the purposes of this policy the term "graded assessment" includes examinations and other activities where students are assessed.

- Course Materials: [§§] Graded assessments that are not returned to students will be available from the instructor, course coordinator, or Director of Academics for student review for 45 calendar days following the final date for that course.

Academic Standards and Academic Progress

Definition of Full-time Status for Academic Purposes

Full-time status for undergraduate students for academic purposes is defined as 12 or more credits of registered coursework at the end of the drop/add period.

Full-time Master's students are expected to complete all the requirements for their degree in two academic years. All students pursuing Master's degrees must complete their degree requirements within a five-year time period.

Full-time Enrollment: USciences Online MS and Graduate Certificates students, the minimum credit load for full-time status is 6 graduate credit hours per semester (fall, spring, or summer). Students in these programs who enroll in at least 3 semester hours of graduate study are considered to be half-time students.

General Information

The information in this section presents only *university-wide* academic standards.

Students in graduate degree programs (MS, MBA, MPH, PhD) and those in graduate level-certificate programs should consult with their Program Director for any information relevant to their discipline or the profession.

It is also important to note that many major programs have specific academic standards for academic standing, progression, graduation, etc. Please refer to the individual program sections of the *University Catalog* (catalog.usciences.edu) for information related to these standards.

Student Comments and Complaints

See Student Grievance Policy included with Orientation documents.

Grade Change Policy

Course grade changes shall only be made by the instructor of record in the student information system currently employed by the University for up to two months after the end of the term in which the student was registered for the course. Changes in course grades originally assigned by an instructor who is no longer an employee of the University may be made by the Program Director who has responsibility for teaching the course for up to two months after the end of the term in which the student was registered for the course. After two months, all grade changes must be approved by the instructor of record (if still employed by the University), and the Director of Academics.

Students requesting changes in course grades must present to the instructor of record (or to the Program Director if the instructor of record is no longer employed by the University) a copy of the course syllabus or other documents describing how final grades are determined, copies of all available graded materials, and a record of all communications between the student and the instructor regarding the course grade.

Transcripts

Student transcripts are maintained by the Registrar's Office and are covered by the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. Students may request that an official copy of their transcript be sent to a third party (e.g., another college/university or an employer); an unofficial copy may be requested for the student's personal use. An official transcript carries an authorized signature as well as the seal of University of the Sciences.

All requests for transcripts must be made in writing and signed by the student. There is a charge for each official transcript (\$6 as of 2019), which is subject to change. Unofficial transcripts are free to students. University of the Sciences does not release transcripts unless tuition, fees, and other obligations due the University have been satisfied. More information regarding transcript requests is available on the University website at <https://www.usciences.edu/academics/academic-resources/registrar/transcripts-enrollment-verification.html>

When a course is repeated/replaced, both courses will appear on the transcript. Replaced Courses are marked with the asterisk (*) symbol indicating the higher of the two grades has been used in the calculation of the GPA . Repeated Courses are marked with a pound or hashtag (#) symbol indicating all grades are included in the calculation of the GPA.

Students may view their official course grades and GPA information for each term online through WebAdvisor after faculty members have submitted grades for the term. Grades are not mailed to students.

Requirements for Graduation

To fulfill its obligation to the precepts of higher education, University of the Sciences has established standards of achievement that must be met before any student is recommended for graduation by the faculty. Every person upon whom a degree shall be conferred must have successfully completed the assigned curriculum and must have met the specific graduation requirements pertaining to the degree to be conferred.

A student must complete all graduation requirements by:

- The end of the fall B, spring B, or summer B term, or
- The 1st day of the month of July or November.

Any student not meeting these deadlines will be delayed until the next graduation date.

To qualify for an earned degree, students must:

- Fulfill all of the requirements of the respective curriculum, including achieving at least the minimum academic requirements and passing all proficiencies required by the University and the major, as outlined in this Catalog and in the policies of the individual academic programs.
- Be in good academic standing, having satisfied all academic and program requirements, and be free of all conduct holds at the conclusion of the final semester of enrollment.
- File a Petition for Graduation at the start of the final semester of matriculation. To participate in the May Commencement Ceremony, the Petition for Graduation must be submitted by the end of the drop/add period of the spring semester, term A.

Only those students who have fulfilled all requirements for graduation by the end of the spring semester (term A or B) will be permitted to participate in the commencement ceremony.

Students with financial and/or conduct holds will not receive a diploma and will not be able to obtain a copy of their transcript until the hold(s) is/are released. If a financial or conduct hold is in place, the University will not respond to requests for verification of graduation status on the graduate's behalf.

Separation from the University

Dropped from the Rolls

Students will be dropped from the rolls if they:

- Complete any three semesters (six terms), whether full-time or part-time, with an academic record resulting in academic probation; or
- Fail the same course twice. This regulation applies whether the course is taken in regular sessions or in summer school, whether at the University or at another institution.

Students who do not meet the criteria for progression in their curriculum may be subject to being dropped from the rolls (refer to section on Academic Standards and Academic Progress).

Students who are dropped from programs for exceeding program probations will be dropped from the University rolls if they are not admitted to a program by the end of the drop/add period following the term they were dropped from their program.

The Director of Academics will officially notify the student of this action and notify pertinent University offices of the change in status. A student who is dropped from the rolls is not eligible to attend any courses at the University. (Refer to sections on Readmission to the University and Fresh Start Readmission for readmission policies.)

Leave of Absence

Short-Term Leave of Absence Policy (No more than 10 businessdays)

In the event of an immediate and significant health or family emergency* a student may request from his/her Director of Academics, a Short-Term Leave of Absence (Short term LOA). A Short-Term Leave of Absence is intended to provide the student an opportunity to address the issue and then resume his/her academic course of study. If the student cannot resume his/her studies after 10 business days, the student may apply for a LOA for a longer period of time.

For any impact on fixed tuition rates, please reference the tuition policy.

*Examples of a *significant health or family emergency* include accident, injury, or illness requiring hospitalization; or health and/or safety concern (i.e., risk to self or to others), or death of a parent, sibling, or significant other. A Short-Term LOA does not negate or preclude the administration of the conduct policy or the administrative withdrawal policy.

To request a Short-Term LOA, the student should first contact his/her Director of Academics. The student may be asked to provide documentation to verify the circumstances. Upon approval of a Short-Term LOA, the Director of Academics will notify the applicable Program Director, course instructors, Student Success Coach, and Student Affairs. Upon return to the academic program, the student is responsible for working with the instructors to complete the course requirements as specified in the course syllabus.

Personal Leave of Absence and Medical Leave of Absence

There are two additional types of leaves of absence, a Personal Leave of Absence and a Medical Leave of Absence.

A leave of absence affords students the opportunity to remain in academic standing with their program and not have to reapply for admission. A leave of absence form must be requested from the Student Success Coach, completed and submitted to the student's Director of Academics and Student Success Coach.

The leave of absence may have financial aid implications and the student should meet with Financial Aid prior to the leave of absence and at the time they return from the leave. To be in compliance with Title IV Financial Aid Programs, USciences reports the student as "Withdrawn" from USciences to the National Student Loan Data System (NSLDS) on the date the leave begins.

Reasons a student may be granted a personal leave of absence include but are not limited to personal or financial problems or military service. To be considered for a personal LOA, the student must:

- Submit a written request for the leave to his/her Director of Academics and provide documentation to verify the circumstances cited in the request for the leave.
- Speak with his/her Director of Academics, or designee, to review the request, including the precipitating circumstances and submitted documentation.

A medical leave of absence may be requested when a student's medical or psychological condition significantly impairs his/her ability to function successfully or safely in the academic environment. Requests for a medical leave of absence are coordinated through the Dean of Students' office.

To be considered for a medical leave of absence, the student must take the following steps:

- Have a major mental or physical health issue that cannot be mitigated in a short period of time, such as an incident involving a major accident, injury, or significant illness requiring hospitalization or extended treatment.
- Meet with the Dean of Students or his/her designee to review the precipitating health concerns.
- Provide documentation from a licensed health professional. The documentation must be typed and submitted on official letterhead and must include the name, address, office telephone number, license number, and signature of the health

professional. The documentation should specify the length of time needed for the leave and the reason for the leave. The Office of the Dean of Students will make the final determination if a personal or medical leave of absence will be granted and will notify the student in writing.

Upon approval of a personal or medical leave of absence, the Director of Academics will notify the Program Director, course instructors, Student Success Coach, Student Affairs, Financial Aid and other pertinent USciences offices.

The Director of Academics will also determine the status of the student's current coursework and whether or not the student should be withdrawn from courses. A grade of "W" may be assigned by the Director of Academics to all registered coursework based on the effective date for the personal or medical leave of absence. The instructor for each course will have 10 working days from receipt of notice to reassign a course grade if appropriate.

If a medical leave of absence is granted, the Dean of Students will monitor the treatment with the student and licensed health professional. The Dean of Students may require additional documentation including medical evaluation, treatment plans, and evidence of compliance with treatment.

To return from a medical leave of absence, the student must submit medical documentation to the Dean of Students from a licensed health professional regarding his/her health status and ability to return to his/her studies. After reviewing the medical documentation, the Dean of Students will notify the Director of Academics whether the student is permitted to return to resume his/her academic course of study.

To return from a personal or medical leave of absence, the student must communicate with his/her Director of Academics by the return date specified on the leave of absence form. The Director of Academics will then notify the pertinent USciences offices that the student has been placed on "active" status. If the student does not return by the return date specified on the leave of absence, the student will be administratively withdrawn from USciences by the student's Director of Academics.

Bereavement Policy

The University recognizes that students may suffer greatly from the loss of a loved one. Students suffering from bereavement should refer to the policies on Short-Term Leave of Absence, Leave of Absences, and Course Withdrawal for information on means to address this issue.

Advised to Withdraw

A student may be advised to withdraw from the University either on the grounds of conduct or academic standing.

Voluntary Withdrawals from the University

An official withdrawal from the University must be authorized by the Director of Academics responsible for the student's degree program. A student will be officially withdrawn from the University once the student contacts the office of the Director of Academics responsible for the student's degree program and provides notification of intent to withdraw either verbally or in writing. This notification must include the student's name, current address, phone number, and student identification number or other acceptable information that establishes the identity of the student. The date the student notifies the Director of Academics of his/her withdrawal from the University will be the official effective date of withdrawal. If a student cannot directly contact the Director of Academics due to illness, accident, grievous personal loss, or other such circumstances beyond the student's control, another individual, acting on the student's behalf, can provide the notice of intent to withdraw. Once the Director of Academics verifies that the individual is authorized to act on the student's behalf, the date of withdrawal is effective as of the date of the initial notification.

A student who contacts the Director of Academics and only requests information on aspects of the withdrawal process, such as the potential consequences of the withdrawal, would not be considered to be withdrawn. However, if the student indicates that he/she is requesting this information because he/she will cease to attend USciences, the student would be considered to have provided official notification of his/her withdrawal.

The Director of Academics may request that the student submit the withdrawal request in writing or have an interview with the Director of Academics, but this is strictly voluntary and not required for withdrawal. The student must not attend any academic function or classes after notifying the Director of Academics that he/she is withdrawing from the University. The Director of Academics will notify the student and the pertinent University offices of the withdrawal.

When a withdrawal from the University is authorized by the Director of Academics, a "W" grade will be assigned for all courses in which the student is currently registered, unless the student withdraws during the drop/add period or after the conclusion of a term. The instructor for each course will be notified by the Director of Academics of the student's withdrawal and will have 10

working days from receipt of notice to reassign a course grade.

Administrative Withdrawal

A student may be withdrawn from the University for major violations of University policy or for nonattendance. A typical reason for an administrative withdrawal includes noncompliance with University policy (e.g., nonpayment of debt or exceeding program time limits).

If a student who has ceased to attend the University did not begin the voluntary withdrawal process by contacting the Director of Academics responsible for the student's degree program, the Director of Academics will administratively withdraw the student. The date that the Director of Academics learns of the student's nonattendance will be the official effective date of withdrawal.

An administrative unit may initiate the administrative withdrawal action, but authority to withdraw a student for administrative reasons rests with the student's Director of Academics. The student will be informed in writing by the Director of Academics of the action to withdraw and the criteria for readmission. The Director of Academics will also notify pertinent University offices.

Admission to an Academic Program after being Dropped from a Program

There is no guarantee of admission to a particular program after a student has been dropped from his/her academic program(s) based on program academic standards. The faculty reserves the right to readmit a student to his/her previous program or to admit a student to a different program based on individual program policies, and in this matter the faculty shall be the sole judge. Students should review the academic standards of specific programs and any program-specific application deadlines found in the University Catalog.

Readmission to the University

There is no guarantee of readmission following a separation from the University. The faculty reserves the right to readmit a student, and in this matter the faculty shall be the sole judge.

Students who voluntarily withdrew from the University or were dropped from the rolls of the University may file an application for consideration of readmission with the Online Director of Academics of the program in which they seek to re-enroll. To be considered for readmission, applications must be submitted no later than two weeks prior to the start of a term.

Students who were dropped from the rolls of the University for either three semesters with an academic record resulting in academic probation or conduct expulsion will not be granted readmission for at least one calendar year from the date of separation from the University. Students who were dropped from the rolls of the University for failing the same course twice may immediately apply for readmission to a program in the University.

The application for readmission must provide evidence of the student's ability to complete his/her degree program. The application must be accompanied by any official transcripts of all course(s) taken at other accredited colleges or universities during the period of separation from University of the Sciences.

Readmission of Military Service Members

In accordance with the federal Higher Education Opportunity Act, students who leave the University to perform military service will be readmitted with their previous academic status intact, for an absence of up to five years in length. Students must provide advance notice of their intent to perform military service and must also provide notification of intent to re-enroll. This readmission policy, as well as the requirements for advance notice and notification to re-enroll, is subject to exceptions as noted in the law.

Fresh Start Readmission

A student may apply for readmission under the Fresh Start policy under the following circumstances: 1) the student has left the University after failing to achieve good academic standing, and 2) the student will have been absent from the University for at least one year between the date of withdrawal and the start date of the semester for which readmission is sought.

If a student is readmitted under the Fresh Start policy, his/her transcript will note all credits attempted and grades earned at University of the Sciences prior to readmission. However, grades previously earned will not contribute to the current grade point average calculations, and courses previously attempted will not be accepted toward fulfillment of the student's current degree

requirements.

Acceptance of transfer credits from other institutions will be granted in accordance with current University policy.

After Fresh Start readmission, the student must comply with all current academic regulations required by the University and his/her degree program. No student will be readmitted under this policy more than one time. Once a student is re-enrolled under the Fresh Start policy, the decision to treat the academic record as described above is irrevocable.

Students will be informed of the Fresh Start policy upon exiting the University and upon application for readmission in accordance with current University policy.

The final decision regarding readmission, including readmission under this Fresh Start policy, rests with the University's faculty. The possible effect of the Fresh Start policy will be only one of the factors used in considering application for readmission.

USciences Online Graduate Academic Policies

All graduate students are expected to abide by all University policies including the Student Code of Conduct outlined in the *Student Handbook*.

Student Success Coach for Graduate Students

All graduate students are assigned a Student Success Coach on entering the program. The Student Success Coach(s) will act as the student's guide to navigate course selection and aid the student in getting started in their degree program.

The responsibilities of the Student Success Coach are to:

- Be knowledgeable about the graduate policies and procedures and those of the program
- Serve as the principal liaison between the student and the Director of Academics
- Authorize course selection for the purpose of registration and assist the student in completing the registration process
- Monitor the student's academic progress

Students are encouraged to stay in close contact with their Student Success Coach. Should a student experience any difficulty, they should contact the Student Success Coach. Should the Student Success Coach become incapacitated or leave the institution, the Director of Academics will assign a new Student Success Coach.

Grading and Point System

The following grading system is used to indicate the quality of academic performance of graduate students at USciences:

Grade	Points	Description	Grade	Points	Description
A and A+	4.0	Exceptional	C	2.0	
A-	3.7		C-	1.7	
B+	3.3	Very Good	D+	1.3	
B	3.0		D	1.0	
B-	2.7	Minimum expectation	D-	0.7	
C+	2.3	Below expectations	F	0	Failure

Only courses in which the graduate student earns a grade of C+ or better can be applied toward meeting the minimum requirements of the USciences Online graduate degrees.

For courses taken on a pass/fail basis, the final course grade will be either 'P' pass (no point value and not included in the calculation of a grade point average) or 'F' failure (value of 0 and included in the calculation of the GPA).

Grade Requirements – Academic Standards

A USciences Online graduate student is expected to complete each didactic course with a minimum grade of C+. Only courses in which a student earns a grade of C+ or higher can be credited toward their graduate degree requirements. While the graduate student may be required or may elect to take courses that are numbered below 700, only courses numbered 700 or above carry graduate credit.

The cumulative grade point average is computed using every course for which a letter grade has been received while as matriculated or non-matriculated graduate student at USciences.

A graduate student who fails to maintain a cumulative grade point average of 2.70 or higher or receives an unsatisfactory rating in research from the Research Advisory Committee will be placed on academic probation.

Academic Probation Requirements:

1. Must achieve a 2.70 cumulative GPA at the end of three successive terms following the term in which the student was placed on probation *and*
2. Must maintain at least a 2.70 semester GPA in any term in which student is on probation

Failure to meet either of these requirements will result in dismissal from the graduate program.

Graduate students, who initially register only for courses which do not earn a regular letter grade, e.g., research credit or audit, and thus have no cumulative grade point, are exempt from the rule requiring a cumulative grade point average of 2.70 each term. Graduate students who receive an incomplete grade may be placed on academic probation retroactively once the grade is converted to a final grade.

A graduate student placed on academic probation because of an unsatisfactory rating in research for two consecutive terms or for any three terms will also be dismissed from the graduate program.

The student may appeal a dismissal by writing a letter to the Director of Academics within one week of receiving written notification of dismissal, outlining the reasons why he/she should not be dismissed.

Repetition of a Course

A graduate student must receive a C+ or better to earn graduate credit. If a grade of less than a "C+" is earned for a required course, the course must be repeated. A graduate student may be required by the program to repeat an elective course in which a grade less than C+ was received. If the course is repeated at USciences, both courses will appear on the student's academic record and will be used in calculating the cumulative grade point average.

When a course is repeated successfully, at another accredited institution, with a C+ or higher grade, credit may be granted. However, the passing grade is not computed in the cumulative grade point average. The original grade remains on the academic record and is used in calculating the cumulative grade point average.

Grade Replacement

If a student is placed on probation for not having a cumulative GPA of 2.700, the student will be given three semesters to raise her/his cumulative GPA to at least 2.700. During this time on probation, the student must earn a semester GPA of at least 2.700 each semester while on probation. If either of these conditions is not met, the student will be dismissed from the graduate program.

To assist a graduate student who is on probation in overcoming this GPA deficit, up to three graduate-level courses (one for graduate certificate programs) in which the student did not receive a grade of at least a B- may be repeated. The courses must be identified by the student and agreed to by the student's Director of Academics at the beginning of the probationary period. At the discretion of the Director of Academics, in the case of elective courses, a suitable replacement course may be identified instead of repeating the original course. Upon completion of the replacement course, the previous grade of the course being replaced, while noted on the student's transcript, will not be counted in the student's cumulative GPA. Courses in which the student was found to be guilty of a conduct issue (e.g., such as cheating, plagiarism, etc.) cannot have grades replaced by this mechanism.

Withdrawal from a Course

To withdraw officially from a course, the student must submit a completed Course Withdrawal form to the Registrar's Office,

which includes the signature of the course instructor and the Director of Academics. The designation W (Withdraw -- no point value -- not included in calculation of the GPA) will be assigned after completion of the official withdrawal from a course. In such cases, the student will be financially liable for the course.

A student who fails to complete the course withdrawal will not be considered to be withdrawn from the course and will receive an appropriate letter grade at the end of the term.

Late withdrawals may be granted by the Director of Academics only under extremely extenuating circumstances such as a major illness, extreme change in job responsibilities that make it impossible to fulfill academic responsibilities, or major health issue/death of an immediate family member.

Incomplete Grades/Courses

An incomplete is a privilege, not a right, to be determined by the course instructor. It is the student's responsibility to request an incomplete from the course instructor. It is the faculty member's prerogative to approve or refuse the request.

Students not fulfilling course requirements at the completion of the term may be assigned an "In Progress" designation on their transcript. The instructor is required to replace this "In Progress" designation with a final grade as soon as possible, but no later than 21 calendar days from the end of the term or the end of the Drop/Add period of the next term, whichever comes first. If the instructor has not entered a final grade within the prescribed time limit, the Registrar will automatically enter a grade of 'F' and inform the instructor. Extension beyond 21 calendar days may be granted by the course instructor in consultation with the Program Director in exceptional cases.

Students will sign an Incomplete Contract for each course for which an extension is approved. The instructor will determine what the student must do (e.g., take one or more examinations, perform laboratory work, turn in reports, turn in notebooks, perform library assignments, etc.) in order to meet contract requirements. Information regarding requirements to complete the course will be supplied to the student directly by the instructor. The student is responsible for completing the work in the time allotted.

Audit

Graduate students may audit a course with the approval of the course instructor and Director of Academics. Students who audit a course do not take examinations and do not receive a grade for the course. Students should advise their Student Success Coach of their intent to Audit a course. The audit symbol AU is entered for the registered course on the student's record. Students cannot convert from audit to credit status or the reverse after the designated drop/add period.

Note: Audited course will not count toward meeting the minimum degree requirements and cost 1/2 of the normal tuition charge for the course. Students receiving a tuition scholarship may not use these funds to pay for an audited course.

Pass/Fail Option

An instructor may designate an elective course as a pass/fail elective for some or all students taking the course.

A student who wishes to take on a pass/fail basis a course which has been designated as a pass/fail election must make all necessary arrangements with the instructor prior to the end of the drop/add period. After the drop/add period the election is irrevocable. A student may make only one pass/fail election per term.

All pass/fail courses will appear on a student's transcript. However, credit for courses taken on a pass/fail election is not included in the minimum number of credit hours required for a degree.

Registration

All matriculated USciences Online graduate students are required to register, each term, for a minimum of one didactic or research credit, or *in absentia* with the permission of the Director of Academics.

The course selection in a particular term depends on the course requirements established by the Director of Academics. The Student Success Coach will assist the student in the appropriate course selection. For USciences Online students, the Student Success Coach will register the student for courses.

Students wishing to change their roster of courses may only do so during the designated drop/add period or by returning the

completed drop/add form with the proper signatures.

Students who will not enroll in any didactic or research credits in a given term must register *in absentia* (course AB800) and will not receive any financial aid; however, the student's academic record will remain active. Students who are receiving extramural financial aid should check with the Financial Aid Office to determine the impact of being *in absentia* on their financial aid before electing this option. Time spent in *absentia* will count toward the maximum time allowed to complete degree requirements.

Matriculated students who do not properly register for classes at USciences or do not register *in absentia* by the end of the drop/add period in each semester will be administratively withdrawn and will be required to reapply for admission to their program of study. Upon reapplication for admission all applicable fees and charges are assessed. Such students will not be eligible to appear on class lists, attend classes/labs, receive grades, or earn credit.

Students may not register *in absentia* for two consecutive terms without the written approval of their Director of Academics. Students considering a longer absence from their graduate studies should apply for a leave of absence.

Usually, all matriculated graduate students are required to register for a minimum of one credit during their terminal term. The terminal term is defined as *the term in which the student completes all degree requirements* -- not the term in which the student is to graduate (i.e., when the student receives the diploma).

An exception to this policy would be for the case in which a student has one or more outstanding grades of incompletes from the previous term in the *final didactic courses* (not including research courses) needed to complete the degree requirements; in this case, with the permission of the Director of Academics, the student may complete the degree requirements by converting the incomplete grade during the term without registering for additional credits. Students in the research phase of their degree must register for one credit each term until they have successfully completed their thesis/dissertation.

The completion of degree requirements means that the student must have completed all didactic, laboratory and project requirements of the program, including the minimum number of course requirements, and all research requirements, including journal papers, successful defense and submission to the Director of Academics of an approved, final copy of the M.S. thesis or Ph.D. dissertation.

Student Hold

Students who have a hold on their academic record are not eligible to register for classes and will not be officially enrolled even if they have submitted the proper registration documents. If a hold has been placed on a student's record, the Registrar will confirm this for the student. The student must then contact the appropriate office(s) and take the necessary steps to clear the hold. If the hold is not cleared prior to the end of the drop/add period, the student will not be allowed to register for or attend classes, receive grades or earn credit during that term and will be administratively withdrawn. The student will be required to reapply for admission to the program of study. All applicable fees and charges will be assessed upon reapplication for admission. **Such students will not be eligible to appear on class lists, attend classes, receive grades, or earn credit.**

Leave of Absence

While graduate students are required to enroll for didactic and/or research credits or *in absentia* each term, circumstances may necessitate that a student be absent from the University.

Graduate students may request a leave of absence for up to three consecutive terms by completing a Notification of Student Separation form indicating the effective date, expected return term, and rationale for the request. This Separation form can be requested from the student's Student Success Coach. If the request is approved by the student's Student Success Coach and Director of Academics the leave is granted and the student will be notified. A leave of absence due to medical reasons must be coordinated through the Office of the Dean of Students.

Time during a leave of absence will not count toward the maximum time allowed to complete degree requirements. All financial aid ceases during the leave of absence and there is no guarantee that financial aid will resume upon the student's return.

If the leave of absence occurs after the drop/add period but before completion of the fourth week of the term, the student will be withdrawn from the rolls of each class and will be assigned a grade of W. Students who withdraw after the drop/add period will receive no tuition refund and are responsible for 100% of the tuition for the courses they are to withdraw from.

In extremely unusual and highly extenuating circumstances, such as extreme illness, death in the family, etc. the Director of Academics may allow the student to withdraw after the normal withdrawal period. If the leave of absence occurs after the normal withdrawal period, the student will receive a grade determined by the course instructor of each course. Again, there is no tuition

refund after the end of the drop/add period.

If the student cannot return by the expiration date of the leave of absence, he/she should notify the Director of Academics in writing at least two weeks prior to the expiration date. Normally the Director of Academics will recommend that the student officially withdraw from the graduate program until the student is able to return to his/her studies. However, under extremely unusual circumstances, the Director of Academics may recommend that the student request an extension of the leave of absence.

If the student is not granted an extension or does not officially withdraw from the University and fails to check in with the Director of Academics by the expiration date of the leave of absence, the student will be automatically administratively withdrawn from the graduate program as of the date of last attendance.

Withdrawal

A student may be withdrawn from the University for academic, disciplinary or administrative reasons.

Voluntary Withdrawal:

A student may voluntarily withdraw officially from USciences Online by notifying the Director of Academics. A student will be officially withdrawn from the University once the student contacts the Director of Academics responsible for the student's degree program and provides notification of intent to withdraw either verbally or in writing. If feasible, the Director of Academics may ask the student to complete a check-out process. The student's record becomes inactive on the effective date of withdrawal and any applicable fees must be paid in full.

Administrative Withdrawal:

Any student who does not follow the official withdraw procedure will be administratively withdrawn, inactivating his/ her record. As stated in the University handbook, "a student may be withdrawn from the University for major violations of University policy or for nonattendance. A typical reason for an administrative withdrawal includes noncompliance with University policy (e.g., nonpayment of debt or exceeding program time limits)". The student will have up to the maximum time allowed to complete the degree requirements, which will include all periods of matriculated enrollment in the college and the time elapsed since the administrative withdrawal.

Dropped from the Rolls:

Students will be dropped from the rolls if they:

- Complete any three semesters, whether full-time or part-time, with an academic record resulting in academic probation.
- Fail the same course twice with a grade of "F"; this regulation applies whether the course is taken in regular sessions at the University or at another institution.
- Students who do not meet the criteria for progression in their curriculum may be subject to being dropped from the rolls.

The Director of Academics responsible for the student's major will officially notify the student of this action and notify pertinent University offices of the change in status. A student who is dropped from the rolls is not eligible to attend any courses at the University

Should the student petition for readmission to his/her program of study and the petition is granted, the student will have the maximum time allowed (minus any previous time periods of matriculated enrollment) to complete degree requirements. All applicable fees and charges will be assessed upon reapplication for admission.

Readmission

There may be times in which a graduate student withdraws from a graduate program of his/her own volition, is academically withdrawn from the program or is dropped from the rolls for various reasons. In such cases, the student may reapply to the same or different academic program after the situations that caused her/him to leave the University have changed and there is a reasonable expectation of academic success.

If a former student wishes to apply to a different academic program they must go through the normal application process, except that s/he must clearly indicate in a letter to the Director of Academics why s/he wishes to return to their graduate studies at USciences Online and what circumstances/situations have changed to help insure their academic success.

Depending on the circumstances, the student may wish to reenter the University in the same or a different graduate degree track program than the one in which s/he had been previously matriculated. Frequently in such cases, the student may have left the institution due to academic difficulties. Often in such cases, even if the faculty and Director of Academics reasonably believe that the student is capable of success in their graduate studies, the cumulative grade point average may be so poor as to be difficult to overcome in a reasonable timeframe.

When a graduate student applies for and is granted readmission into an USciences Online graduate program after leaving the institution, a notation will be entered on the student's transcript indicating the date of reacceptance into a graduate program. The Director of Academics will assess the student's academic background and may recommend that up to 12 credits of specific course work previously taken at USciences, for which the student received a grade of "C+" or better, may be applied to the student's graduate program upon readmission. Such courses must be directly applicable to the degree track of the program to which the student has been admitted. In such cases, the Director of Academics may authorize the Registrar's Office not to count such coursework in the overall grade point average of the graduate student in the new program. If the student has taken any research credits (XX799 or XX899 coursework) none of these formerly earned research credits will be allowed to count toward meeting the minimum degree requirements.

Degree Requirements

The following is an outline of typical University requirements. Each student should refer to their program's specific requirements.

Masters Requirements

Students in a master's level degree program are required to be enrolled as a matriculated student a minimum of two semesters (four terms) and satisfy all of the degree requirements within five calendar years from the date of matriculation.

If a student does not complete all of the requirements in the maximum allotted time (five years for masters degrees), they will be withdrawn from the graduate program without a degree.

However, at least two months prior to the deadline the student may petition the Director of Academics for an extension to their degree program.

Didactic Requirements

At the discretion of the Director of Academics and in recognition that the content in particular academic fields may change over the span of several years, a graduate student may be required to retake courses used to satisfy degree requirements if more than eight years has elapsed prior to completion of the degree.

A minimum of 30 credits of didactic course work is required for any master's level degree and must be composed of the following:

- Minimum of three credits at the 800 level. A maximum of two credits of seminar courses may be used toward this minimum.
- Maximum of six credits at the 300 or 400 level
- Remainder must be at the 700 or 800 level

The individual program may have requirements which exceed these minimum requirements.

The Director of Academics and/or Student Success Coach will determine the necessary didactic course work for each graduate student.

Degree Track Review

An applicant is admitted to a specific program for a particular degree track. At a time designated by the Director of Academics, the master's student will be evaluated by the faculty and one of the following recommendations made:

- The student has demonstrated the ability to continue working in the degree track to which he/she was originally accepted.

- The student has demonstrated superior ability and should be advised to bypass the Master of Science Degree and transfer to the Doctor of Philosophy degree track.
- The student has not demonstrated the ability to pursue a graduate degree at USciences and should be dismissed from the graduate program.

The Director of Academics will report the results of the degree track review to the student.

If the student is recommended for dismissal from the program the Director of Academics must provide written rationale for the action to the student.

The student may appeal the action in writing to the Director of Academics outlining the reasons why his/her appeal should be granted. Students should refer to the appeals process for additional information.

USciences Online Undergraduate Academic Policies

Undergraduate Year to Credit Equivalency

Undergraduate Year Credit Range

U1	0-29
U2	30-59
U3	60-89
U4	90-120

Financial Aid

USciences Online students may apply for financial aid by completing a FAFSA at www.studentaid.gov. All students who complete and submit a FAFSA will be evaluated for eligibility for Federal Pell Grant and Federal Direct Loan funding. PA Residents who submit a FAFSA and a PA State Grant Form will be evaluated for PA State Grant eligibility.

Financial Aid will disburse to a student's account when the student has begun attendance/participated in academically-related activity in his/her classes and achieves the required enrollment status for each type of financial aid a student is awarded.

Satisfactory Academic Progress for Financial Aid

Students who receive financial aid while attending the University must maintain satisfactory academic progress (SAP) in order to continue to be eligible for financial aid funding. SAP is measured at the end of each academic year or its equivalent for degree programs. SAP is measured at the end of each payment period for certificate programs. This measure, and the rules of academic probation for financial aid, may be different from the rules of academic progress and probation imposed by individual academic departments. For financial aid purposes, a student maintains satisfactory academic progress if he/she:

- Maintains at least a 2.00 cumulative grade point average for undergraduates programs, and at least a 2.50 cumulative grade point average for graduate students
- Successfully completes at least 67% of the total cumulative hours attempted
- Successful completion is based on the total number of earned credits divided by the total number of attempted credits. Earned credits for a course cannot be counted more than once. Grades of "F" (failure), "W" (withdraw) or "I" (incomplete) are attempted credit hours but do not count as earned credit hours
- Does not exceed 150% of the normal number of credits needed to complete his/her academic program

Financial Aid SAP Probation

A student who fails to meet SAP has the right to appeal and if a waiver of SAP requirements is granted based on an appeal, may

be placed on financial aid probation for the next semester of enrollment, and may continue to receive financial aid during that semester. At the end of the probationary semester, if the student has not raised his/her academic performance to meet the measures described above or hasn't met the academic plan specified in the terms of the waiver, all further disbursements of financial aid will be withheld until the student's status complies with SAP guidelines.

Financial Aid Adjustments due to Withdrawal

The Financial Aid Office is required by federal statute to recalculate federal financial aid eligibility for students who withdraw or take a leave of absence prior to completing up to and including 60% of a payment period or term. In addition, students who receive all "F"s, "I"s or "U"s for a semester may be subject to federal student aid recalculations based on the last date of academically-related activity in the class(es).

Recalculation is based on the percentage of earned aid using the federal "Return of Title IV" funds formula, which is based on a ratio of the number of days completed to the number of days in the payment period (or semester).

If a student earned less aid based on the recalculation than he/she originally received, funds are returned to the appropriate federal Title IV program as necessary based on the percentage of unearned aid. If funds are returned, the student's account will be debited, and the student may owe the amount to the University. If a student earned more aid than was originally disbursed, the student will receive a post-withdrawal disbursement and notification.

Academics

The information, academic policies, and procedures outlined below are designed to guide students during their studies. They do not constitute a binding contract and may be changed at any time. For assistance with these policies and procedures, contact your Student Success Coach, Program Director, or Director of Academics.

Majors

Declaring a Major

All students must be enrolled in an academic program (major).

Changing Majors

Changing from one major field of study to another major at this University is often possible, but it is neither automatic nor guaranteed.

Following consultation with his/her Student Success Coach, the student intending to change his/her major should meet with the Director of Academics and, if applicable, the Program Director responsible for the degree program into which the student desires to transfer.

Formal requests for change of major must be submitted to the student's Student Success Coach using the Change of Major Form. Requests for changes can be made at any time.

A change of major is subject to approval by the Director of Academics, and Program Director (if applicable) and is based on a review of the student's academic record, and other qualifications for acceptance into the degree program under consideration.

Approved change-of-major forms must be submitted to the Registrar's Office no later than the end of the drop/add period in order to be effective for a given term.

Completion of Degrees

A degree may be awarded once all requirements for that degree are met:

- A double major is awarded when the student has satisfied the requirements for earning a degree and all requirements

for both majors are met.

- The first degree of the double degree may be awarded when the student has completed the requirements of that degree.
- The second degree may be awarded once the student has earned the credits for the second degree, including the minimum 30 credits beyond what is required for one of the degrees.

Catalog Year for Degree Requirements

Catalog Year is a term that refers to a set of degree requirements as they apply to individual students in their progress toward earning a degree from USciences. Catalog Year starts with the summer term of each academic year. For example, the 2020 Catalog Year starts with the 2020 summer semester.

Generally, students are responsible for the degree requirements in force for their major at the time when the student initially enrolls as a first-year (U1) student. Catalog Year is used by the Degree Audit system to evaluate a student's progress toward meeting the degree requirements that apply to them in their current major. Certain circumstances listed below have special rules governing Catalog Year.

- **Transfer Students**—Transfer students will adhere to the program requirements as stated in the Catalog of the year they are admitted to the Online program. Students entering with a prior bachelor's degree are considered to have met the requirements of General Education and do not have to satisfy the specific requirements of General Education.
- **Change of Major**—If a student changes his/her major, his/her Catalog Year will remain the same as his/her original entering year.
- **Leave of Absence**—Students who return from an official Leave of Absence retain their original Catalog Year, which is based on their original entrance to USciences.
- **Readmitted Students**—Students who are readmitted after having been separated from the University should have the same Catalog Year as a normally progressing student in the Class Level into which the student is readmitted. This is the same as a transfer student.
- **Readmitted Students (Academic Fresh Start)**—Students who are readmitted under the Academic Fresh Start program are treated as new first-year admissions. They will have the Catalog Year appropriate for a first-year (U1) student entering USciences in the semester in which they reenter the University

General Education

Philosophy

The General Education program at University of the Sciences (USciences) supports the mission of the University and fosters the development of well-rounded college-educated leaders who are lifelong learners prepared to become informed, thoughtful, and meaningful contributors to a multifaceted society.

The General Education curriculum serves as the cornerstone of USciences education by providing a shared learning experience to all students, across all programs and majors. Students will interact, challenge ideas, and gain a deeper appreciation for diverse perspectives and experiences of the world and themselves. The General education curriculum is designed to encourage individual avenues for student exploration and growth.

The General Education curriculum is intentionally designed as a blend of knowledge and skills requirements through which students gain understanding of the human experience in its manifold aspects. The knowledge component ensures that all students are exposed to different perspectives and ways of knowing and attain a broad understanding of the modes of inquiry of the major disciplines in the arts and sciences. Such a body of knowledge broadens students' perspectives of the world and themselves. The skills component of the curriculum strives to prepare students to think critically, ethically and creatively, to communicate effectively, and to demonstrate information and technology literacy. Mastering these skills gives USciences graduates a voice in society and the tools necessary to actively participate in an increasingly diverse global community.

Curriculum

General Education Disciplines

Students must complete a minimum of 41 credits of coursework in general education distributed among the following seven knowledge/discipline areas of the arts and sciences (choose courses from appropriate subject areas):

General Education Discipline Requirements

Discipline	Credits	Choose from subject codes/courses listed below
Natural Science (1 semester of lab required)	7	Biology, Chemistry, Geology, Physics, Computer Science
Mathematics	6	Math, Statistics
Communication (Written & Oral)	9	Writing, Communications
Social Sciences	9	Psychology, Sociology, Anthropology, Social Sciences, Economics, Political Sciences
Humanities	9	Art, Classics, English, Ethics, History, Humanities, Philosophy, Religious Studies, Languages
Multidisciplinary Inquiry	6	Multidisciplinary
Physical Education	1	Physical Education

Knowledge component:

Students who complete the General Education program shall:

- Demonstrate, interpret and apply knowledge of fundamental concepts, method and content in the major disciplines in the arts and sciences (Humanities, Behavioral and Social Sciences, Natural Sciences, Mathematics and Communication);
- Understand, apply and integrate knowledge in and across disciplines; and
- Recognize the importance of mental, physical and social well-being.

Skills component:

Students who complete the General Education program shall demonstrate the ability to:

- Think critically, solve problems, and analyze ethical issues;
- Identify, access and evaluate sources of information;
- Use technology effectively and appropriately; and
- Use the English language to communicate effectively and appropriately to target audiences using a variety of methods and media.

In addition to the knowledge and elective coursework, students must demonstrate that they have been introduced to a total of 6 skill areas. Students are expected to fulfill their Skills requirements within the context of the forty-one (41) credits taken to meet the Discipline course requirements.

This requirement is designed to ensure students are prepared to think critically, ethically and creatively, to communicate

effectively, and to demonstrate information and technology literacy.

Oral Communication and Written Communication are particularly important parts of the general experience. Therefore, students are required to augment the Oral Communication and Written Communication knowledge courses by completing different courses with Applied Oral Communication Skills and Applied Written Communication Skills.

General Education Skill Requirements

Skill	Overall Goal
Ethics	Students will engage in ethical and moral reasoning and act ethically in public, professional, and personal responsibilities.
Information Literacy	Students will identify the need for information and access it, evaluate it, and use it legally and ethically.
Oral Communication	Using standard English, students will communicate in a personally effective and socially appropriate manner.
Reasoning and Problem Solving	Students will recognize, analyze, and propose solutions to problems.
Technology	Students will use appropriate technology and understand its impact.
Written Communication	Students will use the English language to write effectively in a variety of contexts.

Registration and Student Records

Transfer Credit

Recognizing that students often study at more than one college, transfer credit may be awarded for courses completed at another accredited institution. Credit may be granted for courses taken prior to matriculation at the University. After matriculation students may take courses at other institutions and transfer in credit with the prior approval of the Director of Academics or program director, and the approval of the teaching departments. The course must be comparable in content and depth to a course offered at the University.

Transfer credits awarded will be entered on the student's record and transcript with the source and number of credits granted. No grade will be entered on the USciences transcript for transfer credit; the GPA will reflect only courses completed at University of the Sciences.

- Transfer credits are awarded for a course in which a grade of "C" or greater has been achieved after submission of an official transcript. Transfer credits are noted on the USciences transcript with the source and number of credits.
- No grade is entered; the grade point average [GPA] reflects only courses completed at the University of the Sciences.
- A course approved for transfer has the same number of credits and fulfills the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.
- Students matriculating at USciences in the third year or above may substitute six transfer credits of humanities and/or social science for Multidisciplinary [MD] courses in fulfillment of the multidisciplinary inquiry discipline of General Education.
- Students who matriculate into USciences with an earned associates degree from a regionally accredited institution will be approved as fulfilling the General Education requirements of USciences. An official transcript from the institution that conferred the degree is required.

Advanced Placement Program (AP)

Students may qualify for Advanced Placement (AP) credits as administered through the College Board's Advanced Placement program. Official AP scores are sent from the College Board to the University of the Sciences Admission Office so they may be considered for advanced credit. To receive credit, the student must submit a completed Advanced Placement/International Baccalaureate (AP/IB) Action Form, with the signature of the student's Student Success Coach, to the Registrar's Office prior to the end of the last day of the drop/add period of the first term of enrollment at University of the Sciences. The teaching department will determine the comparable USciences course. Advanced Placement (AP) course is awarded the same number of credits and fulfills the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.

Advanced Placement Course	AP Exam Score
Art History	4,5
Biology	4,5
Calculus AB/BC	4,5
Chemistry	4,5
Chinese Language & Culture	4,5
Computer Science A	4,5
Computer Science AB	4,5
Comparative Government & Politics	4,5
Environmental Science	4,5
European History	4,5
French Language	4,5
French Literature	4,5
German Language	4,5
Human Geography	4,5
Italian Language & Culture	4,5
Japanese Language & Culture	4,5
Latin – Literature	4,5
Latin – Virgil	4,5
Microeconomics	4,5
Macroeconomics	4,5
Music Theory	4,5
Physics B	4,5
Physics C	4,5

Psychology	4,5
Spanish Language	4,5
Spanish Literature	4,5
Statistics	4,5
Studio Art Portfolio	4,5
U.S. Government & Politics	4,5
U.S. History	4,5
World History	4,5

International Baccalaureate (IB) Programme

Students may qualify for advanced standing through the International Baccalaureate Programme (IB). IB examination results will be evaluated on a course-by-course basis. To receive credit, the student must submit a completed Advanced Placement/International Baccalaureate (AP/IB) Action Form, with the signature of the student's Student Success Coach, to the Registrar's Office prior to the end of the last day of the drop/add period of the first semester of enrollment at University of the Sciences. International Baccalaureate (IB) course credits will be awarded the same number of credits and fulfill the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.

- Science and mathematics courses: credit awarded with IB examination score of 6 or 7
- Non-science courses: credit awards with IB examination scores of 5, 6, or 7

College-Level Examination Program (CLEP)

The College-Level Examination Program (CLEP), administered by the College Board, is the most widely accepted credit-by-examination program in the United States. The CLEP examinations measure mastery of college-level introductory course content. Credit for CLEP is awarded for examinations in the subject areas of business, composition and literature, foreign languages, and history and social sciences. A minimum score of 50 must be achieved on any individual subject test in order to receive credit. Examinations are scored on a scale of 20 to 80 with a 50 score being equivalent to a grade of "C." Three credits will be awarded for each subject test with a score of 50 or more. Credit will not be awarded for science and mathematics subject tests. Only official score reports from the College Board sent directly to the Registrar's Office will be used to document CLEP results. CLEP scores must be completed and received no later than the end of the drop/add period of the first semester of the last year of didactic work.

Partnership Courses for General Education Requirements

A course taken at an institution with which USciences has established an approved academic partnership may be used to meet the General Education requirements at USciences. The approved partnership course will fulfill the same General Education requirements (e.g., Disciplines, Electives, Skills) as the comparable course at USciences.

Cooperative Program Articulation Agreements and General Education Requirements

- Students admitted to USciences professional programs under Cooperative Program articulation agreements will be considered to have satisfied the USciences General Education requirements provided they have submitted official documentation of general education requirements completion at the sending institution prior to the awarding of their professional degree.

- The student's completion of the general education requirement will be reflected in a notation on their USciences degree audit.

Family Educational Rights and Privacy Act (FERPA) Policy

Access to Education Records

Annual Notice to Students

University of the Sciences fully complies with the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. This law is sometimes referred to as the Buckley Amendment.

The act grants students specific rights and protections with regard to their education records. It governs access to, release of, and corrections to the records kept by the University on current and former students. These rights do not extend to individuals who never actually attend the University.

Students wishing to review or correct their education records should submit a written request to the registrar indicating which records they wish to review or what corrections they believe are necessary. If the records in question are not in the control of the registrar, the request will be forwarded to the appropriate University official. While prompt attention is given to all such requests, the University reserves the right to respond no later than 45 days after receiving a request.

Education records are available to University officials and agents with legitimate educational interest. Such interest exists when access to the records is necessary for the official or agent to perform his/her professional duties. An agent may include a person or company (including contractors and consultants) with whom the University has contracted to provide a service that the University would otherwise perform and may include a communication and data service, an attorney, an auditor, a collection agent, etc. This also may include officials at other educational institutions with which USciences has a partnership agreement for student enrollment. Personally identifiable information from students' education records is only released, other than to University officials and agents, upon a specific written and dated request from the student or as provided for by federal or state law.

As of January 3, 2012, the U.S. Department of Education's FERPA regulations expand the circumstances under which a student's education records and personally identifiable information (private information) contained in such records—including Social Security number, grades, or other private information—may be accessed without the student's consent. First, the U.S.

Comptroller General, the U.S. Attorney General, the U.S. Secretary of Education, or state and local education authorities ("Federal and State Authorities") may allow access to a student's records and private information without the student's consent to any third party designated by a Federal or State Authority to evaluate a federal- or state-supported education program. The evaluation may relate to any program that is "principally engaged in the provision of education," such as early childhood education and job training, as well as any program that is administered by an education agency or institution. Second, Federal and State Authorities may allow access to a student's education records and private information without the student's consent to researchers performing certain types of studies, in certain cases even when the University objects to or does not request such research. Federal and State Authorities must obtain certain use-restriction and data security promises from the entities that they authorize to receive a student's personally identifiable information, but the Authorities need not maintain direct control over such entities. In addition, in connection with Statewide Longitudinal Data Systems, State Authorities may collect, compile, permanently retain, and share without the student's consent private information from education records, and they may track a student's participation in education and other programs by linking such private information to other personal information about the student that they obtain from other federal or state data sources, including workforce development, unemployment insurance, child welfare, juvenile justice, military service, and migrant student records systems.

The following information related to a student is considered "Directory Information" and under FERPA, the University may release the following without a student's prior consent: the student's name, USciences ID number, address, e-mail address, telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, enrollment status, degrees and awards received, photograph, class level, undergraduate/graduate status.

The University reserves the right to disclose directory information to anyone inquiring without the student's written consent and will limit information made public to these categories. Students can request that any or all such information not be released by informing the Registrar's Office, in writing before the end of drop/add each semester. Please note that this request is permanent until student's notify the Registrar's Office that they would like it to be removed.

A copy of the University's policy in compliance with FERPA can be obtained upon request from the registrar's Office. All

questions regarding FERPA should be directed to the Registrar. Information is also available from, and students have a right to file a complaint regarding compliance with, the Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202-5920.

Enrolling in Courses

Registration

The Student Success Coach will assist USciences Online students in identifying their course options and once selected, will register the student for that course or courses.

Students wishing to change their roster of courses may only do so during the designated drop/add period or by returning the completed drop/add form with the proper signatures.

Administrative Holds

A student may be kept from registering for classes, dropping or adding courses, attending classes, receiving grades, official transcripts, participating in commencement or graduating if the student has not complied with any University requirement.

Administrative holds include conduct, health, library, registrar's, and financial holds. If left unresolved, a hold will result in administrative withdrawal.

Students will be informed of an administrative hold by the appropriate administrative unit. The Online Director of Academics will maintain a record of administrative holds and their resolution by the return to good standing or administrative withdrawal.

Dropping/Adding Courses

Registration changes must be completed by the student by the end of the designated drop/add period as noted on the Academic Calendar. All changes will be made on a space-available basis. Students may make registration changes through their Student Success Coach. Permission from the instructor may be necessary for section changes in some cases. This transaction must occur during the drop/add period.

Course Withdrawal

Students are permitted to withdraw officially from a course after the drop/add period but before completion of the fifth week of an 8-week term. To withdraw officially from a course, the student must submit to the Registrar's Office a completed Request for Course Withdrawal form that includes the signatures of the course instructor and the program director. First- and second-year students are required to obtain the signature of their Student Success Coach on withdrawal forms. The student must discuss the withdrawal with the course instructor and Student Success Coach. (Third-year and above students do not require an Student Success Coach's signature, but they are strongly encouraged to consult their Student Success Coach regarding course deletions and/or additions since withdrawal can impact both financial aid and progress in the program.) The designation "W" (for withdrawal; no point value; not included in calculation of the GPA) will be assigned after completion of the official withdrawal from a course. Except in special circumstances as determined in consultation with the, Online Director of Academics and program director, with jurisdiction over the student's major program of study, a student may not withdraw officially after the fifth week of a term. Special circumstances for a late course withdrawal may include accident, injury, illness requiring hospitalization, or distress from bereavement. This is intended as partial relief from a full academic course load.

A student who fails to complete the Request for Course Withdrawal form and either discontinues attendance or exceeds the number of absences permitted in a course is not officially withdrawn from the course. Such students may, at the discretion of the instructor, receive a final grade of "F" for the course.

A student who withdraws officially from a course and subsequently registers for the same course a second time will not be permitted to withdraw from that course after the drop/add period except in special circumstances as determined in consultation with the Online Director of Academics, or program director with jurisdiction over the student's major program of study.

Audit

A student may audit a course with the written permission of the Online Director of Academics and instructor that offers the course. Instructors may or may not require auditors to take examinations, complete course assignments, and meet course attendance requirements. Students who audit a course do not receive a grade for the course. The audit symbol "AU" is entered for the registered course on the student's record. Students cannot convert from audit to credit status, or the reverse, after the designated drop/add period. The audited course may be subject to additional charges based on the student's total credit load.

Pass/Fail Option

An instructor may designate an elective course as being available as a pass/fail elective for some or all students taking the course. A student who wishes to take, on a pass/fail basis, a course that has been designated as a "pass/fail election" must make all necessary arrangements with the instructor and submit a Pass/Fail Election form to the Registrar's Office prior to the end of the drop/add period in which the course is taken. After the drop/add period, the election is irrevocable. A student may make only one pass/fail election per semester.

All pass/fail courses will appear on a student's transcript; for those pass/fail courses a student passes, credits will count toward the minimum number of semester hours required for a degree.

Final grades for courses taken as pass/fail are either "P" (pass) or "F" (failure). The grade of "P" has no assigned quality point value and, therefore, is not included in the calculation of the GPA. The grade "F" carries a point value of zero (0) and is included in the calculation of the GPA. A grade of "F" for a pass/fail course or election is taken into account with respect to the provisions of academic probation and other academic policies.

Grade Replacement

Students may repeat a course for grade replacement in their U1-U4 years of their program of study provided they meet all course prerequisites and certain eligibility requirements. Professional, graduate, and USciences Online students should contact their program directors for information concerning program-specific guidelines.

Note: Students repeating a course for grade replacement must meet with and obtain prior approval of their academic advisor. Students are also advised that repeating courses may have financial aid implications.

Eligibility Requirements:

Courses repeated for grade replacement must be completed before progressing to any other course for which the repeated course is a prerequisite. For example, a student cannot replace CH101 grade while enrolled in or having completed CH102.

Credits and Calculation of University Grade Point Average (GPA):

- When a course is repeated for grade replacement at this University, both attempts will appear on the transcript and academic record. Only the grade for the most recent attempt (even if it is lower) will be used to calculate the USciences GPA. Credits toward graduation requirements will be counted only once.
- A maximum of two courses may be repeated for grade replacement during the U1-U4 years.

Notes:

- The policy does not apply to courses that are listed as 'repeatable for credit' in the course catalog description.
- This policy does not apply to courses repeated at an alternate institution.

Repeating Additional Courses

After exhausting the two-course limit for grade replacement, students may register for a course taken previously, provided all course eligibility criteria and prerequisites are satisfied. The grades for both the original and all repeated course(s) will appear on the student's transcript and be counted in the grade point average. Credit toward graduation requirements will be counted only once for the repeated courses with the exception of courses that were given College Council approval to be counted more than once towards graduation requirements. Courses will be noted "repeatable for credit" in their course description. Students are advised that repeating courses may have financial aid implications. Students may only receive federal student aid for repeating a previously passed course one time per course. Students may not receive PA State financial aid for any previously passed course. Students should consult with a Financial Aid Office representative if they are unsure if repeating a course will impact their financial aid eligibility.

When a course is failed at the University but successfully completed with a grade of "C" or better at another accredited

institution, credit may be granted. However, the repeated off-campus course grade is not computed in the University of the Sciences grade point average and does not appear on the University transcript. The original grade remains on the University transcript and is used in the calculation of the grade point average.

Taking and Completing Courses

Attendance Regulations

There are certain kinds of information and certain intangible values gained by attendance in classes that are not capable of being measured by examinations and which a student will lack as a result of excessive absence. Accordingly, attendance in all classes is strongly encouraged. University-wide attendance regulations for Online students are listed below; additional requirements for attendance are determined by course instructors and will be included in the course syllabus.

All Online students are required to academically participate in their course no later than 11:59 PM EST on the 7th calendar day of class within the session. Academic participation will be determined by completion of the required activities as assigned by your professor in the course. Those students who do not demonstrate any academic participation may be administratively dropped from their course(s) by the Office of the Registrar, with a full reversal of tuition and fees. Students who are dropped from course(s) due to lack of participation will not be eligible to receive disbursements of federal financial aid.

Absence from and Makeup of Examinations

- The USciences Online makeup examination policy is included in all course syllabi. It is the discretion of the instructor to decide which makeup reasons are valid and when the makeup examination or assessment will take place.
- Incomplete grades must still be finalized within 21 calendar days of the end of the semester.

Rules Governing Examinations and Graded Assessments

Rules governing the administration of examinations and graded assessments, as well as policies related thereto, are determined by course instructors and will be included in the course syllabus. For the purposes of this policy the term "graded assessment" includes examinations and other activities where students are assessed. Graded assessments should be returned to students within 7 calendar days.

Academic Standards and Academic Progress

Definition of Full-time & Half-time Status for Academic Purposes

Full-time status for undergraduate students for academic purposes is defined as 12 or more credits of registered coursework at the end of the drop/add period. Half-time status is defined as 6 credits/semester at the end of the drop/add period.

General Information

The information in this section presents only university-wide academic standards.

The minimum passing grade in all undergraduate courses taken at the University is "D-." At the conclusion of each semester of study, students are expected to have a cumulative GPA of at least 2.00, unless a higher GPA is specified by their program. For the purposes of these academic regulations, "good academic standing" shall be defined as maintenance of a cumulative GPA of at least 2.00 and not more than one failing grade ("F") in the most recent semester, irrespective of cumulative GPA.

To progress into advanced or professional coursework, students must have completed and passed all required courses. Depending on curriculum, these may be first-, second-, or third-year courses. Students also must have achieved at least the minimum cumulative GPA required by their major.

All undergraduate students must achieve a minimum cumulative GPA of 2.00 by prior to progressing to the U3 year, unless a higher standard is specified by their program (see specific requirements in the University Catalog). The minimum cumulative GPA must be achieved by the time a student has completed 54 credits. An undergraduate student who has achieved the minimum cumulative GPA after completing 54 credits but who has not completed or has failed a required course must satisfactorily complete the required course prior to completing more than 60 credits and within the same year with the minimum cumulative GPA or above, in order to progress into the third year of a curriculum.

The academic records of all second-year undergraduate students are evaluated by the corresponding program director/Online Director of Academics for their degree program. Those students who do not meet the criteria for progression into the third year of the curriculum will be referred to the Online Academic Council.

The Online Academic Council may:

- Drop the student from the University rolls; or
- Provide the student an opportunity to attain the required GPA within a maximum of 24 additional credits while assigned a full course load, including reassignment to courses in which a minimum final grade of "C" was not achieved (subject to policies on Repetition of a Course and Grade Replacement)

Academic Probation

The Online Director of Academics will review the scholastic progress of all students at the end of two terms of instruction. Students, whether full-time or part-time, who have not achieved the required minimum cumulative grade point average of 2.00, or who have received a failing grade ("F") in two or more courses in the most recent two terms of instruction (whether full-time or part-time), will be placed on academic probation. Students on academic probation are required to meet with their Student Success Coach to develop and complete an Academic Improvement Plan (AIP). Students are required to develop this plan in consultation with their Student Success Coach and comply with the AIP. Please see the Academic Improvement Policy for further details.

No student will be permitted more than four Online terms of academic probation, whether full-time or part-time.

Academic Improvement Policy

Students who are not performing at a level of achievement that is consistent with success in their academic program at the end of a term are placed on academic probation (see Academic Probation). Students placed on academic probation will complete an Academic Improvement Plan (AIP). The AIP is designed to help students increase their academic performance to achieve their academic goals.

- Students on academic probation are required to meet with their Student Success Coach. Students are expected to develop their AIP in consultation with their Student Success Coach who must sign-off on their plan. Students will be required to communicate with their Student Success Coach regularly throughout the semester regarding the progress they are making with their personalized plan.
- Students are expected to implement their AIP immediately after earning academic probation. Students on academic probation must meet with their Student Success Coach no later than the end of the second week of classes of the next Online term.

It is the student's responsibility to schedule and attend any meetings, workshops, tutoring, etc., associated with the development and implementation of this plan. The AIP includes utilizing resources in the Division of Student Affairs (Academic Advising, Academic Support Services, Tutoring, Career Counseling, etc.) and other appropriate resources (e.g. their instructors, the Writing Center).

Students who do not complete and follow through with their AIP will have a hold placed on their record preventing further registration activity until they meet with their Student Success Coach. Students who do not develop or implement their AIP and earn a second academic probation may be administratively withdrawn from the University.

Student Comments and Complaints

See Student Grievance Policy included with Orientation documents.

Residency and Length of Time to Complete Program of Study

In order to earn an undergraduate or first professional degree from USciences, a student must complete at least 30 credits at USciences. At least half of these credits must be upper-division courses required by the major (i.e., 300 level or above).

Satisfactory Academic Progress for Financial Aid

Students who receive financial aid while attending the University must maintain satisfactory academic progress to continue to be eligible for financial aid funding. Progress is measured at the end of each academic year or its equivalent. This measure, and the rules of academic probation for financial aid, may be different from the rules of academic progress and probation imposed by individual academic departments. For financial aid purposes, a student maintains satisfactory academic progress if he/she:

- Maintains at least 2.00 cumulative GPA for undergraduates
- Completes at least 75% of the total cumulative hours attempted.
- Does not exceed 150% of the normal number of credits needed to complete his/her academic program.

Dean's List

Following the close of each two terms of consecutive instruction, the dean's list is posted, recognizing those students who have achieved high scholastic distinction. Those named to the dean's list must have taken a full-time (12 credits) course-load in that time, completed and passed all courses with no grade below "C," and attained a cumulative grade point average of 3.40 or above. Students receiving grades of "I" at the conclusion of the two terms of consecutive instruction will be eligible for retroactive assignment of dean's list upon course completion. Those students who prefer not to have their names posted should notify the Online Director of Academics.

Students with written reprimand for an academic violation or any conduct probation or higher sanction are not eligible for the dean's list.

Requirements for Graduation

To fulfill its obligation to the precepts of higher education, University of the Sciences has established standards of achievement that must be met before any student is recommended for graduation by the faculty. Every person upon whom a degree shall be conferred must have successfully completed the assigned curriculum and must have met the specific graduation requirements pertaining to the degree to be conferred.

A student must complete all graduation requirements by:

- The end of the fall, spring, or summer term, or
- The 1st day of the month of July or November.

Any student not meeting these deadlines will be delayed until the next graduation date.

To qualify for an earned degree, students must:

- Fulfill all of the requirements of the respective curriculum, including achieving at least the minimum academic requirements and passing all proficiencies required by the University and the major, as outlined in this Catalog and in the policies of the academic programs.
- Be in good academic standing, having satisfied all academic and program requirements, and be free of all conduct holds at the conclusion of the final semester of enrollment.
- File a Petition for Graduation at the start of the final semester of matriculation. To participate in the May Commencement Ceremony, the Petition for Graduation must be submitted by the end of the drop/add period of the spring semester. The Student Success Coordinator will assist in completing this process..

Only those students who have fulfilled all requirements for graduation by the end of the spring semester (last day of final exams) will be permitted to participate in the commencement ceremony.

Students with financial and/or conduct holds will not receive a diploma and will not be able to obtain a copy of their transcript until the hold(s) is/are released. If a financial or conduct hold is in place, the University will not respond to requests for verification of graduation status on the graduate's behalf.

Graduation Honors

Undergraduate students who achieve outstanding academic records at the University may graduate with one of the honors listed below:

Cum Laude—GPA of 3.40

Magna Cum Laude—GPA of 3.60

Summa Cum Laude—GPA of 3.80

Honors are awarded based on the student's cumulative grade point average calculated using the total quality points and credits earned as shown on the student's University transcript. Honors are awarded only with the bachelor's degree, and all university and program requirements for the bachelor's degree must be met in order for an honor to be awarded. Once awarded, the honor becomes a permanent part of the student's record.

Grades

The following grading system is used to indicate the quality of academic performance at University of the Sciences:

A- to A+	Excellent
B- to B+	Good
C to C+	Fair or satisfactory
D- to C-	Unsatisfactory, but passing
F	Failure

The quality point values assigned to these letter grades are:

A and A+	4.00 points
A-	3.70 points
B+	3.30 points
B	3.00 points
B-	2.70 points
C+	2.30 points
C	2.00 points
C-	1.70 points
D+	1.30 points
D	1.00 point
D-	0.70 point
F	0.00 point

Other grading indicators:

AU Audit

I Incomplete (see Incomplete Policy, below)

P	Pass (Pass/Fail courses)
W	Withdrawal
S	Satisfactory
U	Unsatisfactory

For courses taken on a pass/fail basis, the final course grade will be either "P" (for Pass, which has no point value and is not included in the calculation of a grade point average) or "F" (for Failure, which has a value of "0.00" but is included in the calculation of the grade point average).

Grade Point Average

A term grade point average (GPA) is computed at the conclusion of each academic term. Course grades are assigned quality point values. Grades of "F" (in a pass/fail course) are considered equivalent to a failing grade of "F" (0.00) and are included in the calculation of the GPA. Grades of "W," "I," "AU," "P," "S," and "U," are not included in the calculation of a GPA.

The following illustrates how a semester GPA is computed:

Note: For each course, the quality point value is multiplied by the number of course credits to obtain the course quality points.

	Course Grade	Quality Point Values	Course Credit	Course Quality Points
XX001	C+	2.30 x	5 =	11.50
XX002	B	3.00 x	3 =	9.00
XX003	W	0.00 x	3 =	0.00
XX004	B-	2.70 x	3 =	8.10
XX005	A	4.00 x	4 =	16.00
Total			18 - 3 (W) = 15	44.60

The term GPA is calculated by dividing the total number of course quality points by the total number of course credits and rounded to two decimal points. In this, as noted above, the 3 credits for XX003 are not counted because of the "W" grade; therefore the calculation is $44.60/15 = 2.97$.

The cumulative GPA (the average of grades from two or more terms) equals the sum of the course quality points of all grades received at the University divided by the total number of course credits for courses receiving quality points.

Incomplete Policy

All course requirements must be completed prior to the end of the semester.

Students not fulfilling course requirements at the completion of the term due to extenuating circumstances may be assigned an "Incomplete" or "I" designation on their transcript by the instructor. The instructor is required to replace this "Incomplete" designation with a final grade as soon as possible but no later than 21 calendar days from the end of the term or the end of the drop/add period of the next term, whichever comes first. If the instructor has not entered a final grade within the prescribed time limit, the Registrar will automatically enter a grade of "F" and inform the instructor and student. Extensions beyond 21 calendar days may be granted by the course instructor in consultation with the Online Director of Academics in exceptional cases.

Students will sign an "Incomplete" contract for each course for which an extension is approved. The instructor will determine what the student must do (e.g., take one or more examinations, perform laboratory work, turn in reports, turn in notebooks, perform library assignments) in order to meet contract requirements. Information regarding requirements to complete the course

will be supplied to the student directly by the instructor. The student is responsible for completing the work in the time allotted.

When an "Incomplete" grade is converted to a letter grade, the GPA is recalculated retroactive to the end of the term in which the course was originally taken. University/program academic policies and procedures governing probations, dismissal, etc., apply to GPA changes resulting from conversions of "Incomplete" grades. For example, should a converted "Incomplete" result in a GPA warranting dismissal from the University/program, the student's dismissal would be effective retroactive to the end of the term in which the course was originally taken.

It is the student's responsibility to estimate and calculate the results of a converted "Incomplete" on the retroactive GPA. Should the dismissed student be registered for, and/or attending classes, taking exams, etc., in the term subsequent to the term in which the "Incomplete" was assigned, the courses for the subsequent session will be deleted from the student's record. No academic credit will be granted for the courses; refunds will be made according to the tuition refund schedule.

No Grade Submitted

Faculty may assign an "Incomplete" grade for incomplete coursework or if they are not able to evaluate a student. If the faculty member leaves the student's grade blank the Registrar will enter a grade of "I" for "Incomplete" and the rules governing "Incomplete" grades apply.

Grade Change Policy

Course grade changes shall only be made by the instructor of record in the student information system currently employed by the University for up to six months after the end of the term in which the student was registered for the course. Changes in course grades originally assigned by an instructor who is no longer an employee of the University may be made by the Online Director of Academics for up to six months after the end of the term in which the student was registered for the course. After six months, all grade changes must be approved by the instructor of record (if still employed by the University), and the Online Director of Academics.

Students requesting changes in course grades must present to the instructor of record (or to the Online Director of Academics if the instructor of record is no longer employed by the University) a copy of the course syllabus or other documents describing how final grades are determined, copies of all available graded materials, and a record of all communications between the student and the instructor regarding the course grade.

Transcripts

Student transcripts are maintained by the Registrar's Office and are covered by the Family Educational Rights and Privacy Act (FERPA) of 1974, as amended. Students may request that an official copy of their transcript be sent to a third party (e.g., another college/university or an employer); an unofficial copy may be requested for the student's personal use. An official transcript carries an authorized signature as well as the seal of University of the Sciences.

All requests for transcripts must be made in writing and signed by the student. There is a charge for each official transcript. Unofficial transcripts are free to students. University of the Sciences does not release transcripts unless tuition, fees, and other obligations due the University have been satisfied. More information regarding transcript requests is available on the University website at <https://www.usciences.edu/academics/academic-resources/registrar/transcripts-enrollment-verification.html>

When a course is repeated/replaced, both courses will appear on the transcript. Replaced Courses are marked with the asterisk (*) symbol indicating the higher of the two grades has been used in the calculation of the GPA. Repeated Courses are marked with a pound or hashtag (#) symbol indicating all grades are included in the calculation of the GPA.

Separation from the University

University of the Sciences and its faculty reserve the right to dismiss at any time any student who is deemed undesirable, either on the grounds of conduct or of academic standing, and in this matter the faculty and Director of Academics shall be the sole judge.

Dropped from the Rolls

Students will be dropped from the rolls if they:

- Complete any three semesters (six Online terms), whether full-time or part-time, with an academic record resulting in academic probation; or
- Fail the same course twice. This regulation applies whether the course is taken in regular sessions or in summer school, whether at the University or at another institution.

Students who do not meet the criteria for progression in their curriculum may be subject to being dropped from the rolls (refer to section on Academic Standards and Academic Progress). Students who are dropped from programs for exceeding program probation will be dropped from the University rolls if they are not admitted to a program by the end of the drop/add period following the term they were dropped from their program.

The Online Director of Academics will officially notify the student of this action and notify pertinent University offices of the change in status. A student who is dropped from the rolls is not eligible to attend any courses at the University. (Refer to sections on Readmission to the University and Fresh Start Readmission for readmission policies.)

Leave of Absence

Short-Term Leave of Absence Policy (No more than 10 businessdays)

In the event of an immediate and significant health or family emergency* a student may request from the Online Director of Academics, a Short-Term Leave of Absence (Short term LOA). A Short-Term Leave of Absence is intended to provide the student an opportunity to address the issue and then resume his/her academic course of study. If the student cannot resume his/her studies after 10 business days, the student may apply for a LOA for a longer period of time.

*Examples of a significant health or family emergency include accident, injury, or illness requiring hospitalization; or health and/or safety concern (i.e., risk to self or to others), or death of a parent, sibling, or significant other. A Short-Term LOA does not negate or preclude the administration of the conduct policy or the administrative withdrawal policy.

To request a Short-Term LOA, the student should first contact the Online Director of Academics. The student may be asked to provide documentation to verify the circumstances. Upon approval of a Short-Term LOA, the Online Director of Academics will notify the applicable Program Director, course instructors, Student Success Coach, and Student Affairs. Upon return to the academic program, the student is responsible for working with the instructors to complete the course requirements as specified in the course syllabus.

Personal Leave of Absence and Medical Leave of Absence

There are two additional types of leaves of absence, a Personal Leave of Absence and a Medical Leave of Absence.

A leave of absence affords students the opportunity to remain in academic standing with their department and not have to reapply for admission. A leave of absence form must be requested from the student's Student Success Coach and submitted to the Online Director of Academics and Student Success Coach.

The leave of absence may have financial aid implications and the student should meet with Financial Aid prior to the leave of absence and at the time they return from the leave. To be in compliance with Title IV Financial Aid Programs, USciences reports the student as "Withdrawn" from USciences to the National Student Loan Data System (NSLDS) on the date the leave begins.

Reasons a student may be granted a personal leave of absence include but are not limited to personal or financial problems or military service. To be considered for a personal LOA, the student must:

- Submit a written request for the leave to the Online Director of Academics and provide documentation to verify the circumstances cited in the request for the leave.
- Meet with the Online Director of Academics, or designee, to review the request, including the precipitating circumstances and submitted documentation.

A medical leave of absence may be requested when a student's medical or psychological condition significantly impairs his/her ability to function successfully or safely in the academic environment. Requests for a medical leave of absence are coordinated through the Dean of Students' office.

To be considered for a medical leave of absence, the student must take the following steps:

- Have a major mental or physical health issue that cannot be mitigated in a short period of time, such as an incident involving a major accident, injury, or significant illness requiring hospitalization or extended treatment.
- Meet with the Dean of Students or his/her designee to review the precipitating health concerns.
- Provide documentation from a licensed health professional. The documentation must be typed and submitted on official letterhead and must include the name, address, office telephone number, license number, and signature of the health professional. The documentation should specify the length of time needed for the leave and the reason for the leave.

The Dean of Students will make the final determination if a medical leave of absence will be granted and will notify the student in writing.

Upon approval of a personal or medical leave of absence, the Online Director of Academics will notify the applicable program director, course instructors, Student Success Coach, Student Affairs, Financial Aid and other pertinent USciences offices.

The Online Director of Academics will also determine the status of the student's current coursework and whether or not the student should be withdrawn from courses. A grade of "W" may be assigned by the Online Director of Academics to all registered coursework based on the effective date for the personal or medical leave of absence. The instructor for each course will have 10 working days from receipt of notice to reassign a course grade if appropriate.

If a medical leave of absence is granted, the Dean of Students will monitor the treatment with the student and licensed health professional. The Dean of Students may require additional documentation including medical evaluation, treatment plans, and evidence of compliance with treatment.

To return from a medical leave of absence, the student must submit medical documentation to the Dean of Students from a licensed health professional regarding his/her health status and ability to return to his/her studies. After reviewing the medical documentation, the Dean of Students will notify the Online Director of Academics whether the student is permitted to return to resume his/her academic course of study.

To return from a personal or medical leave of absence, the student must report to the office of Online Director of Academics by the return date specified on the leave of absence form. The Online Director of Academics will then notify the pertinent USciences offices that the student has been placed on "active" status. If the student does not return by the return date specified on the leave of absence, the student will be administratively withdrawn from USciences by the Online Director of Academics.

Bereavement Policy

The University recognizes that students may suffer greatly from the loss of a loved one. Students suffering from bereavement should refer to the policies on Short-Term Leave of Absence, Leave of Absences, and Course Withdrawal for information on means to address this issue.

Advised to Withdraw

A student may be advised to withdraw either on the grounds of conduct or academic standing.

Voluntary Withdrawals from the University

An official withdrawal from the University must be authorized by the Online Director of Academics responsible for the student's degree program. A student will be officially withdrawn from the University once the student contacts the office of the Online Director of Academics responsible for the student's degree program and provides notification of intent to withdraw either verbally or in writing. This notification must include the student's name, current address, phone number, and student identification number or other acceptable information that establishes the identity of the student. The date the student notifies the Online Director of Academics of his/her withdrawal from the University will be the official effective date of withdrawal. If a student cannot directly contact the Online Director of Academics due to illness, accident, grievous personal loss, or other such circumstances beyond the student's control, another individual, acting on the student's behalf, can provide the notice of intent to withdraw. Once the Online Director of Academics verifies that the individual is authorized to act on the student's behalf, the date of withdrawal is effective as of the date of the initial notification.

A student who contacts the Online Director of Academics and only requests information on aspects of the withdrawal process, such as the potential consequences of the withdrawal, would not be considered to be withdrawn. However, if the student indicates

that he/she is requesting this information because he/she will cease to attend USciences, the student would be considered to have provided official notification of his/her withdrawal.

The Online Director of Academics may request that the student submit the withdrawal request in writing or have an interview with them, but this is strictly voluntary and not required for withdrawal. The student must not attend any academic function or classes after notifying the Online Director of Academics that he/she is withdrawing from the University. The Online Director of Academics will notify the student and the pertinent University offices of the withdrawal.

When a withdrawal from the University is authorized by the Online Director of Academics, a "W" grade will be assigned for all courses in which the student is currently registered, unless the student withdraws during the drop/add period or after the conclusion of a term. The instructor for each course will be notified by the Online Director of Academics of the student's withdrawal and will have 10 working days from receipt of notice to reassign a course grade.

Administrative Withdrawal

A student may be withdrawn from the University for major violations of University policy or for nonattendance. A typical reason for an administrative withdrawal includes noncompliance with University policy (e.g., nonpayment of debt or exceeding program time limits).

If a student who has ceased to attend the University did not begin the voluntary withdrawal process by contacting the Online Director of Academics responsible for the student's degree program, the Online Director of Academics will administratively withdraw the student. The date that the Online Director of Academics learns of the student's nonattendance will be the official effective date of withdrawal.

An administrative unit may initiate the administrative withdrawal action, but authority to withdraw a student for administrative reasons rests with the student's Online Director of Academics. The student will be informed in writing by the Online Director of Academics of the action to withdraw and the criteria for readmission. The Online Director of Academics will also notify pertinent University offices.

Readmission to the University

There is no guarantee of readmission following a separation from the University.

Students who voluntarily withdrew from the University or were dropped from the rolls of the University may file an application for consideration of readmission with the Online Director of Academics of the program in which they seek to re-enroll. To be considered for readmission, applications must be submitted no later than two weeks prior to the start of a term.

Students who were dropped from the rolls of the University for either six terms with an academic record resulting in academic probation or conduct expulsion will not be granted readmission for at least a minimum of two terms from the date of separation from the University. Students who were dropped from the rolls of the University for failing the same course twice may immediately apply for readmission to a program in the University.

The application for readmission must provide information of the student's ability to complete his/her degree program. The application must be accompanied by any official transcripts of all course(s) taken at other accredited colleges or universities during the period of separation from University of the Sciences.

Readmission of Military Service Members

In accordance with the federal Higher Education Opportunity Act, students who leave the University to perform military service will be readmitted with their previous academic status intact, for an absence of up to five years in length. Students must provide advance notice of their intent to perform military service and must also provide notification of intent to re-enroll. This readmission policy, as well as the requirements for advance notice and notification to re-enroll, is subject to exceptions as noted in the law.

Fresh Start Readmission

A student may apply for readmission under the Fresh Start policy under the following circumstances: 1) the student has left the University after failing to achieve good academic standing, and 2) the student will have been absent from the University for at least one year between the date of withdrawal and the start date of the semester for which readmission is sought.

If a student is readmitted under the Fresh Start policy, his/her transcript will note all credits attempted and grades earned at

University of the Sciences prior to readmission. However, grades previously earned will not contribute to the current grade point average calculations, and courses previously attempted will not be accepted toward fulfillment of the student's current degree requirements.

Acceptance of transfer credits from other institutions will be granted in accordance with current University policy.

After Fresh Start readmission, the student must comply with all current academic regulations required by the University and his/her degree program. No student will be readmitted under this policy more than one time. Once a student is re-enrolled under the Fresh Start policy, the decision to treat the academic record as described above is irrevocable.

Students will be informed of the Fresh Start policy upon exiting the University and upon application for readmission in accordance with current University policy.

The final decision regarding readmission, including readmission under this Fresh Start policy, rests with the University's faculty. The possible effect of the Fresh Start policy will be only one of the factors used in considering application for readmission.

USciences ONLINE

Business of Medical Marijuana and the Cannabis Industry - Graduate Certificate

In this program, students will examine how cannabis affects the body, discover the processes involved in turning cannabis flowers and plant components into concentrates, and explore the many pharmacological uses of cannabis. Students will analyze how cannabis is marketed and understand how cannabis is taxed and sold despite its federal classification as a controlled substance. Students enrolled in the Cannabis Business Graduate Certificate will explore this rapidly expanding industry and related policies and laws, medical advancements, and cultural impacts in the United States. Each of the four certification courses will guide students through the key sectors of the cannabis business.

Required Courses

- MC 701 - Introduction to the Cannabis Industry Credits: 3
- MC 702 - Finance and Regulation Cannabis Industry Credits: 3
- MC 703 - Cannabis Marketing and Sales Credits: 3
- MC 704 - Supply Chain Management in the Cannabis Industry Credits: 3

Total Credits: 12

Data Science & Analytics - Major

The part-time Bachelor of Science in Data Science and Analytics program will provide students with the foundational education and tools to collect, manage, and analyze data. Students will develop proficiency in areas like statistics, data visualization, computer science, and data collection that are vital to a multitude of fields, from business and gaming to medicine and public health. Further, students will learn to ask research questions that generate data for actionable insights.

- Students may transfer into the program at any point but must meet the program requirements to be eligible for graduation. Students are required to complete all other University requirements for graduation.
- All students enrolled in the BS in Data Science and Analytics program must complete a minimum of 30 credits at the University in order to graduate. A minimum of 120 approved credits is required to earn a bachelor's degree.
- All USciences undergraduate students enrolled in a degree granting program must complete the general education curriculum. A description of the General Education curriculum may be found elsewhere in this catalog.

General Education (41 credits)

Required Courses in the Major (45 credits)

- DA 305 Visualization Strategies for Data Analysis: Credits: 3
- DA 306 Techniques for Business Data Analytics Credits: 3
- DA 307 Introduction to Database Design Credits: 3
- DA 310 Use of Big Data Credits: 3
- DA 313 Programming with Python Credits: 3
- DA 402 Methods of Regression Analysis Credits: 3
- DA 403 Fundamentals of Experiment Design and Analysis Credits: 3
- DA 405 Data Mining Credits: 3
- DA 406 Data Governance Credits: 3
- DA 407 Advanced Statistics/Statistical Modeling Credits: 3
- DA 408 Modeling and Predictive Analysis Credits: 3
- DA 450 Data Science Capstone Credits: 3*
- DA 301 - Data Science and Analytics Introduction I Credits: 3
- DA 302 - Data Science and Analytics Introduction II Credits: 3
- DA 401 - Introduction to Data Structure/Algorithms Credits: 3

Elective Courses in the Major (15 credits)

- DA 311 SAS Programming and Data Analysis Credits: 3
- DA 314 Introduction to Survival Analysis Credits: 3
- DA 315 Multivariate Data Analysis Credits: 3
- DA 316 Introduction to Categorical Data Analysis Credits: 3
- DA 317 Applied Mathematical Modeling Credits: 3
- DA 318 Forecasting with Time Series Data Credits: 3
- DA 319 Introduction to Stochastic Modeling Credits: 3
- DA 320 Applied Numerical Analysis Credits: 3
- DA 321 Applications in Information Security Credits: 3
- DA 410 Artificial Intelligence Credits: 3
- DA 412 Advanced SAS Programming Credits: 3
- DA 413 Statistical Methods for Clinical Trials Credits: 3
- DA 414 Introduction to Applied Machine Learning Credits: 3
- DA 308 - Introduction to Epidemiology Credits: 3
- DA 309 - Essentials of Biostatistics Credits: 3

Free Electives (19 credits)

Total Minimum Credits: 120

Note:

*Must be taken as part of the last 9 credits in the program

Genomics - Graduate Certificate

Program Description

The Graduate Certificate in Genomics Program was designed to provide a review of current and future applications of genetics

and genomics. This program is designed to prepare students for a career or a graduate program in genomics. The four courses build upon each other to help students acquire the skills and resources they can apply to their careers or further education in genomics. The program's content is built to address essential competencies in genetic and genomic education in the health sciences for use in multiple disciplines to include pharmacy, medicine, nursing, social work, ethics, legal, and computer science.

Program Outcomes

Upon completion of the Genetics and Genomics Certificate of Competency, students will be able to:

1. Demonstrate proficiency in the understanding of foundational concepts of genetics and genomics.
2. Critically analyze, translate, and apply genetics and genomics in education, research, and practice.
3. Demonstrate an understanding of epigenetics and pharmacogenomics.
4. Discuss the social, ethical, and legal issues associated with genetics and genomics.
5. Explain how to pursue careers and/or graduate study in genetics and genomics.

Required Courses

- GN 701 - Intro to Genomics Credits: 3
- GN 702 - Genetic Concepts Testing and Translation to Healthcare Credits: 3
- GN 703 - Ethical, Legal, Social Issues in Genomics and Pharmacogenomics Credits: 3
- GN 704 - Cancer Genomics and Applications of Genomics in Health and Disease Credits: 3

Total Credits: 12

Genomics- Master of Science

Program Description

This genomics master's program is designed to provide a comprehensive examination of the principles and applications of genetics and genomics. Throughout this program, learners will examine principles of genetics followed by human disease and clinical applications. They will cover the essential competencies in genetic and genomic education in the health sciences for use in multiple disciplines to include pharmacy, medicine, nursing, social work, ethics, legal, and computer science. Additionally, broader genomic content with evolutionary analyses and population and public health are addressed, as well as statistics and computational algorithms used to collect and analyze genomic data in research, industry, and healthcare.

Program Outcomes

Upon completion of this program, students will be able to:

1. Describe the foundational concepts of genetics and genomics.
2. Demonstrate an understanding of genetics and genomics in the era of precision medicine.
3. Critically analyze, translate, and apply genetics and genomics in education, research, and practice.
4. Demonstrate an understanding of epigenetics and pharmacogenomics.
5. Discuss the social, ethical, and legal issues associated with genetics and genomics.
6. Evaluate human genomic variation and its relationship to health and disease.
7. Discuss genomic applications in healthcare, industry, and research.
8. Research careers and/or doctoral study in genetics and genomics.

Required Courses

- GN 701 - Intro to Genomics Credits: 3
- GN 702 - Genetic Concepts Testing and Translation to Healthcare Credits: 3

- GN 703 - Ethical, Legal, Social Issues in Genomics and Pharmacogenomics Credits: 3
- GN 704 - Cancer Genomics and Applications of Genomics in Health and Disease Credits: 3
- GN 710 - Principles of Genetics Credits: 3
- GN 715 - Chromosomes and Human Disease Credits: 3
- GN 720 - Molecular Basis of Human Inherited Disease Credits: 3
- GN 725 - Clinical Applications of Genetics and Genomics Credits: 3
- GN 730 - Evolutionary Analysis Credits: 3
- GN 735 - Human Population Genetics Credits: 3
- GN 740 - Public Health Genetics Credits: 3
- GN 745 - Genomic Statistics & Research Credits: 3

Health Administration - Graduate Certificate

Program Description

The Health Administration Graduate Certificate provides working professionals in the healthcare field, recent college graduates and career changers a foundation in health administration for professional development, and credential building. The four course, 12 credit-hour online certificate can also be used towards USciences' Online MS Health Administration degree. The graduate certificate is designed to provide students with an in-depth understanding of the broad structures and functions of the U.S. health system and the essential topics of health information systems, healthcare law and ethics, and quality improvement.

Program Outcomes

Students completing the Health Administration Graduate Certificate will be able to:

1. Explain the main functions of U.S. healthcare delivery, including financing, insurance, delivery settings, and workforce needs.
2. Use data and evidence to make decisions toward improving organizational performance.
3. Describe the role of government and healthcare organizations in healthcare law and ethics, and discuss federal, state, and local laws and regulations impacting the delivery of health services.
4. Analyze an organization's structure, processes, and outcomes in continuous quality improvement and demonstrate an understanding of the link between cost and quality.

Required Courses

- HA 701 - Introduction to Health Delivery and Administration Credits: 3
- HA 702 - Understanding Health Information Systems Credits: 3
- HA 703 - Healthcare Law, Regulation & Ethics Credits: 3
- HA 704 - Healthcare Quality Improvement Credits: 3

Total Credits: 12

Health Administration - Major

The part-time Bachelor of Science in Health Administration program will provide students with the foundational tools needed to become future industry managers and leaders. The Health Administration degree will provide students with the necessary knowledge and skills for working in a dynamic and rapidly changing health care setting to ensure the delivery of high-quality, accessible care. This degree program is designed to provide a comprehensive academic experience, combining didactic and practical learning opportunities. Graduates of this degree program will leave with a commitment to strategically manage and improve the U.S. health delivery system.

- Students may transfer into the program at any point but must meet the program requirements to be eligible for graduation. Students are required to complete all other University requirements for graduation.

- All students enrolled in the BS in Health Administration program must complete a minimum of 30 credits at the University in order to graduate. A minimum of 120 approved credits is required to earn a bachelor's degree.
- All USciences undergraduate students enrolled in a degree granting program must complete the general education curriculum. A description of the General Education curriculum may be found elsewhere in this catalog.

General Education (41 credits)

Required Courses in the Major (45 credits)

- HA 304 Communication for Healthcare Managers Credits: 3
- HA 306 Healthcare Marketing Credits: 3
- HA 301 - US Healthcare Systems Credits: 3
- HA 302 - Health Information Systems and Health Informatics Credits: 3
- HA 303 - Managed Care and Insurance Credits: 3
- HA 305 - Leadership and Supervision Credits: 3
- HA 307 - Human Resource Management Credits: 3
- HA 401 - Health Policy Credits: 3
- HA 402 - Economics of Healthcare Credits: 3
- HA 403 - Financial Management Credits: 3
- HA 404 - Quality Management Credits: 3
- HA 405 - Law & Ethics Credits: 3
- HA 406 - Strategy and Planning Credits: 3
- HA 420 - Research Methods Credits: 3
- HA 450 - Capstone Credits: 3 *

Elective Courses in the Major (15 credits)

- HE 315 Medical Terminology Credits: 3
- HE 318 Infectious Disease Response Credits: 3
- DA 308 - Introduction to Epidemiology Credits: 3
- HA 310 - Introduction to Health Careers Credits: 3
- HA 317 - Long-Term Care Credits: 3
- HA 318 - Public Health Credits: 3
- HA 319 - Global Health Credits: 3
- HE 302 - Health Behavior Credits: 3
- HE 305 - Community Health Credits: 3
- HE 316 - Human Disease Credits: 3
- HE 403 - Health Disparities and Cultural Diversity Credits: 3

Free Electives (19 credits)

Total Minimum Credits: 120

Note:

*Must be taken as part of the last 9 credits in the program

Health Administration - Master of Science

Program Description

The American College of Healthcare Executives (ACHE) has identified essential competencies for the healthcare executive within five major domains: communication and relationship management, leadership, professionalism, knowledge of the healthcare environment, and business skills and knowledge.

Reflecting the ACHE competencies, the online master of health administration (MHA) will prepare graduates for leadership roles in dynamic and rapidly changing U.S. healthcare systems. Students will acquire communication, quantitative analysis, critical thinking, and management skills as well as an in-depth understanding of essential topics such as health law, financial management, research, and operations within an array of health delivery settings. Taught by accomplished and experienced faculty, this 36 credit-hour graduate program is offered online to accommodate the diverse needs of our student body. Utilizing didactic instruction, case studies, experiential learning, skills training, and other methodology, the curriculum will engage students to generate solutions to real-world problems in the healthcare industry.

Program Outcomes

Upon graduation, students will be able to:

1. Explain the main functions of U.S. healthcare delivery, including financing, insurance, delivery settings, and workforce needs
2. Utilize standards of communication appropriate in professional healthcare environments
3. Use data and evidence to make decisions toward improving organizational performance
4. Apply accounting principles in budget management and conducting financial analyses to
5. Use epidemiological methods and health indicators to assess population health and prepare the health system to respond to community health needs
6. Discuss federal, state, and local laws and regulations impacting the delivery of health services
7. Analyze improvement
8. Understand organizational behavior and human resource management principles necessary to engage and motivate individual employees and teams toward executing

Required Courses

- HA 701 - Introduction to Health Delivery and Administration Credits: 3
- HA 702 - Understanding Health Information Systems Credits: 3
- HA 703 - Healthcare Law, Regulation & Ethics Credits: 3
- HA 704 - Healthcare Quality Improvement Credits: 3
- HA 710 - Advanced Financial Management in Healthcare Credits: 3
- HA 715 - Healthcare Marketing and Strategic Planning Credits: 3
- HA 720 - Managerial Epidemiology and Population Health for Healthcare Organizations Credits: 3
- HA 725 - Operations Management in Healthcare Credits: 3
- HA 730 - Organizational Behavior, Leadership & Human Resource Management Credits: 3
- HA 790 - Health Administration Master's Capstone Credits: 3

Electives

- DS 701 - Introduction to Data Science Credits: 3
- GN 701 - Intro to Genomics Credits: 3
- HA 750 - Business Communication for Healthcare Administrators Credits: 3
- HA 751 - Emergency Management in Healthcare Credits: 3
- IF 701 - Introduction to Health Informatics Credits: 3

Total Credits: 36

Health Informatics - Graduate Certificate

Program Description

In this program, individuals with healthcare and information technology backgrounds will learn about the concepts and precepts of modern health information technology. Courses in health informatics, health information systems, data management and utilization, and strategic planning provide a broad base for developing the skills necessary to impact clinical decision making and patient outcomes in a variety of healthcare settings.

Program Outcomes

1. Describe the overarching structure of data flow in electronic health records and address existing and potential challenges facing healthcare professionals
2. Describe the issues surrounding data management, quality assurance and data integrity as they apply to electronic health records.
3. Apply strategic planning methods and change/project management theories to health information technology related problems in varied healthcare environments.
4. Apply knowledge of the fundamentals of health information technology to decision- making in varied healthcare environments.

Required Courses

- IF 701 - Introduction to Health Informatics Credits: 3
- IF 702 - Understanding Health Information Systems Credits: 3
- IF 703 - Data Management and Utilization Credits: 3
- IF 704 - Strategic Planning in Healthcare Informatics Credits: 3

Total Credits: 12

Health Informatics - Master of Science

Program Description

The goal of this program is to provide training in methods and concepts in healthcare informatics. It is designed for current and future healthcare professionals who wish to understand how informatics integrates into healthcare, why informatics is needed, and what can be done to improve efficiency, cost, and healthcare quality. Students will learn about current technology in healthcare, the modern U.S. healthcare system, healthcare legislation, data standards, research methods, health data science, project management, and change management.

Program Outcomes

Upon graduation, students will be able to:

1. Apply data, information, and knowledge in healthcare informatics to find solutions at the local, national, and international levels.
2. Discuss information technology, informatics concepts, and methods to improve healthcare delivery and outcomes.
3. Demonstrate how to effectively communicate between information technology and healthcare professionals to assess their needs and constraints and to implement appropriate informatics-related interventions.
4. Evaluate healthcare informatics policy, including the application of concepts related to health policy analysis.
5. Discuss current trends in information technology and its application to healthcare quality, efficiency, and cost.
6. Demonstrate the ability to create and implement an organizational strategic plan utilizing concepts related to project management and change management.
7. Apply concepts of public health informatics, telehealth, and population health to improve healthcare quality in a population.

8. Evaluate big data sets.
9. Describe the importance of standard terminology in the setting of data reporting and clinical decision support systems.
10. Discuss research methods to appropriately conduct research using healthcare informatics data.

Required Courses

- IF 701 - Introduction to Health Informatics Credits: 3
- IF 702 - Understanding Health Information Systems Credits: 3
- IF 703 - Data Management and Utilization Credits: 3
- IF 704 - Strategic Planning in Healthcare Informatics Credits: 3

Electives

- DS 701 - Introduction to Data Science Credits: 3
- GN 701 - Intro to Genomics Credits: 3
- HA 701 - Introduction to Health Delivery and Administration Credits: 3
- HA 750 - Business Communication for Healthcare Administrators Credits: 3

Total Credits: 36

Medical Cannabis for Health Professionals - Graduate Certificate

This program offers a certificate for healthcare practitioners who want to understand the medical cannabis industry and the literature on the therapeutic effects of cannabis. Students will learn about the mechanics of the industry's supply chain, the impacts of federal prohibition on research and access to cannabis, the plant growth/life cycle, the impact of horticulture methods on cannabinoid content, the potential therapeutic effects of cannabis according to current literature, and communicating with patients about cannabis.

Required Courses

- MC 701 - Introduction to the Cannabis Industry Credits: 3
- MC 710 - Cannabis Pharmacology Credits: 3
- MC 711 - Pharmacognosy of Cannabis Credits: 3
- MC 712 - Medical Uses of Cannabis: From Theory to Practice Credits: 3

Total Credits: 12

Medical Cannabis Retail Operations and Sales - Undergraduate Certificate

This program will introduce students to the cannabis industry. Students will learn about the cannabis plant, how it interacts with the body, and the basic final products on the sales floor. There will be a focus on best practices for relaying health and safety information to patients and customers. The program will also explain dispensary operations and how regulations impact the day-to-day workflow for employees.

Required Courses

- MC 310 - Introduction to Cannabis Industry Credits: 3
- MC 320 - Health Communication in the Cannabis Industry Credits: 3

- MC 330 - Cannabis Marketing and Sales Credits: 3
- MC 340 - Supply Chain Management in the Cannabis Industry Credits: 3

Total Credits: 12

Public Health - Major

The part-time Bachelor of Science in Public Health program will provide students with the breadth of tools needed to promote good health. Students will learn about the history and values of public health, the human disease process, theories of health behavior, and the contexts that benefit or harm health. Students will acquire broad skills, including biostatistics, epidemiology, policy analysis, program planning and evaluation, and communication. Upon completion of this program, graduates will be prepared for jobs in the health care industry, public health departments, and nongovernmental agencies.

- Students may transfer into the program at any point but must meet the program requirements to be eligible for graduation. Students are required to complete all other University requirements for graduation.
- All students enrolled in the BS in Public Health program must complete a minimum of 30 credits at the University in order to graduate. A minimum of 120 approved credits is required to earn a bachelor's degree.
- All USciences undergraduate students enrolled in a degree granting program must complete the general education curriculum. A description of the General Education curriculum may be found elsewhere in this catalog.

General Education (41 credits)

Required Courses in the Major (45 credits)

- HE 402 Public Health Ethics Credits: 3
- DA 308 - Introduction to Epidemiology Credits: 3
- DA 309 - Essentials of Biostatistics Credits: 3
- HA 401 - Health Policy Credits: 3
- HE 302 - Health Behavior Credits: 3
- HE 305 - Community Health Credits: 3
- HE 316 - Human Disease Credits: 3
- HE 403 - Health Disparities and Cultural Diversity Credits: 3
- HE 301 - Introduction to Public Health Credits: 3
- HE 304 - Health Communication Credits: 3
- HE 401 - Environmental Health Credits: 3
- HE 406 - Program Planning and Evaluation Credits: 3
- HE 407 - Collaboration and Advocacy in Public Health Credits: 3
- HE 420 - Public Health Research Methods Credits: 3
- HE 450 - Public Health Capstone Credits: 3 *

Elective Courses in the Major (15 credits)

- HE 314 Sexual Health Credits: 3
- HE 315 Medical Terminology Credits: 3
- HE 318 Infectious Disease Response Credits: 3
- HA 301 - US Healthcare Systems Credits: 3
- HA 303 - Managed Care and Insurance Credits: 3
- HA 310 - Introduction to Health Careers Credits: 3
- HA 319 - Global Health Credits: 3
- HE 317 - Health Mapping with ArcGIS Credits: 3
- HE 319 - Health Education Credits: 3

- HE 321 - Nutrition and Physical Activity in Public Health Credits: 3

Free Electives (19 credits)

Total Minimum Credits: 120

Note:

*Must be taken as part of the last 9 credits in the program

Courses

AC 101 - Elementary Arabic I

Students in this course will develop the ability to use Arabic functionally and communicatively in context. This course will include intensive oral interaction with the instructor and fellow students. The basics of the writing system and Arabic phonology will also be covered.

Credits: 3

AC 102 - Elementary Arabic II

Developing further language ability through learning how to perform certain functions orally and using them with fellow students, as well as reading and writing passages reflecting their abilities.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): AC 101 - Elementary Arabic I with grade greater than or equal to D-.]

Credits: 3

AN 103 - Introduction to Anthropology

This is a survey-level introduction to anthropology, which can be defined as the holistic study of the human species. The course uses the four subfields of anthropology - biological, cultural, linguistic, and archeological - to understand the diversity of the human species in time and space.

Credits: 3

AN 201 - Health and Societies

This course provides an anthropological perspective of how our development as a species, and our existence as societies of people living in different places and times, affects our health, how we get sick, and how we interpret these conditions. It includes units on human evolution, cross cultural healthcare, anthropology and international health, and culturally competent health communication.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): AN 103 - Intro to Anthropology, BS 104 - General Biology II, BS 131 - Introductory Biology II, PS 101 - Intro to Psychology, SO 101 - Introduction to Sociology with grade greater than or equal to D-.]

Credits: 3

AN 202 - Forensic Anthropology (cross-listed as FS 202)

This course presents techniques and perspectives that biological anthropologists bring to investigations involving human remains (forensic). Topics include human osteology, the recovery of bodies, the analysis of life history, the reconstruction of causes of death, and various case studies where anthropologists have contributed significantly to solving forensic cases. Discussions will include the limitations of forensic anthropology and the application of DNA recovery to skeletal/mummified materials.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): AN 103 - Intro to Anthropology, BS 119 - General Biology II, BS 120 - General Biology II Lab, BS 133 - Introductory Biology II, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II, SO 101 - Introduction to Sociology with grade greater than or equal to D-.]

Credits: 3

AN 301 - Medical Anthropology

The course surveys the field of medical anthropology, which is commonly viewed as a branch of socio-cultural anthropology that intersects with the concerns of biological (physical) anthropology, medicine, and public health. The course also explores how medical anthropology addresses social issues such as health disparities and culturally competent healthcare.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): AN 103 - Intro to Anthropology, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

AN 314 - Peoples and Cultures of Latin America

This course is an anthropological introduction to the history and culture of Latin America. The lectures, films, readings, and museum exhibits will explore issues such as indigenous identities, political and human rights struggles, and health and healing. Since this is a course in anthropology we will examine ethical debates regarding anthropological research in the region. We will also explore transnational migration as an economic survival strategy for many Latin Americans.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): AN 103 - Intro to Anthropology, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

AN 399 - Independent Study in Anthropology

Available to students to work on a community-based or cross-cultural research project, or more in-depth reading, under the direction of a faculty member in the department. May be taken more than once, for one, two, or three credits.

Prerequisites & Notes

Student has received department permission for AN 399 - Indep Study-Anthropology

Credits: 3

AN 498 - Directed Research in Anthropology

Independent research opportunities in anthropology are available to self-directed, motivated students to expand their knowledge in an area of particular interest under the direction of a faculty member of the department. The student must plan the study with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography is required. In-depth knowledge of the area selected will be expected.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): AN 103 - Intro to Anthropology with grade greater than or equal to D-.]

Credits: 3

AR 101 - Art Appreciation

Art exploration and discussion of the various periods, time, and artists in the history of art.

Credits: 3

AR 201 - Drawing

An introduction to the principles of drawing.

Credits: 3

AR 340 - Special Topics in Art

Topics explore art, photography, art history, art theory, studio art, performance art, or a related interdisciplinary combination.

Credits: 3

BI 291 - Primer for Computational Biology I

This course is the first in a two-semester sequence aimed at equipping students with a background in basic chemistry, biochemistry and molecular biology, in the context of computation and modelling in diverse areas such as genomics and computer-aided drug design. This first course introduces the basics of chemical structure, chemical reactions, and the structure and function of biological macromolecules (proteins and nucleic acids).

Prerequisites & Notes

(Prerequisite: CH102/CH104 or CH 112/CH 114 or permission by instructor)

Credits: 3

BI 292 - Primer for Computational Biology II

This course is the second in a two-semester sequence aimed at equipping students with a background in basic chemistry, biochemistry and molecular biology, in the context of computation and modelling in diverse areas such as genomics and computer-aided drug design. This second course focuses on molecular biology, including gene transformation, with emphasis on how pathways can be modulated for therapeutic purposes. Public domain databases and tools for genomic, proteomic and system analysis will be introduced.

Prerequisites & Notes

(Prerequisite: BI 291)

Credits: 3

BI 292 - Primer for Computational Biology II

This course is the second in a two-semester sequence aimed at equipping students with a background in basic chemistry, biochemistry and molecular biology, in the context of computation and modelling in diverse areas such as genomics and computer-aided drug design. This second course focuses on molecular biology, including gene transformation, with emphasis on how pathways can be modulated for therapeutic purposes. Public domain databases and tools for genomic, proteomic and system analysis will be introduced.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BI 291 - Primer Comp Bio I with grade greater than or equal to D-.]

Credits: 3

BI 395 - Independent Study in Bioinformatics

This course is designed to allow undergraduate students to perform independent study in a subdiscipline of bioinformatics under the guidance of a faculty member in the bioinformatics program. This course may be taken in multiple semesters. Variable hrs, depending on credits

Credits: 3

BI 400 - Bioinformatics Seminar

This capstone course is designed to allow undergraduate students to investigate and to learn about current topics in bioinformatics. A major portion of the course will be formal oral presentations by students on articles in the primary scientific literature. Students will be expected to critically evaluate research data for their own presentations and from the presentations given by fellow students.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 1

BI 425 - Bioinformatic Computing

This course will cover basic topics concerning computing and computer programming in modern bioinformatics research. The focus will be on operating systems including file system navigation, text editors, advanced commands and system administration, and on fundamentals of programming.

Prerequisites & Notes

(Prerequisites: BI 292 or CH 340 or CH 341 or CH 346 or BS 466)

Credits: 3

BI 450 - Bioinformatics I: Genomics

An in-depth analysis of genome structure and analysis will be presented. DNA/protein sequence analysis software will be used extensively to model and predict molecular genetic structure-function relationships in both microbial and eukaryotic systems. Sequence database searching and web-based bioinformatic tools will be used to understand problems in genomics. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BI 292 - Primer Comp Bio II, BS 466 - Genetics, CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry with grade greater than or equal to D-.]

Credits: 3

BI 451 - Bioinformatics II

A first course in algorithms, with applications to bioinformatics, and with implementation using the C programming language. Topics include applications of exhaustive search and greedy algorithms (sequence motifs, genome rearrangements, clustering, and tree construction), dynamic programming methods, sequence alignment, and graph-theoretic algorithms.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 3

BI 465 - Microarray Technology

This course will cover a variety of topics concerning microarray technology. Fundamental and advanced concepts in microarray design, construction, utilization, and analysis will be addressed. The course will be taught as a combination of lecture and computer-based data analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 3

BI 468 - High-Throughput Sequencing and Microarray Technology

This course will cover a variety of topics concerning high-throughput sequencing (HTS) and microarray technology. Fundamental and advanced concepts in HTS, including sequencing platforms, assembling, mapping, variant calling, and RNASeq, along with microarray design, construction, utilization and analysis will be addressed. The course will be taught as a combination of lecture and computer-based data analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 3

BI 475 - Proteomics

This course will cover a variety of proteomic topics with a special focus on protein structure determination and prediction. Widely used experimental techniques such as mass spectrometry, NMR, and X-ray, as well as computational techniques, will be presented. The course will be taught as a combination of lectures, demonstrations, and hands-on exercises.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 3

BI 481 - Special Topics in Bioinformatics

This course covers a variety of topics in the development of software applications that integrate diverse components, including network resources, databases and web applications, to implement solutions for bioinformatics computing. While the focus will be on applications in the area of bioinformatics, the course will be suitable for all students with a background in computing and a basic understanding of the fundamental concepts of molecular biology.+

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BI 451 - Bioinformatics II, CS 201 - Computer Programming I with grade greater than or equal to D-.]

Credits: 3

BI 485 - Advanced Algorithms for Chemical and Bioinformatics

This course will cover a broad variety of computational approaches for data analysis, simulation, and machine learning. While the focus will be on applications in the area of bioinformatics, the course will be suitable for all students with a background in computing and a basic understanding of the fundamental concepts of molecular biology.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BI 451 - Bioinformatics II, BI 780 - Advanced Systems Analysis with grade greater than or equal to D-.]

Credits: 3

BI 490 - Special Topic/Bioinformatics

This course is designed to give students the opportunity to explore current topics in bioinformatics. The specific topic will rotate on an annual basis. Topics may include functional genomics and microarray analysis, proteomics, molecular phylogenetics, and advanced computer programming in bioinformatics.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics with grade greater than or equal to D-.]

Credits: 3

BI 495 - Directed Research in Bioinformatics

This course is designed to allow undergraduate students to perform independent research in a subdiscipline of bioinformatics under the guidance of a faculty member. This course may be taken in multiple semesters.

Credits: 3

BI 725 - Advanced Bioinformatic Computing

This course will present fundamental theory and implementation of advanced computing techniques used in bioinformatics. Methods covered will include multithreading, parallel (cluster) computing, grid computing, and acceleration using vector and graphics processors.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 451 - Bioinformatics II with grade greater than or equal to D-.]

Credits: 3

BI 745 - Molecular Evolution and Phylogenetics

This course will present fundamental concepts of molecular evolution and a survey of the computational algorithms that are employed to construct phylogenetic trees and to estimate pertinent biological data from phylogenetic reconstruction.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 451 - Bioinformatics II with grade greater than or equal to D-.]

Credits: 3

BI 755 - Advanced Probability for Bioinformatics

This course will present concepts and methods of advanced probability theory with application to problems in bioinformatics. Topics will include Bayesian probability and statistics, stochastic methods, information theory, and a variety of probabilistic inference methods.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BI 450 - Bioinformatics I: Genomics, ST 310 - Biostatistics I with grade greater than or equal to D-.]

Credits: 3

BI 765 - Microarray Technology

This course will cover a variety of topics concerning microarray technology. Fundamental and advanced concepts in microarray design, construction, utilization, and analysis will be addressed. The course will be taught as a combination of lecture and computer-based data analysis. The course will give students experience in working with microarrays with hands-on exercises and experimental projects. 3 lecture hrs

Credits: 3

BI 768 - High-Throughput Sequencing and Microarray Technology

This course will cover a variety of topics concerning high-throughput sequencing (HTS) and microarray technology. Fundamental and advanced concepts in HTS, including sequencing platforms, assembling, mapping, variant calling, and RNASeq, along with microarray design, construction, utilization and analysis will be addressed. The course will be taught as a combination of lecture and computer-based data analysis.

Credits: 3

BI 775 - Proteomics

This course will cover a variety of proteomic topics with a special focus on protein structure determination and prediction. Widely used experimental techniques such as mass spectrometry, NMR, and X-ray, as well as computational techniques, will be presented. The course will be taught as a combination of lectures, demonstrations, and hands-on exercises.

Credits: 3

BI 780 - Advanced Systems Analysis and Design for Bioinformatics

This course focuses on the design and implementation of web-based bioinformatics applications. Topics include relational database management and SQL; fundamentals of HTML, XML, and style sheets; client/server programming using PHP, JavaScript, and MySQL; and basic AJAX techniques. Students will develop complete client/server projects in the course of the semester.

Prerequisites & Notes

Student has not met all of the following Student has satisfied all of the following: [Student has completed all of the following course(s): BI 451 - Bioinformatics II with grade greater than or equal to D-.]

Credits: 3

BI 781 - Systems Architecture for Bioinformatics

This course covers a variety of topics in the development of software applications that integrate diverse components, including network resources, databases and web applications, to implement solutions for bioinformatics computing. While the focus will be on applications in the area of bioinformatics, the course will be suitable for all students with a background in computing and a basic understanding of the fundamental concepts of molecular biology.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BI 451 - Bioinformatics II, CS 201 - Computer Programming I with grade greater than or equal to D-.]

Credits: 3

BI 785 - Advanced Algorithms for Chemical and Bioinformatics

This course will cover advanced theory in the areas of chemical and biological informatics. It is intended primarily for seniors and graduate students who will be going on to careers in industrial or academic research. A variety of topics will be covered, ranging from methods to support construction and application of combinatorial chemical libraries to applications of algorithmic information theory and prediction of three-dimensional protein structure from peptide sequence. Specific topics will depend on the interests of the instructor. 3 class hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BI 451 - Bioinformatics II, BI 780 - Advanced Systems Analysis with grade greater than or equal to D-.]

Credits: 3

BI 790 - Project in Bioinformatics

In this course, the student will select a real-world bioinformatics problem to solve in collaboration with a mentor in industry or academia. The student will devise a solution in cooperation with the mentor and independently implement it. The student will be encouraged to develop a contemporary approach using web-based tools. May be taken for two semesters.

Credits: 4

BI 860 - Special Top/ Bioinformatics

This course is designed for the exploration of specific topics in the field of bioinformatics. Subject areas will usually be cutting-edge topics in the field or an in-depth examination of a specific subdiscipline in bioinformatics. Different course formats may be used including lecture, seminar, or laboratory.

Credits: 3

BI 880 - Direct Study Bioinformatics

The Directed Study course will provide the opportunity for individual study in the field Bioinformatics under the direction of a faculty member in any of the departments associated with the Bioinformatics program. Students interested in this option must approach a faculty member with a proposed course of study. The faculty member must agree to direct the student, and furthermore the student and faculty member must agree to a plan for evaluating the student's performance in the course. The proposal must be submitted to the graduate program director for Bioinformatics for approval. The directed study course, if approved and successfully completed, may be applied as elective credit toward a graduate Bioinformatics degree.

Credits: 3

BI 898 - Graduate Seminar

Current literature topics and research in bioinformatics will be analyzed in writing and presented orally.

Credits: 1

BS 101 - Biology Orientation I

Introduction to the biological sciences, including current developments and future prospects. Designed to prepare students for current studies and future careers. Required for all first-year biology, biomedical sciences, environmental science, medical

laboratory science, and microbiology students; open to all interested students.

Credits: 1

BS 103 - General Biology I

Basic principles of biology with emphasis on the scientific method, cellular structure and function, cellular respiration, cellular division, protein synthesis, metabolism, and genetics. 3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 103L - General Biology I Lab with grade greater than or equal to D-.]

Credits: 4

BS 104 - General Biology II

A continuation of basic principles of biology with emphasis on evolution, morphology, and diversity of organisms within the three domains in life, ecology, animal behavior, and environmental biology. 3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 104L - General Biology II Lab with grade greater than or equal to D-.]

Credits: 4

BS 109 - General Biology I

This course introduces students to basic principles in biology with emphasis on: the scientific method; cellular chemistry, structure and function, communication, respiration, and division; gene expression and regulation.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 110 - General Biology I Lab]

Credits: 3

BS 110 - General Biology I Lab

This is a laboratory-based course to be taken with General Biology I. This laboratory allows students to participate in the scientific method through various experiments. Students will perform hypothesis-based experiments on a variety of topics, which may include macromolecule composition, microscopy, osmolarity, enzyme activity, fermentation, and biotechnology.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 109 - General Biology I with grade greater than or equal to D-.]

Credits: 1

BS 119 - General Biology II

This course is a continuation of BS 109. It is a study of basic principles of biology emphasizing: genetics, evolution, diversity with in the three domains of life (Archaea, Bacteria, and Eukarya), ecology, and global climate change.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 103 - General Biology I, BS 109 - General Biology I] And Student has satisfied all of the following: [Student has completed

or is in process of completing any of the following course(s): BS 120 - General Biology II Lab])

Credits: 3

BS 120 - General Biology II Lab

This is a laboratory-based course to be taken with General Biology II. Students will engage in experiments that focus on Mendelian and population genetics and microbiology. Additionally, students will observe live and preserved specimens to investigate plant and animal diversity.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 103 - General Biology I, BS 109 - General Biology I] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II with grade greater than or equal to D-.]

BS 125 - Foundations for Biology

This course offers a basic overview of biological concepts with real-life applications. Topics include the basis of life, structure / function relationships, energy exchange, inheritance of genetic information, evolution, diversity of life, and ecology.

Credits: 3

BS 126 - Foundations of Biology Lab

This laboratory allows students to participate in the scientific method through various experiments and explore core concepts of biology. Students will perform hypothesis-based experiments in a variety of topics including the basis of life, energy exchange, inheritance of genetic information, and evolution. Students will participate in hands-on learning activities of genetics and physiology.

Credits: 1

BS 130 - Introductory Biology I

An introduction to basic biological principles including molecular biology, cell biology, energetics, plant biology, plant diversity, and Mendelian and molecular genetics. 3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 130L - Introductory Biology I Lab with grade greater than or equal to D-.]

Credits: 4

BS 132 - Introductory Biology I

An introduction to basic biological principles with an emphasis on cellular and molecular biology. Major topics include molecular makeup of a cell, cell structure, cellular respiration, cell to cell communication, cell division, gene expression, and gene regulation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 134 - Intro Biology I Lab, BS 136 - Phage Hunters I with grade greater than or equal to D-.]

Credits: 3

BS 133 - Introductory Biology II

This course is a continuation of BS 132; it is a study of basic biological systems emphasizing evolution, biodiversity, and physiological and morphological differences between organisms.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 132 - Introductory Biology I] And Student has satisfied any of the following: [Student has completed or is in process of

BS 134 - Intro Biology I Lab

This is a laboratory-based course to be taken with Introductory Biology I. This laboratory allows students to participate in the scientific method through various experiments. Students will perform hypothesis-based experiments on a variety of topics, which may include macromolecule composition, microscopy, osmolarity, enzyme activity, fermentation, and biotechnology.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 132 - Introductory Biology I with grade greater than or equal to D-.]

Credits: 1

BS 135 - Intro Biology II Lab

This is a laboratory-based course to be taken along with Introductory Biology II. Students will engage in experiments that focus on Mendelian and population genetics and microbiology. Additionally, students will observe live and preserved specimens to investigate plant and animal diversity.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 132 - Introductory Biology I]

Credits: 1

BS 136 - Phage Hunters I

This course is the first in a 2-semester series that will provide students with a hands-on, discovery-based research experience. Using standard microbiological and molecular techniques, students will isolate, purify, and begin characterization of their own, novel bacteriophage. Further genetic characterization will be completed in the subsequent semester. Discoveries will contribute to a national database and may serve as the foundation for scientific publications.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 132 - Introductory Biology I with grade greater than or equal to D-.]

Credits: 2

BS 137 - Phage Hunters II

This is the second course in a 2-semester series that will provide students with a hands-on, discovery-based research experience. In part one of the course students isolated, purified and had 2 bacteriophages sequenced. This semester students will analyze and annotate those DNA sequences using several computational programs. The sequence will then be published in the national GenBank database and may serve as the foundation for scientific publication. The semester will culminate with students completing an independent research project.

Prerequisites & Notes

Student has received department permission for BS 137 - Phage Hunters II

Credits: 2

BS 200 - Animal Diversity and Morphology

An introduction to the natural history, diversity, and functional anatomy of animals, stressing the theme of evolution.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 201 - Human Structure-Function I

Organization of the human body and histology. Students will examine the histology, gross anatomy and function of the integumentary, skeletal, muscular and nervous systems. 3 class hrs.

Credits: 4

BS 202 - Human Structure-Function II

Continuation of BS 201, Human Structure and Function I. Organization of the human body and histology. Students will examine the histology, gross anatomy and function of the circulatory, digestive, respiratory and excretory systems. 3 class hrs.

Credits: 4

BS 204 - Biological Sciences Colloquium

Preparation for careers in biology, microbiology, environmental science, and the health professions; introduction to faculty research. Required for all second-year students in biological sciences; open to all interested students.

Credits: 1

BS 205 - Human Structure and Function I

Organization of the human body and histology. Students will examine the histology, gross anatomy, and function of organs of the integumentary, skeletal, muscular, and nervous systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 206 - Human Structure and Function II

Continuation of BS 205 - Human Structure and Function I. Organization of the human body and histology. Students will examine the histology, gross anatomy, and function of organs of the circulatory, digestive, respiratory, and excretory systems.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BS 205 - Human Structure & Func I with grade greater than or equal to D-.]

Credits: 3

BS 207 - Human Structure and Function I Laboratory

Organization of the human body and histology, microscopic examination of tissues and organs, followed by a study of the gross anatomy of the muscular and skeletal systems.

Credits: 1

BS 208 - Human Structure and Function II Laboratory

Continuation of BS 207 - Human Structure and Function I Laboratory. A study of the organization and histology of the human circulatory, digestive, respiratory, and excretory systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 1

BS 212 - Funct Human Anat-Histology

A systems-oriented study of human anatomy incorporating histological support for macro- and microstructure and function.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 218 - Hematology

Study of the blood and blood-forming tissues with emphasis on the cellular morphology and hematopoietic mechanisms of the red blood cells, white blood cells, and platelets. Also covers a wide variety of clinical disorders, particularly those involving abnormally formed cellular elements and coagulation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Medical Laboratory Science (BS)]

Credits: 3

BS 219 - Basic Nutrition

A basic course in understanding nutrition and its implications in the maintenance of good health.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

BS 220 - Plant Diversity-Morphology

A study of the diversity that exists within the plant kingdom. Topics include evolutionary trends, functional anatomy, and ecological influences.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 221 - Economic Botany

A basic biological and chemical coverage of plants of economic importance. Emphasis on description and display as well as constituents, distribution, processing, marketing, and use.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

BS 222 - Economic Botany

A basic biological and chemical coverage of plants of economic importance. Emphasis on description and display as well as constituents, distribution, processing, marketing, and use.2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 2

BS 230 - Basic Concepts and Procedures in Medical Laboratory Science

Fundamentals in medical laboratory sciences.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] [Students who specified one or more of these Programs of Study or Program Foci: Medical Laboratory Science (BS)]

Credits: 4

BS 240 - Basics of Microbiology I

The biology of microorganisms and their roles in the living world. The lecture emphasizes microbial structure, growth, metabolism, and diversity. The laboratory presents standard methods for laboratory isolation and culture of microorganisms, as well as microbial identification.3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 4

BS 241 - Microbiology

Introduction to classification and control of microorganisms. Emphasis is placed on microbial diseases and their causes, symptoms, diagnosis, prevention, and treatments of choice. This course is designed for pharmacy majors.3 lecture/3 lab hrs

Credits: 4

BS 243 - Microbial Science

This course will give students a solid foundation in the science of microbiology. Students will learn about the various types of microbiological life (bacteria, archaea, viruses and single cell eukaryotes) with a special emphasis on common themes. These include: classification, structure, growth, the flow of genetic information and relevance to human activity.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.])

Credits: 3

BS 244 - Microbial Science Lab

This course introduces students to the growth, classification and manipulation of microorganisms in a laboratory setting. The laboratory introduces students to aseptic/sterile technique, normal microflora, microbiological media, microbial colony isolation, classic and modern microbiological techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 1

BS 255 - Fundamentals of Immunology

Study of the basic principles and mechanisms of immunology and their applications to transplantation, infection, cancer, AIDS, hypersensitivity, and autoimmunity. Not offered after Spring 2008.2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 2

BS 260 - Intro to Neuroscience

Introduction to neuron structure and function, synaptic transmission, organization of the nervous system, brain-behavior relationships, and current neuroscience methods.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 109 - General Biology I, BS 132 - Introductory Biology I with grade greater than or equal to D-.] [Student has completed or is

in process of completing any of the following course(s): CH 101 - General Chemistry I, CH 111 - Principles of Chemistry I with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): MA 104 - College Algebra, MA 107 - Precalculus, MA 110 - General Calculus with grade greater than or equal to D-.]

Credits: 3

BS 270 - Evolutionary Biology

Principles of evolution and the study of the forces that drive change in populations and organisms.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 276 - Introduction to Environmental Science

This is an introductory course in environmental science. It is intended for any student who wants to gain a background in the major environmental issues of our present time. It will cover the issues of world population expansion, sustainability, and basic ecological principles in the context of energy issues, water and mineral resource issues, biodiversity, agricultural issues, and suburban sprawl. Pollution of the air we breathe and the water we drink will also be discussed. We will also examine the issues of solid waste disposal and the economics of environmental issues.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 3

BS 277 - Introduction to Environmental Science Lab

This is the laboratory component for the introductory course in environmental science. It is intended for any student who wants to gain a background in the major environmental issues of our present time. It will cover the issues of early industrialization of the United States, brownfields, landfills, sewage treatment plants, mining, and stream assessment, and students will visit a variety of habitats located in the Mid-Atlantic region.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 1

BS 280 - Comparative Animal Phys

Study of organ and system functions in major invertebrate and vertebrate phyla.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

BS 291 - Special Topics in Bio

Bioscience topics of interest that are not covered in-depth in other courses. The course content is subject to change from one offering to the next. As such, students may receive credit for this course more than once, provided that the title and subheadings indicate different material has been covered.

Credits: 3

BS 301 - Ethical Issues in Biological Sciences

Students explore fundamental ethical issues relevant to the biological sciences. Emphasis will be on ethical dilemmas presented, and debated or discussed, to foster analytical and empathetic thinking within varied contexts. These contexts will include federal regulation and oversight; politico-legal perspectives (including civil liberties); human, wildlife, and ecological health and safety; and the public (right to know).

Credits: 2

BS 304 - Toxic Natural Products

Description and recognition, distribution and habitat, and toxic characteristics of potentially hazardous plants and animals, and the clinical management of intoxication with such substances.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 2

BS 305 - Animal Behavior

An introduction to the proximate causes and ultimate consequences of behavioral strategies used by individuals within a population. Specific questions concerning the behavior of individuals and populations of individuals are explored in a mechanistic and evolutionary context.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 4

BS 306 - Human Molec & Cell Bio

An exploration of how human cells function with an emphasis on molecular techniques used to diagnose disease. Course will provide an introduction to foundational topics in molecular and cellular biology such as, DNA replication, transcription, translation, organelles, and cell division with application to human diseases, when such components and processes fail or are mutated.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.]

Credits: 3

BS 308 - Human Parasitology

Survey of the geographic distribution, incidence, symptoms, diagnosis, treatment, prevention, control, and immunology of important parasitic diseases in humans. Emphasis is placed on relationship of culture and social customs to the life cycles of the parasites. Class discussions and presentations will focus on ethical implications of diagnoses, as well as related Western interventions in developing countries.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 310 - Anatomy and Physiology I

A systemic approach to the structure and function of the human. Organ systems studied include the integumentary, skeletal, muscular, and nervous systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II]

Credits: 3

BS 311 - Anatomy and Physiology II

Continuation of BS 310; systemic approach to the structure and function of the human. Organ systems studied include endocrine, circulatory, respiratory, digestive, and excretory systems.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BS 310 - Anatomy and Physiology I with grade greater than or equal to D-.]

Credits: 3

BS 318 - The Biology of Aging

Study of the aging process, including the role of evolution and genetics, systems review, probable causes, and major consequences of aging.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): BS 119 - General Biology II, BS 120 - General Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 133 - Introductory Biology II, BS 135 - Intro Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 137 - Phage Hunters II with grade greater than or equal to D-.]) And (Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry])

Credits: 3

BS 325 - Plant Physiology

Study of metabolism, development, water relations, and mineral nutrition of higher plants with molecular, cellular, and organismal considerations.3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 4

BS 326 - Plant Physiology

Study of metabolism, development, water relations, and mineral nutrition of higher plants with molecular, cellular, and organismal considerations.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): BS 119 - General Biology II, BS 120 - General Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 133 - Introductory Biology II, BS 135 - Intro Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 137 - Phage Hunters II with grade greater than or equal to D-.])

Credits: 3

BS 332 - Intro to Plant Tissue Cul

Introduction to the theory, practice, and biotechnical applications of culturing plant cells, tissues, and organs.1 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 2

BS 336 - Pharmacognosy

Chemistry, biosynthesis, and activity of medicinal substances of natural origin. Emphasis on natural products having clinical, ecological, agricultural, and forensic importance.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): BS 119 - General Biology II, BS 120 - General Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 133 - Introductory Biology II, BS 135 - Intro Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 137 - Phage Hunters II with grade greater than or equal to D-.]) And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 2

BS 337 - Marine Pharmacognosy

Survey of nature and taxonomy of biotoxic marine organisms and consideration of the chemistry and biological activity of drugs of marine origin.2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 336 - Pharmacognosy with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 2

BS 338 - Analysis of Natural Products

Survey of qualitative and quantitative microscopic and chemical procedures for analysis of economically important natural products and drugs of abuse.2 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

BS 339 - Toxic Natural Products

Description and recognition, distribution and habitat, and toxic characteristics of potentially hazardous plants and animals, and the clinical management of intoxication with such substances.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 3

BS 342 - Advanced Microbiology

An advanced-level continuation of BS 240 - Basics of Microbiology. The topics presented in lecture and laboratory are designed to prepare the student for a career in microbiology and to provide an overview of techniques applicable to contemporary microbial research.3 lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology with grade greater than or equal to D-.]

Credits: 4

BS 343 - Microbial Genetics

Microbial genetics explores the mechanisms and regulation of information storage, duplication, transmission, and translation in living microorganisms. Major themes include DNA replication, mutation, and repair; gene expression; protein production and trafficking. Practical applications and fundamental discoveries will be emphasized.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science]

Credits: 4

BS 347 - Applied Microbiology

Industrial applications of microbiology are emphasized. Covers methods for microbial fermentation; harvesting and processing of microbial products in food processing; and microbiological quality control methods for food, water, and commercial products.2
lecture/3 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology with grade greater than or equal to D-.]

Credits: 3

BS 348 - Clinical Microbiology

A survey of the various bacteria that cause human infections. The type of infection caused, portal of entry, molecular basis of the infection process, treatment, and laboratory identification are discussed for each group of organisms.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.]

Credits: 4

BS 350 - Trends in Applied Microbiology

This course will feature new and relevant topics in the field of applied microbiology every year. Students will learn how microbes can be used and manipulated for a variety of useful applications - we will cover diverse topics, such as food microbiology, sociomicrobiology, synthetic biology or microbial engineering.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science]

Credits: 3

BS 355 - Clinical Immunology

Basic principles and types of immunity. Consideration of transplantation, AIDS, hypersensitivity, and tumor immunology of the human. Laboratory methods of serodiagnosis of disease and blood and tissue typing are emphasized.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.]

Credits: 3

BS 358 - Principles and Applications of Immunology

Study of the principles and mechanisms of immunology and their applications to infection, hypersensitivity, autoimmunity, transplantation, cancer and AIDS.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 202 - Organic Chemistry II with grade greater than or equal to D-.]

Credits: 3

BS 372 - Aquatic Biology

A lecture and field course concerning the biological, physical, and chemical aspects of freshwater ecosystems. Includes collection, preservation, and recognition of aquatic organisms other than vertebrates and the study of those aspects of their biology that are important adaptations to aquatic life.

Prerequisites & Notes

Student has received department permission for BS 372 - Aquatic Biology

Credits: 4

BS 375 - Environmental Microbiology

Discussion of the role of microorganisms in global ecology and environmental quality, including methods of study, isolation, and analysis; relevant physical/biological chemistry; and applications of microbes to waste management, pest control, bioremediation, and ore leaching.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

BS 377 - Ecology

Consideration of the interaction of living organisms with the environment. Aquatic, terrestrial, and marine systems are examined.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): BS 119 - General Biology II, BS 120 - General Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 133 - Introductory Biology II, BS 135 - Intro Biology II Lab with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 137 - Phage Hunters II with grade greater than or equal to D-.])

Credits: 4

BS 391 - Special Topics in Bio

Bioscience topics of interest that are not covered in-depth in other courses. The course content is subject to change from one offering to the next. As such, students may receive credit for this course more than once, provided that the title and subheadings indicate different material has been covered.

Credits: 3

BS 399 - Independent Study in Biological Sciences

Available to motivated students to expand their knowledge in an area of particular interest under the direction of a member of the department. Student and faculty member usually plan a project prior to the semester in which the study is to begin. Variable hrs, depending on credits

Prerequisites & Notes

Student has received department permission for BS 399 - Ind Study in Bio Sci

Credits: 3

BS 400 - Biology Internship

Students participate in an intern experience in biological science, a structured series of modular experiences that provide exposure to varied aspects of biological investigations within the student+s chosen area of interest.

Credits: 3

BS 410 - Principles of Forensic Pathology

Forensic pathology is the study of how and why people die. This course will provide foundational understanding of primary pathological findings in the physical, environmental, and social contexts that are used to explain and define cause of death diagnoses in a courtroom.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 311 - Anatomy and Physiology II, BS 412 - Human Physiology, PC 302 - Physiology II with grade greater than or equal to D-.]

Credits: 2

BS 412 - Human Physiology

Examination of critical concepts in human physiology from an integrative perspective common to current biomedical disciplines. Levels of organization within and between classical systems include skeletomuscular, nervous, endocrine, cardiovascular, respiratory, renal, and digestive systems. Recommended for pre-professional students.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.])

Credits: 4

BS 415 - Modern Issues of Vaccinology

An exploration of the history and scientific basis of vaccination through discussion, research, and social media. Current issues, such as vaccination against emerging pathogens and cancer, clinical trial design, and clinical administration will be considered as well as marketing, regulation and cultural attitudes towards vaccines.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.]

Credits: 3

BS 420 - Ethnobotany

The study of the interactions of various human cultures with plants in the local environment. Topics on the use of plants in medicinal, ritual, and cultural contexts by various aboriginal cultures will be addressed.

Credits: 2

BS 425 - Neuroscience

A study of the basic principles and concepts related to the nervous system. The development and changes of the nervous system, and subsequently the individual, across the life span provides the foundation for understanding the brain-behavior relationship. Emphasis is placed on the role of the nervous system in normal physiologic function with particular emphasis on sensorimotor

behavior. Neuroanatomy, neurophysiology, and an introduction to neuropathology are included.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 311 - Anatomy and Physiology II, BS 412 - Human Physiology with grade greater than or equal to D-.]

Credits: 3

BS 428 - Neuropsychology

This course is designed to introduce upper-level students interested in careers in medicine, clinical psychology, and related health science disciplines to the structure-function relationships of the human brain. The course emphasizes adult brain anatomy and function. The behavioral effects of brain damage (e.g., agnosia, neglect, aphasia, apraxia, amnesia) will be related to neuropsychological theories of brain function and examined in depth through readings, case material, and presentations.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 430 - Molecular Basis of Neurological Disorders

Students will explore the molecular underpinnings of different neurological disorders and diseases, such as neurodegenerative disorders (Alzheimer+s, Parkinson+s Disease, etc.), addiction, and epilepsy. Through primary literature, discussion, and inquiry-based learning, students will also learn about the research methodology and model systems used to make advances in the investigation of these diseases and disorders.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 3

BS 431 - Genes and Brains

Advances in the fields of neuroscience and genetics have begun to unravel complex ways in which our genes control proper functioning and dysfunctioning of our brains. In this course-based undergraduate research experience (CURE), students investigate emerging ideas in neurogenetics through rigorous and collaborative laboratory-based research. Students apply the scientific method to test hypotheses, collect and interpret data, and examine broader relevance of their experiments through analysis of primary literature.

Credits: 3

BS 440 - Environmental Toxicology

Courses covers the physiological and systemic interaction of environmental pollutants with plants and animals.

Credits: 3

BS 441 - No Microbe Is an Island: The Social Life of Microbes

Microbes do not live in isolation. More commonly microbes live in association with one another and with non-microbial host organisms. Students will use the primary literature to explore selected topics in sociomicrobiology, including: quorum sensing, biofilms, interkingdom communication, symbioses, and microbiomes.

Credits: 3

BS 450 - Human Virology

The study of bacterial, plant, and animal viruses is presented with an emphasis on animal virology. Viral taxonomy, mechanisms of viral reproduction and replication, and the pathology of selected viral families are presented.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science])

Credits: 3

BS 453 - Microbial Physiology

Survey of bacterial morphology, factors affecting growth characteristics of bacterial populations, biosynthetic processes, and biochemical and genetic factors that control these processes. Mechanisms of antibiotic activity, development of resistance, and methods of antibiotic testing are also covered.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry] And Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Microbiology (BS), Microbiology Minor]

Credits: 4

BS 455 - Infection and Immunity

This course examines the interaction between a host and pathogens and the environmental factors that influence the outcome of this interaction. Students will read, analyze, and discuss primary literature in the field of microbial infection and host immunity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 200 - Survey of Physics, PY 202 - Introductory Physics II, PY 205 - Elements of Physics with grade greater than or equal to D-.]

Credits: 3

BS 456 - Immunobiology

Course covers basic principles of immunology with emphasis on the chemistry and genetics of immunogens and antibodies, as well as the molecules and cells involved in immune responses. Transplantation and possible alternatives, tumor immunology, AIDS, allergies, psychoneuroimmunology, and reproductive immunology are discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 240 - Basics of Microbiology I, BS 241 - Microbiology, BS 243 - Microbial Science] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry]

Credits: 4

BS 460 - Neurobiology

In-depth study of the molecular and cellular components of neurons and neural networks. Neuronal functions including synaptic transmission, neurotransmitter release, signaling pathways, and gene expression will be covered. Primary literature will be used to analyze the cellular mechanisms and components regulating neural systems including sensation, integration, sleep, learning, and memory.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 3

BS 461 - Cell Biology

Analysis of the cell at all levels of organization, which includes consideration of techniques used in the study of cells.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 4

BS 462 - Genetics

Course includes mechanisms of inheritance and gene action from the molecular to the organismic and population levels.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry

Credits: 3

BS 463 - Genetics Laboratory

This course will involve laboratory experiments that demonstrate the concepts in classical, molecular, population, developmental and quantitative genetics.

Prerequisites & Notes

Student has satisfied all of the following: [Student has enrolled in all of the following course(s): BS 462 - Genetics] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry]

Credits: 1

BS 464 - Topics in Biotechnology

This course will provide a high-level instruction in the fundamentals of molecular biology. Students will study the mechanisms surrounding the central dogma with a focus on the specific differences between prokaryotes and eukaryotes at the molecular level and the importance of molecular interactions, and will be introduced to the modern techniques used to work with DNA, RNA and proteins. A heavy focus will be given to critically analyzing recent scientific literature related to biotechnology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): BS 343 - Microbial Genetics with grade greater than or equal to D-.]

Credits: 3

BS 466 - Genetics

Course covers fundamental concepts, principles, and applications of microbial, classical, and molecular genetics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 340 - Survey of Biochemistry, CH 341 - Molecular Struct-Biochem, CH 346 - Biochemistry]

Credits: 4

BS 470 - Molecular Pharmacognosy

The course will be centered on molecular, cell and analytical techniques used in solving challenges in the development of drugs from natural resources.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 120 - General Biology II Lab, BS 135 - Intro Biology II Lab, BS 137 - Phage Hunters II with grade greater than or equal to D-.]

Credits: 3

BS 471 - Environmental Law

Major environmental legislation at both state and federal levels; problems of regulation. Required course for environmental science majors; open to all other qualified students.

Credits: 3

BS 472 - Principles of Environmental Risk Assessment

Study of factors relating to environmental risk assessment in a variety of situations. Emphasis on the methodology of risk assessment. Required of environmental science majors; open to all other qualified students.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 276 - Intro Environmental Science, BS 377 - Ecology with grade greater than or equal to D-.]

Credits: 3

BS 474 - Emerging Biological Threats and Global Sustainability

Biological threats such as emerging human/animal diseases, food insecurity, and population growth are examined in connection with causes and effects on global changes in climate, land use, decline in biodiversity, etc. Topics are covered through journal readings, reports, presentations, and student blogs.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 3

BS 475 - Molecular Biology

Study of molecular biology concepts and techniques. Topics include biochemical basis of macromolecular structure, maintenance of the genome, gene expression, gene regulation, and current molecular biology techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 462 - Genetics, BS 466 - Genetics with grade greater than or equal to D-.]

Credits: 3

BS 476 - Molecular Biology Lab

Application of molecular biology techniques. Topics include purification, analysis, and manipulation of biological macromolecules, expression of proteins in different cell systems, and interaction studies.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 475 - Molecular Biology with grade greater than or equal to D-.]

Credits: 2

BS 490 - Special Topics in Biology

Bioscience topics of special interest not included in regular courses are offered by a faculty member of the department. Students are expected to have motivation and self-direction greater than would normally be required in a regular course.

Prerequisites & Notes

Student has received department permission for BS 490 - Special Topics in Biology

Credits: 3

BS 493 - Biological Sciences Seminar I

Reports and seminars on topics of current biological interest presented by students or outside speakers. Depending on the instructor, topic may be one of students' or instructor's choice. Required of all senior biological sciences majors; open to all qualified students. 1 class hr

Prerequisites & Notes

This course is for fourth-year students only and is restricted to students in Biological Sciences programs.

Credits: 1

BS 494 - Biological Sciences Seminar II

Continuation of BS 493 - Biological Sciences Seminar I. Students will integrate knowledge and ideas within biology and across other fields. 1 class hr

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 493 - Biological Sciences Sem I with grade greater than or equal to D-.]

Credits: 1

BS 495 - Seminar in Neuroscience

Current research and techniques in the field of neuroscience through primary literature review, discussion, and analysis. Topics will be chosen based on current discoveries and advancements in the field.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

BS 499 - Directed Research in Biological Sciences

Independent research for motivated students under the direction of a faculty member of the department. Provides experience in principles and process of the scientific method and biological research. Student and faculty must plan a project prior to the semester in which the research is to begin.

Credits: 3

BS 704 - Animal Developmental Biology

Analysis of the basic phenomena and patterns of animal development from fertilization through the formation of the major organs. The student will use current literature to develop an understanding of the cellular and molecular processes that regulate animal embryonic development.

Credits: 2

BS 716 - Neuromuscular Physiology

An analysis of the development and physiology of the motor and sensory portions of the nervous system and of muscle contraction.

Credits: 3

BS 724 - Plant Biochemistry

This course covers the biosynthetic mechanisms of the plant and biogenesis of alkaloids, steroids, glycosides, volatile oils, tannins, flavonoids, and other plant principles.

Credits: 2

BS 736 - Advanced Pharmacognosy

This course builds on information provided in BS 336 - Pharmacognosy. A combination of lecture and (journal club+ format will be used, which will relate current literature to the lecture themes. Each student will be responsible for preparing a written and oral mini-review of the literature on a topic related to the current state of knowledge in pharmacognosy.

Credits: 3

BS 750 - Virology

The focus of this course will be the study of animal viruses with an emphasis on viral genetics. Students will develop an understanding of virion structure, viral taxonomy, mechanisms of viral reproduction and replication, the pathology of selected viral families, and the nature of the viral/host relationship.

Credits: 3

BS 752 - Advanced Immunobiology

The principles of immunology will be presented with emphasis on cellular and molecular interactions. The genetic factors that govern immune mechanisms will be described. Application of immunological principles to tissue implantation, hypersensitivity, tumor development and therapy, AIDS, psycho-neuro influences on the immune system, and aging will be discussed.

Credits: 3

BS 761 - Advanced Cell Biology

This course is designed to give the student a working knowledge of recent advances in cell biology through critical analysis of the current literature. The course will be presented in a lecture/seminar format.

Credits: 3

BS 763 - Cell Biology Methods

The theory of methodologies and techniques commonly used in modern cell biology and biochemistry laboratory settings. Each student will be required to develop an understanding of the theory and current practice of separations and analysis of biochemical and cellular systems, including cell cultures, SDS-PAGE, affinity chromatography, HPLC analysis, cell manipulation, ELISAs, and fluorescence microscopy. The course is complementary to BS 767 - Cell Biology Methods Laboratory.3 class hrs

Credits: 3

BS 764 - Biotechnology

An in-depth study of the techniques and applications of recombinant DNA technology with emphasis on current literature. Students will learn about techniques of recombinant DNA technology, develop an understanding of biotechnology industry product development, and examine ethical issues concerning biotechnology.3 class hrs

Credits: 3

BS 765 - Biotechnology Lab

This laboratory course will provide students with the opportunity to gain hands-on experience in recombinant DNA technology, experimental design principles, and data analysis.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 764 - Biotechnology with grade greater than or equal to D-.]

Credits: 2

BS 767 - Cell Biology Methods Lab

Laboratory practice in methodologies found in a cell biology laboratory environment. Typical projects may include cell culture and transfection, extraction and analysis of proteins, densitometric analysis of gels, fixation and immunostaining of cellular components, and live-cell fluorescence microscopy and analysis.

Credits: 2

BS 768 - Biochemical Genetics

Topics of current interest in molecular biology and molecular genetics are explored using the current literature.

Credits: 2

BS 770 - Fundamentals of Brewing Sciences

Comprehensive course in the brewing process and its underlying scientific principles. Students will learn methods of brewing beer from grain to glass as instructed by industry experts. There will be a focus on raw ingredient quality, assessment, application, and processing in the brewery.

Credits: 3

BS 771 - Brewery Engineering

Designed to inform students of key engineering principles with application to best brewery practices. A combination of theory and application will enable the student to better understand the function, theory, and design of brewery process, equipment, and layout.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):
BS 770 - Fundamental Brewing Science with grade greater than or equal to D-.]

Credits: 3

BS 773 - Microbiology of Beer

Through laboratory exercises, students will learn general concepts in cell and molecular biology as it pertains to yeast, bacteria, and fermentation including microscopy, culturing techniques, identification, and yeast management. Through the Yeast Hunters program, students will learn essential techniques while isolating wild yeast strains.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):
BS 770 - Fundamental Brewing Science with grade greater than or equal to D-.]

Credits: 2

BS 774 - Quality Control Lab

In this laboratory, students will practice and demonstrate the theory behind common analytical techniques as described by the American Society of Brewing Chemists. Many of these techniques can be incorporated into the brewery, while alternative / more advanced methods will inform the student of possible analytical lab expansion or outsourcing.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):
BS 770 - Fundamental Brewing Science with grade greater than or equal to D-.]

Credits: 2

BS 775 - Project in Brewing Science

This course is an opportunity to study a topic or establish a skill set as determined by the student with program director oversight. It is meant to prepare students for the industry internship. This will likely be a team-based project that asks a research-based question, utilizing the pilot brewing system.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):
BS 770 - Fundamental Brewing Science with grade greater than or equal to D-.]

Credits: 3

BS 776 - Brewing Science Internship

This internship is a commitment to the brewing industry which enables practice and experience in a real-world setting. Students may find internships in a working brewery, microbrewery, brewpub, brewing materials analytical lab, fermentation biotechnology lab, or other related workplace.

Credits: 3

BS 785 - Introduction to Research

This course is designed for students who are beginning the research phase of their thesis project or who are deciding between the thesis and non-thesis options. The course consists of at least two rotations in the laboratories of department faculty.

Credits: 4

BS 786 - Research Ethics

This course will provide an examination of ethical behavior and practice in research in the scientific research. The course will follow a case study format in which students will be expected to present and participate in group discussions.

Credits: 1

BS 790 - Project in Cell Biology and Biotechnology

Graduate students may perform a graduate-level project under the direction of a mentor. The project must include a comprehensive literature search, an analysis of data, and a written paper.

Credits: 3

BS 799 - Master's Research

Candidates for the master of science in cell biology and biotechnology (thesis option) are required to complete a research project under the direction of an advisor chosen from within the department.

Credits: 9

BS 801 - Scientific Discourse

Graduate students will learn and improve upon their skills in presentation and debate of primary scientific data. The course will take the format of student presentations about their own ongoing research to their peers. Students will be expected to actively participate in the presentation of others through discussion and critical evaluation of the work presented. General presentation skills and strategies will be covered and feedback will be provided to students on an individual basis. All levels of graduate students are welcome and those without a significantly advanced research project may, at the discretion of the instructor, present current literature related to their research topic.

Credits: 1

BS 820 - Advanced Ethnobotany

The study of the interactions of various human cultures with plants in the local environment. Topics on the use of plants in medicinal, ritual, and cultural contexts by various aboriginal cultures will be addressed. Such information can serve as the basis for drug discovery and development from natural resources.

Credits: 2

BS 826 - Cellular Plant Development

This course will cover the principles of the development of plants at the molecular and cellular levels. Using current literature, the course will emphasize development in relation to hormone interactions, reproduction, and the plant genome.

Credits: 2

BS 850 - Metabolic Engineering

This course examines the field of metabolic engineering and synthetic biology. Students will gain an understanding of the techniques utilized in this field, including pathway and strain construction, balancing of mass and energy in a microbial system, and metabolic network analysis. An emphasis will be placed on how these techniques have been used to improve production of important compounds such as primary metabolites (e.g., ethanol), antibiotics (e.g., penicillin), and various other enzymes and peptides.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 764 - Biotechnology with grade greater than or equal to D-.]

Credits: 3

BS 860 - Special Topics in Cell Biology and Biotechnology

This course is designed to allow in-depth exploration of one of a variety of topics of current interest in the field. The topic and credits will be designated by the instructor. A variety of formats may be used, including lecture, presentations, papers, and discussion.

Credits: 3

BS 861 - Cell and Molecular Biology

This course is designed to give the student a working knowledge of modern cell biology, mostly through critical analysis of the current literature. This course will be presented in a lecture/seminar format.

Credits: 3

BS 862 - Biological Membranes

This course is designed to provide an in-depth analysis of the structure, synthesis, and function of cellular membranes with emphasis on the current literature.

Credits: 3

BS 870 - Molecular Pharmacognosy

The course will be centered on molecular, cell and analytical techniques used in solving challenges in the development of drugs from natural resources.

Credits: 3

BS 872 - Current Topics in Zymurgy

This course focuses on current research and techniques in fermentation science through primary literature review, discussion, and analysis. Additional material will cover current issues such as supply chain management, regulatory compliance, and safety.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 770 - Fundamental Brewing Science with grade greater than or equal to D-.]

Credits: 2

BS 887 - PhD Colloquium

This course is focused on those skills required by the PhD scientist and consideration of career options.

Credits: 1

BS 897 - Scientific Proposals

The course is focused on writing and peer assessment of grant proposals. Thesis students will use their approved research prospectus to compose the Specific Aims page and Research Plan sections of a federally-supported funding opportunity. Non-thesis graduate students will develop a grant application focused on a research project of interest.

Credits: 2

BS 898 - Seminar in Cell Bio-Biotech

Current literature topics and research in cell biology and biotechnology will be analyzed in writing and presented orally. Each student will prepare a formal research proposal for presentation to the class.

Credits: 1

BS 899 - Doctoral Research

Candidates for the doctor of philosophy degree are required to fulfill their research requirements under the direction of a graduate faculty member of the department.

Credits: 9

BW 700 - Graduate-Level Academic Writing

Students will learn to write at a level acceptable for those seeking graduate degrees. Students will focus on writing several brief documents based on a proposal that they will develop into a longer paper related to an area of their discipline or future profession. The course will be a combination of lecture and workshop and will be taught online. All work will proceed through the various stages of the writing process.

Credits: 3

BW 701 - Professional Writing in Science

BW701 is a foundation course that introduces students to two fundamental issues in writing and science: rhetorical theory and the social context surrounding the scientific enterprise. Students are introduced to different styles and examples of medical writing and the thought processes behind them and learn to craft their own writing appropriately for scientific and healthcare professionals and for general and specific audiences. AMA style is required.

Credits: 3

BW 702 - Stylistics & Editing

This course focuses on the features of style that make different writing projects unique. The course takes a broad approach to medical narrative, from clinical reports to essays on medical writing. Students will also study modern principles of medical editing, apply them to sample documents and become familiarized with the AMA Manual of Style and theories of grammar in analyzing medical text. Through a variety of critiques, they will gain experience in applied principles of grammar and scientific rhetoric.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 703 - Information Strategies for Biomedical Writers

In this course students learn to identify their information needs and corresponding sources appropriate for a variety of biomedical writing projects. Students will search a variety of databases and other resources pertinent to their needs, evaluate the information they find, and use that information appropriately. Students will become familiar with searching medical, business, and government sources and will develop skills to assess available statistics for applicability to their projects. Students will also learn how to retrieve information as a biomedical writer unaffiliated with a university or other library.

Credits: 3

BW 704 - Regulatory Document Processes

This course is an introduction to the drug development process from the regulatory medical writer+s point of view. Specific topics include the ethics of using human subjects in clinical research, overviews of U.S. and international regulatory agencies, product life cycles, the conduct of clinical trials and reporting clinical trial results, and activities and documentation involved with submissions for marketing approval of treatments. This is a core course for both the MS in biomedical writing and regulatory writing certificate programs.

Credits: 3

BW 705 - Biostatistics for Biomedical Writers

This course is an introduction to two main aspects of the use of statistics in biomedical fields to improve students+ skills in reading, writing, and editing biomedical text: the ways in which statistics support arguments in biomedical fields and statistical terminology and tests

Credits: 3

BW 706 - Ethical and Legal Issues in Biomedical Communication

This course examines ethical and legal issues related to publishing biomedical information, including the ethics of authorship, editorship, and peer review; conflicts of interest; codes of ethics; scientific misconduct; and contracts, copyright, trademark, and privacy issues.

Credits: 3

BW 707 - Regulatory Writing: Medical Device Submissions

This course examines the process of writing medical device submissions. Topics covered include FDA medical device regulations, the medical device development process, and clinical study documents. Students will practice communicating complex scientific information in various documents, including investigator+s brochures, clinical trial reports, and IDE/PMA/510(k) submission components.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 708 - Regulatory Writing: New Drug Applications

This course concentrates on the development of clear, concise, consistent, and complete New Drug Application (NDA) reports, focusing on the clinical study report (CSR). It covers the interface between clinical documents and draft package inserts; resources for preparing the CSR; and practice writing a synopsis, table explanations, narrative summaries, and labeling.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 709 - Promotion of Biomedical Products: Regulatory Considerations

This course examines ethical and legal issues related to the promotion of FDA-regulated products with a focus on pharmaceuticals. The course emphasizes critical thinking and understanding the nature of the underlying issues, and how to write about the issues, and how to apply regulatory information to the communication.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 712 - Pharm Product Labeling

This course introduces the student to the regulatory, operational, and commercial aspects of pharmaceutical labeling, and provides opportunities to practice the specialized writing required to generate a variety of labeling content.+

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 718 - Scientific Literacy

This course has been designed to provide a clear, practical foundation in critical thinking, and its application to scientific literacy. Concepts are explored in the context of medical communication.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 722 - Regulatory Writing: Biologics

This course examines the process of writing regulatory documentation for biologics. Topics covered include FDA regulation of biologics, the biological product development process, and clinical study documents. Students will practice communicating complex scientific information in various documents for biologics. This course builds upon the foundation from BW 704 to focus in depth on the particular issues unique to biologics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 724 - Chemistry Manufacturing and Controls: Analytical and Manufacturing Processes in Pharmaceutical Development

This course is an introduction to documenting Chemistry, Manufacturing, and Controls (CMC) information that forms the quality sections of regulatory documents. These are critical for pharmaceutical manufacturing, testing, regulatory reporting, approval for marketing, and licensing of medicinal products. Course content includes discussion of the regulations that govern the industry and guidance documents that lead product development and reporting practices.+

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 731 - Anatomy and Physiology Documentation

An intensive review of basic anatomy and physiology for biomedical writers with little or no prior education in human biology and medical terminology. Students will become proficient in basic anatomy and physiology and learn how to communicate specifically about each body system to a variety of targets using a variety of delivery techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 732 - Cardiovascular Disease Documentation

This is an intensive medical science biomedical writing course that introduces students to both normal and pathophysiologic cardiovascular biology. Pharmacotherapeutic and nonpharmacotherapeutic approaches to management of disease are explored through the evaluation of clinical trials and publications. A final project involves application of cardiovascular related research and writing skills.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 733 - Health Journalism Documentation

Through discussion of representative scholarly publications, critiques of these publications and their research design, students will become more adept at tackling various communication problems in both scholarly and workplace writing.

Credits: 3

BW 741 - Introduction to Therapeutic Areas: Medical and Pharmacological Overview for Biomedical

This course focuses on 22 important disease states or conditions within 8 therapeutic areas. These disease states were chosen because of their market impact, not necessarily because of their relative clinical importance. The course covers the medical basis of each disease state and the important therapeutic classes of drugs used to treat it. Each disease state will be explored in terms of its qualitative and quantitative descriptors, epidemiology, pathogenesis, and clinical course. The analyses of treatments will follow the (STEPS+ approach that considers each agent+s Safety, Tolerability, Efficacy, Pricing, and Simplicity profile. The evidence basis for their efficacy claims are explored in the light of clinical usefulness and comparative effectiveness.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

BW 750 - Continuing Medical Education

Continuing Medical Education (CME) is a highly specialized form of biomedical writing. This course introduces students to the concepts underlying continuing education in general and the process for developing CME courses in particular. It covers both the writing and design of effective CME programs in various media (print and digital) and the myriad approval processes for design and delivery.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 760 - Entrepreneurship in Biomedical Communication

This course explores entrepreneurial activities in biomedical communication. Students will read research literature on the evolution of the workplace and the implications of gender on the roles of consultants. They will construct a mission statement, develop a business plan, and study the legal, financial, and ethical issues of operating their own consultancy in biomedical communication.

Credits: 3

BW 770 - Social History of Therapeutics

This course introduces students to the social history of selected healthcare professions and therapies. Particular attention will be given to examples of technology in the healthcare professions (to illustrate how tools shape practice). Students will be introduced to archival documents and material culture (the study of objects, their manufacture, and their use) for their own studies. Owing to the rich medical and pharmaceutical heritage of Philadelphia, students will visit important permanent collections at local libraries and museums

Credits: 3

BW 780 - Special Topics in Biomedical Communication

This course is intended as a forum for studying current or innovative topics in biomedical communication. Its topic will therefore vary from term to term. Students will design and carry out appropriate assignments keyed to the special topic being explored in the course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing with grade greater than or equal to D-.]

Credits: 3

BW 830 - Independent Study in Biomedical Communication

This course affords the opportunity to pursue research either in a cognate field or on a topic not fully explored in offerings of regular program electives. Students may choose to work with a member of the graduate faculty from another department at USciences for this study with permission of the program director.

Credits: 3

BW 860 - Research in Biomedical Communication

This course introduces current research approaches G??principally ethnographic and historicalG??in the field of professional and scientific communication. Students learn qualitative research techniques by analyzing online videos and applying the same techniques in the field

BW 890 - Project Seminar - Capstone

This course requires students to demonstrate knowledge of theory and practice in biomedical communication acquired throughout the program. Students will take this course, followed by BW 891 - Graduate Research Project II, as a research-based, independent study to develop a large project: a course for continuing medical education, a product monograph, a major research paper for publication, a website, or a similar project

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 860 - Adv Communications Research with grade greater than or equal to D-.]

Credits: 3

BW 891 - Graduate Research Project II

This course requires students to demonstrate knowledge of theory and practice in biomedical communication acquired throughout the program. Students will take this course as a continuation of BW 890 - Graduate Research Project I, as a research-based, independent study to develop a large project: a course for continuing medical education, a product monograph, a major research paper for publication, a website, or a similar project.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BW 890 - Graduate Research Project I with grade greater than or equal to D-.]

Credits: 3

CA 301 - Greek and Roman Religions

Consideration of the major rituals and religions of ancient Greece and Rome and their impact on today+s world.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.])

Credits: 3

CA 302 - Greek and Roman Philosophy

Survey of the pre-Socratics, Plato, Aristotle, the Epicureans, and the Stoics and their relationship to later modes of thought.

Credits: 3

CA 303 - Ancient Medicine

This course examines the cultural context, social history, and literary, documentary, and material evidence for the theory and practice of medicine, as it developed in the ancient Mediterranean and the Greco-Roman world.

CA 340 - Special Topics Classics

Topics addressed in this course vary.

Credits: 3

CB 785 - Introduction to Research

This course is designed for students who are beginning the research phase of their thesis project. The course consists of at least two rotations in the laboratories of program faculty.

Credits: 4

CB 815 - Cancer Biology

This course is focused on the basic pathways and mechanisms of cancer development and progression as well as current approaches for the identification of therapies for the treatment of cancer.

Credits: 3

CB 880 - Molecular Screening

The goal of this course is to provide hands-on planning, conceptualization, and assay development of a molecular screening strategy relevant to cancer biology and cancer therapeutics. The wet lab component of the course is designed to leverage the existing collaboration between Wistar and USciences centered on the Molecular Screening Facility at The Wistar Institute.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CB 813 - Molecular Cancer Therapeutics with grade greater than or equal to D-.]

Credits: 2

CB 890 - Journal Club

The journal club will be offered each fall and spring semester. Journal club will be taken for zero credits each semester; journal club will receive two credits in the student's final semester. A grade of pass/fail will be assigned each semester based on the student's attendance and active participation.

Credits: 2

CB 899 - Doctoral Research

Students must complete a minimum of at least 20 credits of CB 899 - Doctoral Research. While the stated minimum for research is 20 credits, at least two additional years of research after completion of coursework is expected of the students. Students propose, develop, and perform an independent research project under the guidance of a faculty advisor and Advisory Committee.

CH 101 - General Chemistry I

A general course covering basic chemical principles, including atomic structure, periodicity, stoichiometry, chemical bonding, and states of matter.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): MA 107 - Precalculus with grade greater than or equal to D-.]

Credits: 3

CH 102 - General Chemistry II

Continuation of CH 101, covering solutions, equilibrium, acid-base chemistry, complex ions, elementary kinetics and thermodynamics, electrochemistry, and nuclear chemistry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 101 - General Chemistry I, MA 107 - Precalculus with grade greater than or equal to D-.] Or (Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 104 - General Chem Lab II, MA 110 - General Calculus with grade greater than or equal to D-.])

Credits: 3

CH 103 - General Chemistry Lab I

A laboratory course designed to illustrate fundamental principles of chemistry and to introduce basic chemical laboratory techniques.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 101 - General Chemistry I with grade greater than or equal to D-.]

Credits: 1

CH 104 - General Chemistry Lab II

Continuation of CH 103, with emphasis on titrations and qualitative analysis of cations and anions.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 103 - General Chemistry Lab I, CH 113 - Principles of Chem Lab I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has enrolled in all of the following course(s): CH 102 - General Chemistry II])

Credits: 1

CH 109 - Survey of Chemistry

A survey of general chemistry, organic chemistry, and biochemistry and their impact on society and the environment.

CH 111 - Principles of Chemistry I

Rigorous treatment of the principles and theories of chemistry, covering atomic structure, stoichiometry, kinetic theory of gases, acids, bases, chemical equilibrium, thermochemistry, and thermodynamics discussed.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): MA 107 - Precalculus with grade greater than or equal to D-.]

Credits: 3

CH 112 - Principles of Chemistry II

Continuation of CH 111, covering periodicity, quantum theory, electronic structure and bonding, molecular orbital theory, intermolecular forces in condensed phases and phase equilibria, oxidation-reduction, and electrochemistry.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 111 - Principles of Chemistry I, MA 107 - Precalculus with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 110 - General Calculus, MA 122 - Calculus I with grade greater than or equal to D-.])

Credits: 3

CH 113 - Principles of Chemistry Lab I

Basic chemical laboratory techniques applied to demonstrate the fundamental principles of chemistry. Provides an introduction to complex manipulation of quantitative laboratory data.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 111 - Principles of Chemistry I with grade greater than or equal to D-.]

Credits: 1

CH 114 - Principles of Chemistry Lab II

Continuation of CH 113, with emphasis on qualitative inorganic analysis.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 113 - Principles of Chem Lab I with grade greater than or equal to D-.])

Credits: 1

CH 120 - Orientation for the Chemical Sciences

Introduction to all aspects of the chemical sciences, including biochemistry. Students are presented with an overview of the department, the University, the curricula, active research areas, career opportunities, and scientific ethics, as well as information on how they can maximize their USciences educational experience.

Credits: 1

CH 201 - Organic Chemistry I

Introduction to structure and properties of organic molecules, including electronic structure and bonding, physical properties, isomerism, and stereochemistry.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

CH 202 - Organic Chemistry II

Continuation of CH 201, focusing on chemistry of organic molecules containing functional groups: alkyl halides, alcohols, ethers, amines, and compounds containing the carbonyl group.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 201 - Organic Chemistry I with grade greater than or equal to D-.]

Credits: 3

CH 203 - Organic Chemistry Lab I

Basic laboratory techniques for manipulations, characterization, and analysis of organic liquids and solids. Introduction to organic synthesis and to chromatographic and spectroscopic methods.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 104 - General Chem Lab II, CH 114 - Prin of Chem Lab II]

Credits: 1

CH 204 - Organic Chemistry Lab II

Continuation of CH 203, covering development of synthetic and analytical organic chemical techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CH 203 - Organic Chemistry Lab I, CH 213 - Prin of Organic Chem Lab I with grade greater than or equal to D-.]

Credits: 1

CH 205 - Organic Chemistry-Biochemistry

A survey of the structure and reactivity of organic molecules. The principal biomolecules (saccharides, proteins, lipids, nucleic acids, and vitamins) and their modes of activity in living systems are studied. 4 lecture hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II]

Credits: 4

CH 211 - Principles of Organic Chemistry I

Comprehensive study of theoretical aspects of organic chemistry, utilizing a mechanistic approach. Nomenclature, chemical reactions, reaction mechanisms, and stereochemistry are emphasized in the study of several common functional groups.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

CH 212 - Principles of Organic Chemistry II

Continuation of CH 211 with an extension of its mechanistic approach to the chemistry of other functional groups.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 211 - Prin of Organic Chem I with grade greater than or equal to D-.]

Credits: 3

CH 213 - Principles of Organic Chemistry Lab I

Synthesis, characterization, and analysis of organic molecules, with emphasis on modern chromatographic and spectroscopic methods.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 104 - General Chem Lab II, CH 114 - Prin of Chem Lab II]

Credits: 1

CH 214 - Principles of Organic Chemistry Lab II

Continuation of CH 213 emphasizing the development of synthetic and analytical techniques, including classical qualitative organic analysis. Students perform individualized multistep synthetic procedures.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 213 - Prin of Organic Chem Lab I with grade greater than or equal to D-.]

Credits: 1

CH 300 - Discussions in Chemistry

Discussion of ethical issues and research opportunities in the chemical sciences as well as career planning.

Prerequisites & Notes

Latest Class Standing in the selection list U2

Credits: 1

CH 320 - Essentials of Physical Chemistry

Fundamental concepts of physical chemistry: aspects of thermodynamics including the first and second laws, chemical and phase equilibria, solutions, surface chemistry, reaction kinetics, introduction to quantum chemistry including QM postulates/Schrodinger equation/particle in a box, rigid rotor and harmonic oscillator/hydrogen atom/many electron atom, chemical bond, molecular structure, introduction to statistical mechanics including boltzman distribution/partition functions.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 4

CH 321 - Physical Chemistry I

Covers fundamental concepts of physical chemistry: aspects of thermodynamics, including the first and second laws; chemical and phase equilibria; ideal and non-ideal solutions; and electrochemistry.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 4

CH 322 - Physical Chemistry II

Continuation of CH 321, including quantum chemistry, reaction kinetics, spectroscopy, photochemistry, statistical mechanics, and theories of reaction rates.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 4

CH 331 - Basic Inorganic Chemistry

Introduction to basic inorganic chemistry, including elementary bonding theories, the chemistry of elements other than carbon, coordination chemistry, acid-base chemistry, organometallic chemistry, and solid-state chemistry.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 104 - General Chem Lab II, CH 114 - Prin of Chem Lab II])

Credits: 3

CH 340 - Survey of Biochemistry

This survey of biochemistry uses a descriptive approach to biological molecules, including both structure and function. Cellular components, biochemical reactions, metabolism, and the workings of the genetic code will all be discussed. Overall, a general understanding of biochemistry and its relationship to the world around us will be provided.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.])

Credits: 3

CH 341 - Molecular Structure in Biochemistry

This introduction to biochemistry covers protein structure and function, enzyme kinetics and mechanisms, membrane structure and function, and principles of biological regulation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

CH 342 - Nucleic Acid Biochemistry

Focused on molecular genetics, its topics include structure, replication, transcription, translation, repair, recombination, and processing of nucleic acids; control of gene expression; and modern recombinant methods of DNA splicing, cloning, and sequencing.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 466 - Genetics, CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.]

Credits: 3

CH 343 - Intermediary Metabolic Biochemistry

Catabolic and anabolic pathways with emphasis on chemical logic, mechanisms, and regulatory control. Also includes carbohydrate, lipid, amino acid, and nucleotide metabolism, and oxidative and photosynthetic phosphorylation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.]

Credits: 3

CH 346 - Biochemistry

An introduction to biochemistry that includes structure of proteins, nucleic acids, and membranes; enzyme kinetics and mechanisms; membrane transport; central metabolic pathways and their regulation; and basic methods of biochemistry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 4

CH 347 - Biochem-Molecular Bio I

Survey of biochemistry, including basic structures of proteins and membranes, enzymes, central metabolic pathways, and synthesis of biomacromolecules. Drug metabolism and binding, as well as the mechanism of action of several representative drugs, are treated at the molecular level. 3 lecture hrs

Credits: 3

CH 348 - Biochem-Molecular Bio II

Continuation of CH 347 with an emphasis on all aspects of molecular biology. 3 lecture hrs

Credits: 3

CH 356 - Molecular Biology and Genetics

Introduction to molecular biology and genetics. The biochemistry of the synthesis of DNA, RNA, and proteins and their regulation will be studied. We will also investigate the importance of genetic information to biochemistry and medicine.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 346 - Biochemistry with grade greater than or equal to D-.]

Credits: 3

CH 361 - Analytical Chemistry

Introductory analytical chemistry with emphasis on relevant chemical principles, combining both classical and modern instrumental techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 104 - General Chem Lab II, CH 114 - Prin of Chem Lab II]

Credits: 3

CH 362 - Instrumental Analysis

Theory and applications of instrumental methods of analysis: mass spectrometry and spectrophotometric (UV-visible, IR), NMR, electrometric, polarographic, and chromatographic (GC, HPLC) methods. 3 lecture/4 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 321 - Physical Chemistry I, CH 361 - Analytical Chemistry with grade greater than or equal to D-.]

Credits: 4

CH 363 - Analytical Chemistry Lab

Applications of various classical and instrumental methods for the analysis of unknown samples.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed any of the following course(s): CH 361 - Analytical Chemistry, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed any of the following course(s): FS 361 - Forensic Analytical Chem, FS 366 - Forensic Princ Analy Chem with grade greater than or equal to D-.])

Credits: 1

CH 364 - Analytical Meth in Tox-Clin Ch

Applications of various classical and instrumental methods for the analysis of unknown samples with an emphasis on toxicological and clinical samples. 4 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 361 - Analytical Chemistry with grade greater than or equal to D-.]

Credits: 1

CH 366 - Principles of Analytical Chemistry

An in-depth treatment of the quantitative aspects of chemistry. Chemical equilibria commonly encountered in analytical chemistry and strategies for solving chemical equilibrium problems are emphasized. Modern techniques in analytical chemistry, such as spectrophotometry and chromatography, are introduced in this course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 112 - Prin of Chemistry II, CH 114 - Prin of Chem Lab II with grade greater than or equal to D-.]

Credits: 3

CH 367 - Analytical and Physical Methods Laboratory I

Experience with methods for the determination of chemical and physical properties with an emphasis on quantitative analysis.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 366 - Prin of Analytical Chem, FS 366 - Forensic Princ Analy Chem with grade greater than or equal to D-.]

Credits: 1

CH 368 - Analytical and Physical Methods Laboratory II

Laboratory experience covering physical principles of instrumental methods of analysis: modern instrumentation such as atomic, electron and vibrational spectroscopy, NMR, X-ray techniques, separation, and surface analysis.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 366 - Prin of Analytical Chem, FS 366 - Forensic Princ Analy Chem with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 363 - Analytical Chemistry Lab, CH 367 - Analytical Phys Meth Lab I with grade greater than or equal to D-.])

Credits: 1

CH 376 - Instrumental Analysis

Theory and applications of instrumental methods of analysis are presented including mass spectrometry and spectrophotometric (UV-visible, IR), NMR, electrometric, polarographic, and chromatographic (GC, HPLC) methods.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): CH 321 - Physical Chemistry I, CH 361 - Analytical Chemistry with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): CH 363 - Analytical Chemistry Lab, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.])

Credits: 3

CH 377 - Instrumental Analysis Lab

Laboratory experience demonstrating chemical instrumentation described in CH 376.4 lab/1 pre-lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 363 - Analytical Chemistry Lab with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): CH 321 - Physical Chemistry I, CH 322 - Physical Chemistry II with grade greater than or equal to D-.] And (Student has satisfied any of the following: [Student has completed all of the following course(s): CH 321 - Physical Chemistry I, CH 361 - Analytical Chemistry with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed all of the following course(s): CH 363 - Analytical Chemistry Lab, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.])

Credits: 1

CH 400 - Chemical Science Internship

Students will participate in an intern experience in chemistry, biochemistry, or pharmaceutical chemistry. This process will include a structured experience within the student+s chosen area of interest. The project will have predetermined research directives, which will be overseen by a University mentor and an industrial/governmental scientist. This is designed to be a (hands-on+ experience.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 131 - Introductory Biology II, CH 212 - Prin of Organic Chem II, MA 102 - Mathematical Analysis II with grade greater than or equal to D-.]

Credits: 12

CH 401 - Seminar in Chemistry I

Chemical and biochemical topics of current interest presented orally by students and invited guest speakers. Writing, speech, delivery, and use of visual aids are critiqued. All biochemistry, chemistry, and pharmaceutical chemistry majors and other interested persons are invited to attend.

Prerequisites & Notes

Latest Class Standing in the selection list P1, U3

Credits: 1

CH 402 - Seminar in Chemistry II

Continuation of CH 401.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 401 - Seminar in Chemistry I with grade greater than or equal to D-.]

Credits: 1

CH 404 - Literature of Chemistry

The study of the nature and uses of the primary, secondary, and tertiary literature of chemistry and biochemistry and of modern information-retrieval techniques.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 201 - Organic Chemistry I with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 211 - Prin of Organic Chem I with grade greater than or equal to D-.])

Credits: 1

CH 411 - Medicinal Chemistry

A study of the biochemical mechanisms of drug action in order to develop a rational approach to the analysis of drugs and their metabolites and to design new drugs.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.]

Credits: 3

CH 412 - Mod Theor in Organic Chem

Reaction mechanisms elucidated using kinetics, conformational analysis, and isotope labeling. Covers resonance, inductive and steric effects, Hammett equation, nucleophilic displacement reactions, aromatic substitution, and rearrangements. 3 lecture hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

CH 414 - Structure-Activity Relationships (SAR)

Selected classes of medicinal agents are examined, stressing general structures, synthesis, and, in particular, the relationships between structure and pharmacological activity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

CH 416 - Chemical Synthesis Laboratory

Techniques of organic and inorganic synthesis, including reaction control, vacuum and fractional distillation, uniform reagent addition, controlled stirring, operation in inert atmosphere, safe handling of toxic or unstable reagents, and chromatographic purification.

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II, CH 214 - Prin of Organic Chem Lab II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): CH 377 - Instrumental Analysis Lab with grade greater than or equal to D-.])

Credits: 3

CH 417 - Char of Organic Compounds

Determination of structures of organic compounds through the use of spectroscopic as well as classical chemical and physical techniques. 2 lecture/4 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II, CH 214 - Prin of Organic Chem Lab II, CH 362 - Instrumental Analysis with grade greater than or equal to D-.]

Credits: 3

CH 420 - Applications of Computational Chemistry

Introduction to the theory and applications of computational chemistry methods, including quantum mechanics, density functional theory, and classical molecular dynamics simulation methods. Project-based exercises on applying the above methods to chemical/biochemical processes while utilizing state-of-the-art computational software packages.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 320 - Essentials Physical Chem, CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 2

CH 423 - Physical Chemistry Lab I

Laboratory investigations emphasizing physical chemical techniques in thermodynamics, kinetics, electrochemistry, quantum chemistry, and physical biochemistry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 320 - Essentials Physical Chem, CH 321 - Physical Chemistry I with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 363 - Analytical Chemistry Lab, CH 367 - Analytical Phys Meth Lab I with grade greater than or equal to D-.]

Credits: 2

CH 424 - Physical Chemistry Lab II

Continuation of CH 423.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 423 - Physical Chemistry Lab I with grade greater than or equal to D-.]

Credits: 2

CH 425 - Inorganic and Materials Synthesis

A capstone-style lecture and laboratory course focused on using synthesis and physical characterization of inorganic compounds and materials. Students will lead a multi-disciplinary laboratory project oriented around a specific theme from the current chemical literature.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 423 - Physical Chemistry Lab I, CH 431 - Inorganic Chemistry with grade greater than or equal to D-.]

Credits: 2

CH 431 - Inorganic Chemistry

The study of physical inorganic chemistry and chemical bonding, including ligand and crystal field theory, molecular orbital theory, and chemical applications of symmetry. Includes coordination chemistry, acid-base relationships, and application of modern spectroscopic techniques to inorganic compounds.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 322 - Physical Chemistry II, CH 331 - Basic Inorganic Chemistry with grade greater than or equal to D-.]

Techniques of isolation, purification, and assay of representative biomolecules, particularly proteins.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.]

Credits: 1

CH 445 - Biochem Laboratory II

Techniques of isolation, purification, and assay of representative biomolecules, particularly nucleic acids.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 444 - Biochemistry Laboratory I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): BS 466 - Genetics with grade greater than or equal to D-.]

Credits: 1

CH 448 - Computer-Aided Drug Design

Introduction to the theory and practice of molecular modeling, especially as applied to the problem of identifying and designing

bioactive and therapeutic agents, using specialized software and advanced computer hardware such as workstations and supercomputer clusters.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.]

Credits: 3

CH 450 - Undergraduate Research

Qualified students may elect to carry out research in analytical, inorganic, organic, or physical chemistry or biochemistry under the direction of a member of the department. A maximum of 12 semester credit hours can count toward the degree.

Prerequisites & Notes

Student has received department permission for CH 450 - Undergrad Research

Credits: 3

CH 455 - Special Topics in Chemistry

Designed to address subject areas within the chemical sciences that are either interdisciplinary or of unusual current interest and that are not covered in other courses. Students may receive credit for this course more than once, provided the subheadings indicate different material has been covered.

The application of analytical chemistry to pharmaceutical materials and dosage forms.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 377 - Instrumental Analysis Lab with grade greater than or equal to D-.]

Credits: 3

CH 464 - Pharmaceutical Analytical Chemistry

The application of analytical chemical techniques to pharmaceutical materials and dosage forms. The development and evaluation of methods appropriate for pharmaceutical materials.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 376 - Instrumental Analysis with grade greater than or equal to D-.]

Credits: 3

CH 465 - Pharmaceutical Analytical Chemistry Lab

The application of analytical chemical techniques to pharmaceutical materials and dosage forms. The development and evaluation of methods appropriate for pharmaceutical materials.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 368 - Analytical Phys Methods Lab II with grade greater than or equal to D-.]

Credits: 1

CH 480 - Directed Study in Chemistry

An opportunity for students, under the supervision of a faculty member in the department, to independently explore a specific area of chemistry of their choice that is not typically covered in the formal classroom offerings of the department.

Credits: 3

CH 488 - Undergraduate Chemistry Research Thesis

Students will write and defend either a thesis describing their research work, or a draft of an article for publication in a peer-reviewed journal.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 321 - Physical Chemistry I, CH 341 - Molecular Struct-Biochem, CH 363 - Analytical Chemistry Lab, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): CH 450 - Undergrad Research with grade greater than or equal to D-.]

Credits: 1

CH 700 - Intro to Graduate Studies

Individualized coursework designed to strengthen a student's background prior to taking advanced graduate courses. Note: Course is repeatable for credit

Prerequisites & Notes

Student has satisfied all of the following: [Student has received department permission for CH 700 - Intro to Graduate Studies]

Credits: 9

CH 705 - Intermediate Organic Chem

Presents several topics at an intermediate level to bridge the gap between second-year organic chemistry and literature-based courses. Topics include nomenclature, stereochemistry, multistep synthesis, mechanisms, aromaticity, and physical influences on reactions. 3 lecture hrs

Credits: 3

CH 714 - Structure-Activity Relationships

Selected classes of medicinal agents are examined, stressing general structures, synthesis, and, in particular, the relationships between structure and pharmacological activity. Note: Not offered every year

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.]

Credits: 3

CH 716 - Chemical Synthesis Laboratory

Techniques of organic and inorganic synthesis, including reaction control, vacuum and fractional distillation, uniform reagent addition, controlled stirring, operation in inert atmosphere, safe handling of toxic or unstable reagents, and chromatographic purification. Note: Not offered every year

Prerequisites & Notes

(Student has satisfied all of the following: [Student has completed all of the following course(s): CH 202 - Organic Chemistry II,

CH 204 - Organic Chemistry Lab II with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II, CH 214 - Prin of Organic Chem Lab II with grade greater than or equal to D-.]) And Student has satisfied all of the following: [Student has completed all of the following course(s): CH 377 - Instrumental Analysis Lab with grade greater than or equal to D-.]

Credits: 3

CH 717 - Char of Organic Compounds

Determination of structures of organic compounds through the use of spectroscopic as well as classical chemical and physical techniques. 2 lecture/4 lab hrs

Credits: 3

CH 718 - Heterocyclic Chemistry

A study of the major types of aromatic and nonaromatic heterocyclic compounds with a special interest in those having biochemical activity: their synthesis, physical properties, reactivity, and influence on living systems, etc. Note: Not offered every year.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 341 - Molecular Struct-Biochem with grade greater than or equal to D-.])

Credits: 3

CH 720 - Applications Comp Chem

Introduction to the theory and applications of computational chemistry methods, including quantum mechanics, density functional theory, and classical molecular dynamics simulation methods. Project-based exercises on applying the above methods to chemical/biochemical processes while utilizing state-of-the-art computational software packages.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 320 - Essentials Physical Chem, CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 2

CH 721 - Chemical Kinetics

The Study of theoretical aspects of reaction kinetics and the experimental methods used to measure the rates of reactions. Note: Not offered every year

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 322 - Physical Chemistry II with grade greater than or equal to D-.]

Credits: 3

CH 725 - Graduate Physical Chemistry I

Individualized instruction to meet specific needs in thermodynamics, kinetics, or quantum chemistry.

Credits: 3

CH 727 - Physical Biochemistry

Application of principles of thermodynamics, kinetics, and quantum chemistry to biochemical systems.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 3

CH 728 - Advanced Biochemistry

Selected topics in protein structure and function, especially enzymology. Note: Not offered every year

Credits: 3

CH 748 - Computer-Aided Drug Design

Introduction to the theory and practice of molecular modeling, especially as applied to the problem of identifying and designing bioactive and therapeutic agents, using specialized software and advanced computer hardware such as workstations and supercomputer clusters. Note: Not offered every year

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed any of the following course(s): CH 342 - Nucleic Acid Biochemistry, CH 348 - Biochem-Molecular Bio II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed any of the following course(s): MA 201 - Mathematical Analysis III, PY 212 - Physics II with grade greater than or equal to D-.])

Credits: 3

CH 762 - Analytical Separations Chemistry

The study of theory, instrumentation, and practical aspects of analytical and preparative methods of separations, including gas, liquid, and supercritical fluid chromatography; capillary electrophoresis; and separation techniques coupled with mass spectrometry.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): CH 361 - Analytical Chemistry, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.]

Credits: 3

CH 764 - Pharmaceutical Analytical Chemistry

In-depth treatment of the principles and practice of analytical chemistry and instrumental methods as applied to drug analysis, pharmaceutical product quality, concentration of drug and metabolites in biological fluids, drug formulation, etc., with an emphasis on HPLC methods.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed any of the following course(s): CH 361 - Analytical Chemistry, CH 366 - Prin of Analytical Chem with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): CH 363 - Analytical Chemistry Lab with grade greater than or equal to D-.])

Credits: 3

CH 767 - Applied Spectroscopy

A practical approach to the application of spectroscopic techniques such as NMR, UV/Vis, fluorescence, and circular dichroism to problems in biochemistry, chemistry, pharmaceutics, pharmacognosy, and natural products chemistry.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 366 - Prin of Analytical Chem, CH 376 - Instrumental Analysis with grade greater than or equal to D-.]

Credits: 3

CH 786 - Research Ethics

This course will provide an examination of ethical behavior and practice in research in the scientific research. The course will follow a case study format in which students will be expected to present and participate in group discussions.

Credits: 1

CH 799 - Master's Research

Candidates for the master of science degree, specializing in chemistry, biochemistry, or pharmacognosy, are required to complete a research project under the direction of a faculty member in the department graduate program. Note: Course is repeatable for credit

Credits: 9

CH 802 - Research Seminar

Graduate students present a formal seminar based on their research endeavors. Note: Course is repeatable for credit

Credits: 2

CH 805 - Critical Evaluation of Literature

Students critique current journal articles under the mentorship of different faculty members and a course coordinator.

Credits: 1

CH 813 - Special Topics in Organic Chemistry

Topics of current interest in organic chemistry are discussed, with detailed treatment of topics not ordinarily included in a classical course. Students are expected to keep abreast of current literature. Note: Not offered every year, course is repeatable for credit.

Credits: 3

CH 815 - Chemistry of Polymers

The course provides an introduction to polymer chemistry, including classification of macromolecules, modern methods of synthesis and characterization of polymers, physical chemistry of polymers solutions and thin films, and modern research topics. Special attention is given to biopolymers. A three-week laboratory practicum concludes the course. Note: Not offered every year

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): CH 320 - Essentials Physical Chem, CH 321 - Physical Chemistry I with grade greater than or equal to D-.

Credits: 2

CH 828 - Biophys & Biochem Methods

A survey of important biophysical and biochemical methods with special emphasis on applications to drug discovery and design. Topics include single-molecule techniques, calorimetry, binding and high throughput screening, kinetic modeling, spectroscopy, computer simulation and others. Results from current literature that rely on these techniques will be reviewed. Note: Not offered every year

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 728 - Advanced Biochemistry with grade greater than or equal to D-.]

Credits: 3

CH 841 - Special Topics in Biochemistry

Topics of current interest in the biochemical sciences are discussed, with detailed treatment of topics not ordinarily included in a classical course. Students are expected to keep abreast of current literature. Note: Not offered every year, course is repeatable for credit.

Credits: 3

CH 863 - Special Topics in Analytical Chemistry

Topics of current interest in analytical chemistry are discussed, with detailed treatment of topics not ordinarily included in a classical course. Students are expected to keep abreast of current literature.

Prerequisites & Notes

Student has satisfied any of the following: [Student has received department permission for CH 863 - Spec Topics-Analytical Chem]

Credits: 3

CH 864 - Special Topics in Inorganic Chemistry

Topics of current interest in inorganic chemistry are discussed, with detailed treatment of topics not ordinarily included in a classical course. Students are expected to keep abreast of current literature. Note: Not offered every year

Prerequisites & Notes

Student has satisfied any of the following: [Student has received department permission for CH 864 - Special Topics Inorganic Chem]

Credits: 3

CH 870 - Current Research in Pharmacognosy

An in-depth consideration of current literature concerning the taxonomic distribution, biosynthesis, chemical synthesis, extraction, pharmacology, and economic uses of substances of natural origin. Students are expected to make presentations based on the current literature.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 343 - Intermed Metabolic Biochem with grade greater than or equal to D-.]

Credits: 2

CH 878 - Introduction to Research

A laboratory rotation through two seven-week chemical, biochemical, or pharmacognosy research projects for graduate students matriculated in a graduate program in the Department of Chemistry & Biochemistry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has received department permission for CH 878 - Introduction to Research]

Credits: 2

CH 880 - Current Literature

Chemical and biochemical topics based on current literature are analyzed and presented orally and in writing. Writing, speech, delivery, and use of visual aids are critiqued.

Credits: 2

CH 885 - Scientific Writing in Chemical Sciences

Students will learn how to organize and write scientific texts, use scientific language concisely and correctly, and present their ideas clearly. Writing topics will focus on chemical sciences.

Credits: 3

CH 888 - Graduate Project

Graduate students will perform a graduate-level project under the direction of an advisor. This project may take one of several forms but must include a comprehensive literature search, a written paper, and an oral presentation to the graduate faculty of the department.

Credits: 6

CH 892 - Special Topics in Physical Chemistry

Topics of current interest in physical chemistry are discussed, with detailed treatment of topics not ordinarily included in a classical course. Students are expected to keep abreast of current literature.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

CH 899 - Doctoral Research

Candidates for the doctor of philosophy degree, specializing in chemistry, biochemistry, or pharmacognosy, are required to fulfill their research requirement under the direction of a faculty member in the department graduate program. Note: Course is repeatable for credit

Credits: 9

CO 101 - Introduction to Communication

Focuses on factors and processes involved in interpersonal communication: source and receiver variables, verbal and nonverbal messages, and strategic interaction. Prepares students to argue policy topics and make short speeches.

Credits: 3

CO 204 - Public Speaking

Course covers principles and practices of effective oral presentation. Lectures and exercises are used to enable students to develop and deliver information, demonstrations, and persuasive speeches. Emphasis placed on conceptual frameworks and specific communication skills for scientific audiences.

Credits: 3

CO 320 - Relational Communication

Examination of communicative behavior occurring in the development and deterioration of relationships. Emphasis placed on understanding conceptual frameworks and specific skills in interpersonal communication.

Credits: 3

CO 340 - Special Topics in Communication

Special Topics in Communication is a Behavioral and Social Sciences course that will offer students the opportunity to complete a course in an area of interpersonal or mass communication theory, practice application, or a related interdisciplinary combination not otherwise offered. Assignments and class work will emphasize public speaking, interpersonal communication, patient-provider communication in different settings, behavior change communication, and/or related research techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): AN 103 - Intro to Anthropology, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

CO 399 - Independent Study in Communication

Available to students to work in an area of particular interest under the direction of a faculty member of the department. May be elected more than once for one, two, or three credits.

CO 400 - Health Communication and Education

This course introduces principles and techniques of health communication to inform and educate people about health issues. Our focus will include communicating about health and science to the public through media channels, health advocacy, patient information and decision aids, as well emergency and crisis communication. Students will create multiple products for group critique with the goal of developing skills and competency.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): CO 101 - Intro to Communication, CO 204 - Public Speaking

Credits: 3

CO 411 - Health Literacy

Health literacy or the ability to obtain, process and act on health information--is an essential patient safety and public health issue. This course provides key concepts and skills for students in health-related fields to identify patients with health literacy risks; to provide clear health and medical information in oral and written formats; and to assess and modify health care delivery systems and environments to enhance patient access and understanding.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): CO 101 - Intro to Communication, CO 204 - Public Speaking

Credits: 3

CO 420 - Behavioral Change Communications

This course presents a practice-based approach to planning and testing a health communication intervention designed to change individual or group behavior. We apply behavior change communication theory and methods. Students will work with an organizational "client" to advance a health communication objective.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): CO 101 - Intro to Communication, CO 204 - Public Speaking

Credits: 3

CO 498 - Directed Research in Communication

Independent research opportunities in communication are available to self-directed, motivated students to expand their knowledge in an area of particular interest under the direction of a faculty member of the department. The student must plan the independent study project with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography required. In-depth knowledge of the area selected will be expected.

Credits: 3

CO 700 - Health Communication and Education: Communicating to Inform

This course introduces principles and techniques of health communication to "inform, educate and empower people about health issues." Our focus will include communicating about health and science to the public through media channels, health advocacy, patient information and decision aids, as well emergency and crisis communication. Students will create multiple products for group critique with the goal of developing skills and competency.

Credits: 3

CO 711 - Health Literacy

Health literacy - or the ability to obtain, process and act on health information - is an essential patient safety and public health issue. This course provides key concepts and skills for students in health related fields to identify patients with health literacy risks; to provide clear health and medical information in oral and written formats; and to assess and modify health care delivery systems and environments to enhance patient access and understanding.

Credits: 3

CO 720 - Behavior Change Communication

This course presents a practice-based approach to planning and testing a health communication intervention designed to change individual or group behavior. We apply behavior change communication theory and methods. Students will work with an organizational (client+ to advance a health communication objective.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing, PS 701 - Assessment I with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s):

BW 701 - Prof Biomedical Writing, BW 703 - Info Strat for Biomed Writers, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

CO 730 - Health Care Communication

Health care professionals need to listen carefully and to share information clearly; to treat patients with empathy; and to be able to work with patients and colleagues of different backgrounds and abilities. This course introduces interpersonal communication skills, health literacy, and culturally competent communication skills relevant to providing health care.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing, PS 701 - Assessment I with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing, BW 703 - Info Strat for Biomed Writers, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

CO 740 - Social Media for Health and Nonprofit Organizations

Students will acquire beginning competency in selecting and using social media to accomplish social marketing or health communication objectives. The course introduces the strategic use of social media through various digital platforms, as well as analytical tools to measure audience engagement. We will discuss the evidence supporting behavior change effectiveness as well as the ethics of using these media. After social media bootcamp and basic training, students will be deployed to help a non-profit client create and implement a social media strategy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing, PS 701 - Assessment I with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing, BW 703 - Info Strat for Biomed Writers, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

CS 201 - Computer Programming I

A rigorous treatment of the implementation of algorithms using a structural language and study of the syntax of the C++ language.

Credits: 3

CS 202 - Computer Programming II

A continuation of CS201. Advanced syntactical structures in the C++ language (set, pointers, multidimensional arrays, and files) and advanced algorithmic solutions (recursion). Emphasis on the development and execution of large programs.

Prerequisites & Notes

(Prerequisite: CS 201 or permission of instructor)

Credits: 3

CS 250 - Information Technology

This is an introductory/midlevel course that is designed to give undergraduate students an overview of all of the major areas of information technology and computer science. Topics will include computer hardware, operating systems, software applications, networks, the internet, databases, and advanced computer systems. Ethical issues concerning computer technology and society will be emphasized.

Credits: 3

CS 320 - Data Structures

Investigation of the organization and manipulation of structures that represent data and establishment of a repertoire of algorithms that permit the solution of practical problems.

Prerequisites & Notes

(Prerequisite: CS 202 or permission of instructor)

Credits: 3

CS 322 - Assembly Language and Computer Architecture

Introduction to computer architecture and programming in a low-level (assembly) language. Also, interfacing high- and low-level languages.

Prerequisites & Notes

(Prerequisite: CS 202 or permission of instructor)

Credits: 3

CS 324 - Database Design

Introductory course in structured database programming using a database language. Review of the database environment. Basic concepts of structured programming in a database system and database design, use of menu screens, programming, debugging, verification, and security. Includes a project.

Prerequisites & Notes

(Prerequisite: CS 201 or permission of instructor)

Credits: 3

CS 325 - Operating Systems

This course will present the fundamental concepts of modern computer operating systems, with primary focus on UNIX systems. Students will learn about the core organization of multitasking timesharing environments and how to take advantage of key features of UNIX in software applications development.

Prerequisites & Notes

(Prerequisite: CS 250)

Credits: 3

CS 326 - Analysis of Data

Practical methods for analysis and interpretation of research data within chemistry and health sciences. Methods of successive approximation, numerical integration, simultaneous equations, approximate methods in curve fitting, nonlinear regression analysis, smoothing of data interpolation, and numerical differentiation.

Prerequisites & Notes

(Prerequisites: CS 201 and ST 310, or permission of instructor)

(Not offered every year)

Credits: 2

CS 329 - Systems Simulation I

This is the first course in the Systems Simulation sequence. The course introduces students to the role of systems simulation methodology in the life and health sciences. Students will learn to design and implement useful discrete simulation models of real-world situations using various technologies. Students will identify and analyze problems from the chosen subject domain and will formulate and conduct a small research project.

Prerequisites & Notes

(Prerequisite: CS 320 or permission of instructor)

Credits: 3

CS 330 - Systems Simulation II

This is the second course in the Systems Simulation sequence. Students will learn continuous approaches of systems dynamics simulation within various software environments. Specific subject domains (health policy, bioinformatics, biology, environment, sustainable development, etc.) will be used to introduce an appropriate set of applied models. In this course students will identify and analyze problems from the chosen subject domain, formulate a conceptual model, and conduct a small research project concerned with modeling of a process or an object.

Prerequisites & Notes

(Prerequisites: CS 329 and either MA 320 or permission of instructor)

Credits: 3

CS 375 - Software Engineering

This course will present the theoretical and practical concepts of modern software engineering. Topics include the software development process, software design, and architecture. The Unified Modeling Language (UML) will be used as the software development platform.

Prerequisites & Notes

(Prerequisite: CS 202)

Credits: 3

CS 380 - Web-Based Design

This course will cover the fundamental concepts and skills of creating web-accessible content. The focus will be on web page design using HTML, XML, and integrated technologies.

Prerequisites & Notes

(Prerequisite: CS 250)

Credits: 3

CS 385 - Web-Based Computing

This course will cover basic and advanced methods and languages that are commonly used to make computational resources such as applets, databases, and media available to client machines on a network.

Prerequisites & Notes

(Prerequisite: CS 380)

Credits: 3

CS 410 - Network Computing

This course will present fundamental theory and implementation of computer networks. Both hardware and software aspects of network communication, performance, and security will be discussed.

Prerequisites & Notes

(Prerequisite: CS 250)

Credits: 3

CS 490 - Special Topics or Research in Computer Science

Study of one or two topics not included in other courses offered by the department.

Prerequisites & Notes

(Prerequisite: permission of the department)

(Note: Course is repeatable for credit)

Credits: 1 to 3

CS 498 - Research in Computer Sciences I

This is the third course in the Systems Simulation sequence. An individual student research project in the area of system dynamics will be developed in the framework of this course. Specific subject domain of the research project (health policy, bioinformatics, biology, environment, sustainable development, etc.) depends on the scientific interests of the supervisor and the student's background. During the course students will identify and analyze problems from the chosen subject domain, formalize the information flows, and describe the obtained results of the student project.

Prerequisites & Notes

(Prerequisites: CS 329 and either CS 330 or permission of instructor)

Credits: 2 to 3

CS 499 - Research in Computer Sciences II

This is the fourth course in the Systems Simulation sequence. An individual student research project in the area of system dynamics will be developed in the framework of this course. Specific subject domain of the research project (health policy, bioinformatics, biology, environment, sustainable development, etc.) depends on the scientific interests of the supervisor and the student's background. During the course students will build a simulation model by using an actual simulation language

(software), validate the model, develop (program) a scenario of a computational experiment, run the model, analyze the modeling results, and describe the obtained outcomes of the student project.

Prerequisites & Notes

(Prerequisites: CS 329 and either CS 498 or permission of instructor)

Credits: 2 to 3

DA 301 - Data Science and Analytics Introduction I

As data becomes increasingly important to the modern world, there is an increasing need for scientists educated in the process of collecting, coding, cleaning, analyzing, and presenting those data. This course will introduce you to the basic concepts of data analysis; the uses of data in a variety of fields; how to ask research questions; the process of identifying data sources; data collection, cleaning, coding, and manipulation; and how to present data. At the conclusion of the course, you will have a firm foundation to begin working with a variety of data in different scenarios.

Credits: 3

DA 302 - Data Science and Analytics Introduction II

Building from the concepts introduced in Introduction to Data Science I, this course will provide you with the opportunity to develop more advanced programming skills. You will learn the basics of creating visualizations in R, how to perform different data wrangling procedures, and how to work with relational databases and different types of variables. You will also develop skills needed to program, model, and use R to communicate findings from the data you analyze. At the end of the class, you will be prepared to work on projects using the R software and will have a foundation for learning even more advanced programming in R.

Credits: 3

DA 308 - Introduction to Epidemiology

Epidemiology is the foundational science of public health. Epidemiological research helps us understand how diseases occur in certain groups of people and why, in order to identify the determinants of health at the population level. In this course, you will be introduced to the basics of epidemiology. Topics covered will include measures of disease occurrence; measures of association; study designs; the roles of bias, random error, confounding, and effect modification in epidemiological studies; and screening for disease. At the conclusion of the class, you will be able to read and interpret epidemiological studies and explain how an epidemiological study could be designed to answer a particular health question.

Credits: 3

DA 309 - Essentials of Biostatistics

Biostatistics is a central field for understanding and analyzing health and clinical data. This course will introduce you to the basics of data analysis for health studies. Specific topics will include probability, error, descriptive statistics, confidence intervals, hypothesis testing, power size calculations, and different statistical models. At the conclusion of the course, you will be prepared for learning more advanced biostatistical skills and conducting analyses of health data.

Credits: 3

DA 401 - Introduction to Data Structure/Algorithms

Algorithms are an essential tool in data analysis. Additionally, for data analysis to be conducted, the data should be structured in an efficient way. This course covers the essential elements of creating algorithms and the methods used to structure data. You will learn about growth functions, divide and conquer strategies, probabilistic analyses, sorting, basic data structures, hash tables, search trees, and dynamic programming. Throughout the course, you will apply topics covered using both real and simulated data.

Credits: 3

DS 101 - Data Science Orientation

Students are presented with an overview of all aspects of Data Science, including current topics, active research areas, and expectations and career opportunities. Students will learn about campus services, and begin to develop interpersonal communication and presentation skills, and apply principles and practices of cooperative teamwork.

Credits: 1

DS 201 - Introduction to Data Science I

This course will introduce students to data science and equip them with the basic ideas, principles, practices, and challenges of modern data generation, process, and analysis. Students will be introduced to high programming languages and learn to write basic code using, for instance, *R*, R-Studio, and a variety of add-on packages. Real datasets from a variety of disciplines will be used to make the learning contextual.

Credits: 3

DS 202 - Introduction to Data Science II

This second course in Data Science deepens students' knowledge of data curation, management, visualization, and analysis, building from the foundation of DS 201. This course extends data management concepts and skills to accommodate big data and also deepens students' understanding of computational problems and machine learning. Students will be introduced to additional programming languages, e.g. Python, SQL, HADOOP.

Prerequisites & Notes

(Prerequisite: DS 201)

Credits: 3

DS 301 - Data Science and Analytics Introduction I

As data becomes increasingly important to the modern world, there is an increasing need for scientists educated in the process of collecting, coding, cleaning, analyzing, and presenting those data. This course will introduce you to the basic concepts of data analysis; the uses of data in a variety of fields; how to ask research questions; the process of identifying data sources; data collection, cleaning, coding, and manipulation; and how to present data. At the conclusion of the course, you will have a firm foundation to begin working with a variety of data in different scenarios.

Credits: 3

DS 302 - Data Science and Analytics Introduction II

Building from the concepts introduced in Introduction to Data Science I, this course will provide you with the opportunity to develop more advanced programming skills. You will learn the basics of creating visualizations in R, how to perform different data wrangling procedures, and how to work with relational databases and different types of variables. You will also develop skills needed to program, model, and use R to communicate findings from the data you analyze. At the end of the class, you will be prepared to work on projects using the R software and will have a foundation for learning even more advanced programming in R.

Credits: 3

DS 304 - Methods of Regression Analysis

In this course, you will study how regression analysis is done. You will begin this course by reviewing a simple linear model and

then expand your exploration of regression analysis to consider multiple linearly related variables. You will study how to perform simple and multiple linear regression. Finally, you will interpret the results of polynomial regression and implement what you have read about regressions in the module assignments

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 305 - Visualization Strategies for Data Analysis

There is increasing recognition of the importance of effective visualization strategies for depicting data. In this course, you will explore the theory of data visualization and develop the basic skills to engage in data visualization. This course focuses on the methods that you can use to identify trends and differences in data according to time, geography, and other factors. You will have the opportunity to develop infographics, maps, graphs, and charts using data visualization programs. By the end of this course, you will be prepared to discuss the advantages and disadvantages of the different types of data visualization and create your own visualizations.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 306 - Techniques for Business Data Analytics

This course introduces you to data analysis in a business context, the basics of modeling business data, and the processes involved in developing business strategies to gain a competitive advantage using data. Specific topics covered in this course include overfitting models; the similarity, nearest neighbor, and clustering approaches to modeling; assessing model performance; creating data visualizations; and analytical engineering. You will use this information to complete Assignments exploring how big data has changed the way organizations view data and analytics. At the conclusion of the course, you will be prepared to carry out your own business data analyses.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 307 - Introduction to Database Design

To carry out basic data analysis, it is necessary to have a well-structured database. In this course, you will explore the basics of database design. Specific topics covered in this course include database normalization, implementation, and data modeling using erwin. Throughout this course, you will work with data using Microsoft Access, SQL, Perl, Oracle, Python, and Java. You will use SQL extensively when working with data and focus on entity relationship diagrams, data indexes, and query processing. By the end of this course, you should be prepared to create databases and manage data

Credits: 3

DS 308 - Introduction to Epidemiology

Epidemiology is the foundational science of public health. Epidemiological research helps us understand how diseases occur in certain groups of people and why, in order to identify the determinants of health at the population level. In this course, you will be introduced to the basics of epidemiology. Topics covered will include measures of disease occurrence; measures of association; study designs; the roles of bias, random error, confounding, and effect modification in epidemiological studies; and screening for disease. At the conclusion of the class, you will be able to read and interpret epidemiological studies and explain how an epidemiological study could be designed to answer a particular health question.

Credits: 3

DS 309 - Essentials of Biostatistics

Biostatistics is a central field for understanding and analyzing health and clinical data. This course will introduce you to the basics of data analysis for health studies. Specific topics will include probability, error, descriptive statistics, confidence intervals, hypothesis testing, power size calculations, and different statistical models. At the conclusion of the course, you will be prepared for learning more advanced biostatistical skills and conducting analyses of health data.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): DA 301 - Data Science & Analytics Intro] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): DA 302 - Data Science & Analytics Intro II]

Credits: 3

DS 311 - Programming SAS for Data Analysis

SAS is one of the leading statistical software packages in the data industry and is extensively used for data analysis by major pharmaceutical, telecommunications, financial, and insurance companies, among others. It is the software of choice for government institutions such as the Census Bureau and the U.S. Food and Drug Administration (FDA). SAS is used in 13 markets and has an average rating of 4.2 out of 5 by Gartner for their data analysis and data science products (Gartner, 2020). In this course, you will review topics such as the fundamentals of programming in SAS, reading and transforming data, and creating descriptive statistics from the data. You will also explore how to create graphs and charts to visualize the data. Specific topics covered will include how to import data into SAS, recoding and reformatting data, calculating descriptive statistics, using basic statistical procedures for data analysis, creating visualizations to present your analysis, and how to export data and your analysis from SAS to other formats such as Microsoft Excel, HTML, and Adobe Acrobat. In many of the modules you will have Discussions on data analysis using real-world data and will complete Assignments on programming for data analysis.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 314 - Introduction to Survival Analysis

This course provides an overview of survival, or "time-to-event," data and how to format it appropriately for analysis. You will study and demonstrate how to graph data, specify and fit proportional hazard models, check assumptions and compute hazard ratios, and assess stratified and fully extended proportional hazards models. You will apply these ideas to real-world data sets that embrace clinical models of addiction, drug development, and the COVID-19 pandemic

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 315 - Multivariate Data Analysis

Performing analysis on multiple variables is central to conducting data analysis in a number of fields. In this course, you will learn how to select the appropriate statistical model to use to perform a multivariate analysis, the process of performing that analysis, and how to interpret the results from the analysis. Specific topics will include sample distributions, analysis of variance, regression, factor analysis, structural equation modeling, and general linear models. At the conclusion of the course, you will be prepared to carry out your own multivariate analyses

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 316 - Introduction to Categorical Data Analysis

In this course, you will read about performing analyses on categorical variables. In particular, the course will explore methods for understanding categorical variables, including methods for sample distributions and methods for analyzing categorical variables. Specific topics will include generating frequency tables, tests of independence, measures of association, power and sample size calculations, stratification, logistic regression, and generalized linear models. At the conclusion of the course, you will be prepared to carry out your own analysis of categorical variables.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 318 - Forecasting with Time Series Data

Electricity consumption, infection rates, interest rates, rainfall, sales revenue, stock prices, temperature data. These are just a few examples of data collected overtime. Whether you wish to predict rainfall in your area over the next month or predict a trend in financial markets or in electricity consumption, time is an important factor that must be considered in your analysis if you want to develop a reasonable forecast of future values. This type of analysis is called time series analysis, with a time series being a series of data points ordered in time. In a time series, time is usually the independent variable, and the goal is usually to make a forecast for the future. In this course, you will perform time series analysis and use different forecasting techniques with time series data. You will consider the various aspects that come into play when dealing with time series, such as stationarity, seasonality, trends, autocorrelation, and spectral analysis. You will also use several models used in time series analysis, such as ARMA and ARIMA models. By studying examples of the application of timeseries techniques and then applying them yourself with sample data sets provided in the course, you will gain valuable skills for applying time series analysis techniques to real-world data and for building your own time series forecasts.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 321 - Data Privacy and Security

As more and more information (data) is digitized, the importance of ensuring the safety and confidentiality of data grows exponentially. This course introduces the basic methods to protect data. Specific topics covered in the course include data anonymization and de-identification, methods to preserve data privacy, generating synthetic data, and using data aggregation. At the end of the course, you will explore regulations designed to protect data, including the Health Insurance Portability and Accountability Act (HIPPA) and System and Organization Controls (SOC).

Credits: 3

DS 400 - Data Science Internship

Students in this course participate in an internship in Data Science. This will typically involve a structured series of experiences in the student's area of interest that provides exposure to work environments where data science concepts are applied. Students work closely with an off-campus supervisor and his/her academic advisor to coordinate the experience. This is designed to be a "hands-on" experience.

Credits: 1-3

DS 401 - Introduction to Data Structure/Algorithms

Algorithms are an essential tool in data analysis. Additionally, for data analysis to be conducted, the data should be structured in an efficient way. This course covers the essential elements of creating algorithms and the methods used to structure data. You will learn about growth functions, divide and conquer strategies, probabilistic analyses, sorting, basic data structures, hash tables,

search trees, and dynamic programming. Throughout the course, you will apply topics covered using both real and simulated data.

Credits: 3

DS 403 - Applied Machine Learning

The course provides an introduction to machine learning and statistical learning algorithms. Various supervised, unsupervised, and reinforced learning theory and algorithms are introduced and practiced with simulated and real data from a variety of fields. Variable selection and model performance evaluation are introduced to check model efficiency. Adequate models are used to perform predictions.

Prerequisites & Notes

(Prerequisite: ST 331)

Credits: 3

DS 403 - Fundamentals of Experiment Design and Analysis

In this course, you will explore how experiments are designed and executed and how the results from these experiments are analyzed, interpreted, and presented. You will be introduced to fundamentals of experimental design, including randomization, confounding, and statistical models for analysis of experiments. You will have opportunities to design your own theoretical experimental studies and perform analysis on real and simulated data. Ultimately, you will be prepared to interpret the results of experimental studies and to conduct your own.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 403 - Fundamentals of Experiment Design and Analysis

In this course, you will explore how experiments are designed and executed and how the results from these experiments are analyzed, interpreted, and presented. You will be introduced to fundamentals of experimental design, including randomization, confounding, and statistical models for analysis of experiments. You will have opportunities to design your own theoretical experimental studies and perform analysis on real and simulated data. Ultimately, you will be prepared to interpret the results of experimental studies and to conduct your own.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 405 - Data Mining

In this course, you will be introduced to the basic methods of data mining. The topics covered in the course are introductory and advanced classification techniques, association analysis, cluster analysis, algorithms for anomaly detection, and methods to use in order to avoid false discoveries. You will engage in Discussions that cover specific topics that are relevant to different data mining methods, such as the concept of distance. You will also analyze examples of the application of data mining techniques. In the Assignments, you will implement datamining methods to a variety of data sets by writing computer code. You will also have to demonstrate your knowledge of the material covered in each module by solving textbook exercises. By the end of the course, you will have gained valuable skills that will allow you to apply a variety of datamining tasks to different types of real-world data sets. Jupyter Notebook software is required for this course.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 406 - Data Governance

In this course, you will be introduced to methods for governing data. You will first review basic data concepts relevant to data governance and the daily activities of someone who manages a data governance program. After the essential elements of a data governance program—engagement, strategy, architecture, design, maintenance, and implementation—are laid out, the rest of the course will examine these elements in detail. You will explore and discuss newer innovations in data governance in cloud computing and specifically Amazon Web Services. You will find out how to apply aspects of data governance to working with big data. In the module Discussions and Assignments, you will discuss recent literature on these topics, explore the development of business cases for data governance, and draft plans for implementation of data governance programs. This course will help you assist businesses and institutions with developing data governance strategies.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 407 - Advanced Statistics/Statistical Modeling

Generalized linear models (GLMs) are valuable regression techniques that can be used to model most types of data. This course introduces you to the theory and application of generalized linear models to analyze data. Following a review of linear regression, you will explore a central element of GLMs—maximum likelihood estimation. You will find out how to interpret the results from GLMs and how to apply them to a variety of data types including proportion (binomial distribution), count (Poisson and negative binomial distributions), continuous (gamma and inverse Gaussian distributions), and data Tweedie distributions. By the end of this course, you will be able to use GLMs to model a variety of data types and perform analysis using generalized linear models in R.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 408 - Modeling and Predictive Analysis

Predictive analysis is widely used in data science—it uses observations from previously collected data to predict future outcomes. In this course, you will learn how to perform predictive analysis. First, you will explore the basic elements of predictive analysis and find out how to prepare data for predictive analysis and avoid model overfitting. Next, you will review regression and classification methods for predictive analysis in detail. The course will conclude with general topics, including assessing the importance of different predictors, selecting features for a model, and factors that affect the performance of predictive models.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 414 - Introduction to Machine Learning

In this course, we will introduce the basic methods and topics of machine learning. The topics covered will include the concept of search in artificial intelligence; a variety of classification techniques, including Bayesian, nearest neighbor, and inter-class boundary classifiers; neural networks; decision trees; computational learning theory; and performance evaluation of a machine learning model. You will engage in Discussions on specific topics relevant to different machine learning classifiers. You will also analyze examples how machine learning techniques are applied. In the Assignments, you will apply machine learning methods to data sets by writing computer code and solving textbook exercises. At the end of this course, you will have gained the skills necessary to apply machine learning to different types of real-world data sets.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 417 - Applied Mathematical Modeling

Mathematical modeling is a central component of most scientific and technical work. Models support business goals of optimizing production, technical goals of improving performance, and scientific goals of explaining causality. While every field has its own unique knowledge required to assemble precise models, there are many common features and approaches that can help you understand and model just about anything. In this course, you will master the basic mental paradigms and methods for building mathematical models. The course begins with an overview of the modeling process, then goes more in-depth through the development of each aspect of that process in later modules. Throughout the course, you will progressively complete a modeling project that uses both deterministic and stochastic aspects to investigate a data set of interest to you. This project provides an excellent talking point for job interviews to highlight the skills you will achieve in this course and can be used as part of your capstone project for this program. As you complete this course, we hope that you find yourself fascinated with mathematics and more.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): DA 309 - Essentials of Biostatistics

Credits: 3

DS 496 - Data Science Capstone

The capstone course provides students with a comprehensive learning experience that integrates ideas and experiences gained from the three core disciplines of mathematics, statistics and computer science, and applies them to their chosen application domain. Working with a family advisor, students will engage in the process of solving a real-world data science problem.

Credits: 1-2

DS 701 - Introduction to Data Science

The increasing abundance of data in all areas of society has led to a major need for professionals trained in the proper collection, management, and analysis of data. In this course, students will be introduced to the basic principles of data science, with a focus on the application of these principles to answer questions in a wide variety of fields. Specific attention will be given to the definition of data, finding appropriate data sources, methods for collecting data, and how data is processed after it has been collected (cleaning, coding, and manipulation). Students will also be introduced to basic data analysis and data presentation. At the conclusion of the course, students will be prepared to begin exploring data on their own and to take more advanced data science courses.

Credits: 3

DS 702 - Data Collection and Management and Coding

In this course, you will learn about the practical basics of data collection and management for research purposes. In a research setting, data may be collected to learn about human behavior or physical phenomena, or—more broadly—to discover and disseminate knowledge. You will explore different methods used for data collection, data management, and graphic representation of data. Throughout the course, you will get firsthand experience in these different areas by working with real and simulated data. Successfully finishing the course should prepare you to begin collecting, managing, coding, and graphically diagramming data on your own.

Credits: 3

DS 703 - Biostatistical Analysis

Health science professionals must be able to analyze, understand, and describe health data to improve patients' health and the care that they receive.

In this course, you will explore the basic concepts of statistics, such as probability, measures of central tendency, P values, confidence intervals, and random variation. You will also learn how to perform biostatistical analyses, including chi-square, t-tests, analysis of variance (ANOVA), correlation, and linear and logistic regression. Also presented are examples of factors that may impact these analyses, including confounding and effect modification.

Lastly, you will learn how to effectively present your data visually in tables and graphs. This course prepares you to understand more advanced biostatistical analyses, to read and interpret biostatistical literature, and to ultimately perform your own biostatistical studies.

Credits: 3

DS 704 - Introduction to Statistical Programming

Almost all statistical analysis is performed using statistical software. The use of statistical software makes it possible to organize, manipulate, and analyze large amounts of data in an efficient manner. In this course, you will be introduced to one particular statistical software package, SAS (Statistical Analysis Software), and learn how to use its key functions. You will learn about basic concepts and methods for getting data into SAS, as well as focus on the challenges of exporting data from SAS and debugging its programs. In addition, you will learn how to work with information in SAS by modifying data and using macros, and finally, you will perform different types of data visualization and statistical analysis procedures.

Credits: 3

EC 101 - Introduction to Macroeconomics

Fundamentals of economic theory with discussion of national income, money and banking, determination of income and employment, economic fluctuations, monetary and fiscal policy, international trade, and balance of payments.

Credits: 3

EC 201 - Introduction to Microeconomics

Discussion of theory of demand, supply, elasticity, utility, production and cost, perfectly and imperfectly competitive markets, marginal productivity, and income distribution.

Credits: 3

EC 399 - Independent Study in Economics

Available to students to work in an area of particular interest under the direction of a faculty member of the department. May be elected more than once for one, two, or three credits.

Credits: 3

EC 490 - Introduction to Health Economics

An application of micro- and macroeconomics to the fields of healthcare provision and policy. Topics will include healthcare demand versus need, costs, structure of the healthcare market, labor, hospitals, managed care, insurance, pharmaceutical interventions, and practice patterns.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EC 201 - Intro to Microeconomics with grade greater than or equal to D-.]

Credits: 3

EC 498 - Directed Research in Economics

Independent research opportunities in economics are available to self-directed, motivated students to expand their knowledge in an area of particular interest under the direction of a faculty member of the department. The student must plan the independent study project with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography required. In-depth knowledge of the area selected will be expected.

Investigation of poetry, fiction, and drama as different types of literature.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 101 - College Composition, WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 204 - Public Speaking

Course covers principles and practices involved in effective oral presentation. Lectures and exercises are used to enable students to develop and deliver information, demonstrations, and persuasive speeches. 3 class hrs

Credits: 3

EN 302 - Scientific Writing

Lectures, discussion, and practice in organizing and communicating information. Topics covered include audience analysis, correspondence, memo and report writing, editing skills, and news writing and reporting.

Prerequisites & Notes

(Prerequisite: third-year status)

Credits: 3

EN 303 - Creative Writing: Playwriting

This course will focus on the craft, techniques, and devices used to construct believable characters, crisp dialogue, and compelling stories. Studying a wide range of contemporary and classic plays will allow writers to understand new and traditional forms.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 101 - College Composition, WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 304 - Creative Writing: Fiction

This course will introduce students to the craft of writing short fiction. Students will read short works of fiction, keep writing journals, and present short stories of their own to the class.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Provides students with intensive exposure to the nature of critical thought through the rhetorical mode called argumentation.

Credits: 3

EN 306 - Creative Writing: Poetry

This course will introduce students to the craft of writing poetry. Student poems will be analyzed in class workshops, and students will revise their work to strengthen form and thematic content. Readings will include classic and contemporary forms of poetry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 307 - Creative Writing: Nature Writing

A fusion of creative and expository writing with scientific observation and inquiry (nature, landscape, environmental issues). Students will take part in excursions outside the classroom.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 308 - Creative Nonfiction

Creative writing and literary analysis of the (fourth genre+): creative nonfiction.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 312 - Modern Drama and Theatre

Reading and analysis of 10 to 12 modern plays. Course deals with playwrights+ ideas and techniques. Opportunities for role-playing and class participation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 314 - The Short Story

Survey of short fiction of the 19th and 20th centuries, including American, British, and European writers.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

EN 315 - The Self in Prose

Focus on nineteenth- and twentieth-century prose fiction with emphasis on the developing self in Victorian texts as opposed to

the divided, alienated self in contemporary history and literature. Primarily a reading course. 3 class hrs

Credits: 3

EN 317 - Women in Literature

Survey of prose fiction, poetry, and drama about and by women in the nineteenth and twentieth centuries in Britain and the United States. Historical perspective and study of women writers who have enlarged significantly our view of human experience.

Credits: 3

EN 318 - Major American Writers

The course provides a survey of major American writers of fiction, nonfiction, and poetry from colonial times to the present.

Credits: 3

EN 319 - Survey Shakespearean Drama

Survey of Shakespearean drama focusing on six major plays in context of Elizabethan history. Reading course preferably for students who have studied some Shakespeare and are interested in more exposure to the Bard. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.]

Credits: 3

EN 320 - Popular Fiction in America

Study of three genres of popular fiction (the Gothic, detective fiction, and the Western) and the role of popular fiction in the American literary tradition.

Credits: 3

EN 321 - Science Fiction Literature

Survey of science fiction literature (novels, short fiction, and film) from Frankenstein to the present. Special emphasis is placed upon the pulp tradition and science fiction fan culture. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

EN 323 - Fantasy Literature

Survey of the origins of fantasy literature in the mythopoeic imagination and an examination of the history and themes of mythic literature that contribute to the evolution of modern fantasy. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.]

Credits: 3

EN 324 - Asian American Autobiography

A study of selected Asian-American autobiographies exploring common themes.

Credits: 3

EN 325 - Asian American Literature

A study of selected works of Asian-American literature (fiction, drama, poetry, and autobiography) exploring common themes in the Asian-American experience.

Credits: 3

EN 327 - Introduction to Linguistics

A general introduction to linguistics, the scientific study of human language, with a focus on the core areas of phonetics, phonology, morphology, syntax, and semantics, as well as on social aspects of language.

Credits: 3

EN 328 - Modern English Grammar

A descriptive (as opposed to prescriptive) account of the grammar of modern English, focusing primarily on morphology and syntax but with some attention given to phonology and dialects. This is a course on how the English language works, not on (correct+ usage.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 329 - Medicine and Literature

Through analysis of fiction, drama, poetry and film, this course explores attitudes toward illness and healing, disabilities, epidemics and plagues, and the perceptions of patients, physicians and the public.

Credits: 3

EN 330 - Introduction to Journalism

Class covers news writing and editing strategies.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 101 - College Composition, WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 331 - Rhetoric of Science

This course introduces students to the Western rhetorical tradition and its role in creation and analysis of scientific writings.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.]

Credits: 3

EN 332 - Acting & Scene Study

This course offers an introduction to acting, theatre history, and literary analysis. Students will read and perform scenes from classic plays in order to see how the methods of the actor both create and resolve problems of meaning, historical context, and literary value; work will focus on monologue, dialogue, and ensemble performances. This course satisfies the Oral Communication General Education Skill and can be applied toward the General Education Humanities Discipline requirement.

Credits: 3

EN 333 - Business Writing

Emphasis on writing the most common forms of business communications from brief e-mails to reports and proposals.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): EN 101 - College Composition, WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.]

Credits: 3

EN 334 - American Fiction to 1860

This course examines American prose fiction from the 18th century to about 1860, with particular focus on the seduction novel, the picaresque/satirical novel, gothic fiction, romantic fiction, the sentimental novel, the beginnings of African-American fiction, and the beginnings of realism.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 335 - American Fiction: The Age of Realism

This course examines American fiction in the Age of Realism, the period between the Civil War and the beginning of World War I. Primary focus will be on literary realism and naturalism, but some attention may be paid to the beginning of modernism as well.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 336 - Modern American Fiction

This course examines American prose fiction from about 1914 to 1960, focusing on major modern American trends and movements such as modernism, the Harlem Renaissance, radical fiction, and the persistence of naturalism. Specific readings may change from semester to semester and will include both canonical and noncanonical writers.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 337 - The Best of Latin American Literature

This course seeks to introduce students to the cultures of Latin American through literature. By examining a variety of authors and literary genres, students will become familiar with issues of cultural formation, gender, ethnicity, and other important themes in Latin American civilization. The social and political impact of Latin American writers in the struggle for social change in Latin American literature, and the interplay between Latin American literature and film are also examined.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 338 - Tragedy

This course introduces students to the history of tragedy across multiple cultures and time periods. By examining key moments in the articulation and development of this genre of literature and performance, students will learn to understand both individual and social means of confronting suffering, grief, justice, and redemption, and they will use these concepts to interrogate the emergence of tragedy in current events and their own world. This course satisfies the Information Literacy General Education Skill and can be applied toward the General Education Humanities Discipline requirement.

Credits: 3

EN 340 - Special Topics in English

Investigation of literature, creative writing, literary theory, or a related interdisciplinary combination.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

EN 399 - Independent Study in English

An in-depth project in some area of literature, literary theory, creative writing, or related interdisciplinary combination.

Prerequisites & Notes

Student has received department permission for EN 399 - Indep Study English

Credits: 3

EN 498 - Directed Study in English

Capstone course option for completion of the creative writing minor or the literature minor.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

ET 303 - Ethics & Critical Thought

This course presents opportunities for students to learn the skills of ethical deliberation. Course material covers the nature of ethics, its place in philosophical thought, and the application of ethical principles and theories to real-world scenarios. Students will read and attempt to think through ethical dilemmas using the process of moral reasoning.

Credits: 3

ET 313 - Business Ethics

This is a course in applied ethics with a focus on ethical issues arising in commercial life. Basic ethical theories will be studied and deployed in the analysis and evaluation of case studies on select issues in business ethics.

Credits: 3

FS 400 - Forensic Science Internship

Students participate in an intern experience in forensic science. This will typically involve a structured series of modular experiences that provide exposure to varied aspects of forensic investigations within the student's chosen area of interest. A (hands-on) experience is possible but not required.

Prerequisites & Notes

Student has received department permission for FS 400 - Forensic Science Internship

Credits: 1

FT 190 - CPR/AED/First Aid Professional Rescuer

This course will train students to act in emergency situations, to recognize and care for life-threatening cardiac and respiratory emergencies in adults, children, and infants. Students will also learn how to protect themselves and others from disease transmission through preventative measures from bloodborne pathogens, utilize two-rescuer cardiopulmonary resuscitation, and handle oxygen delivery, bag valve mask resuscitation, asthma inhalers, and epinephrine auto-injection. This course will satisfy the requirements for American Red Cross Professional Rescuer Adult, Child, and Infant Cardiopulmonary Resuscitation/Automated External Defibrillation/First Aid Certification.

Credits: 3

FT 200 - Exercise Physiology

This basic exercise physiology course will investigate energy systems, physiological adaptations to exercise, and exercise nutrition. Other topics include the effect of exercise physiology and factors that influence exercise performance.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 4

FT 260 - Health and Wellness

This course will use a health and wellness continuum. Lifestyle management will be studied including healthy life decisions about levels of physical activity, eating habits, obesity, tobacco use, substance use and abuse, responsible sexual behaviors, mental health, ways to avoid injury, violence prevention, importance of immunizations, and access to healthcare.

Credits: 3

FT 300 - Exercise Testing & Prescription

This course will explore physical fitness as a multi-dimensional concept based on coordination, agility, balance, speed, power, and reaction time. In addition, students will study how various health components such as strength, endurance, flexibility, and body composition affect physical fitness. Age-appropriate exercise programs and lifestyle management will be explored using observations, participatory activities, and exploration of personal values and attitudes about exercise.

Credits: 3

FT 302 - Cardiovascular Pathophysiology

This course will present an overview of coronary heart disease (CHD); its scope, etiology, diagnosis, treatment, and prognosis. The course will also focus on electrocardiogram (EKG) principles and interpretation at an introductory level.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 311 - Anatomy and Physiology II, FT 200 - Exercise Physiology with grade greater than or equal to D-.]

Credits: 3

FT 303 - Exercise Testing & Prescrip

This course will explore the various aspects of health-related physical fitness components (Cardiorespiratory, muscular, body composition, flexibility) and several skill-related physical fitness components (coordination, agility, balance, speed, power). Emphasis will be placed on the process of selecting and administering fitness assessment, interpreting results, and creating an exercise prescription, for a variety of populations (sedentary, chronic disease, athletic) that follows current standards set by the American College of Sports Medicine (ACSM) and the National Strength and Conditioning Association (NSCA). In addition, aspects of behavior modification and goal setting will be explored, all through both a lecture and hands-on laboratory experience.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): FT 460 - Health & Wellness with grade greater than or equal to D-.]

Credits: 4

FT 310 - Ethics in Sport

This course will provide students with the opportunity to examine personally held ethical beliefs as well as the ethical dilemmas in past and current sporting events including legal repercussions of participant actions. This course will assist students in defining and understanding legal, ethical, and professional judgment in sport.

Credits: 3

FT 320 - Sport Psychology

The course will provide an overview of the psychosocial aspect of sport and exercise. Topics will include various psychological theories and research related to sport and exercise behavior.

Credits: 3

FT 330 - Development and Performance Lab

Students will design activities and exercises to demonstrate learning and performance of all classes of movement

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 205 - Human Structure & Func I, BS 206 - Human Structure & Func II, BS 207 - Human Struct & Func I Lab, BS 208 - Human Struc & Func II Lab with grade greater than or equal to D-.]

Credits: 1

FT 350 - Research Methods in Kinesiology

The course will provide an overview of the research process and available methods useful for students researching within all subdisciplines of kinesiology and exercise science.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 110 - General Calculus, MA 122 - Calculus I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

FT 351 - Research Experience I

This course will provide students the opportunity to implement and practice the applied application of research methodology, principles and techniques in a research setting with a concentration on health and fitness related research.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): FT 350 - Research Methods in Kines with grade greater than or equal to D-.]

Credits: 2

FT 352 - Research Experience II

This course will provide students the opportunity to collect data, analyze data, and present finding of research data.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): FT 351 - Research Experience I, ST 310 - Biostatistics I with grade greater than or equal to D-.]

Credits: 2

FT 360 - Fitness and Sports Nutrition

This course will examine the relationship between nutrition, exercise, weight management, metabolism, human performance, and disease prevention from various perspectives: scientific principles, consumer knowledge, and holistic health concepts. Intelligent application of information will be encouraged to enable students to succeed in implementing healthy nutritional practices in their own lives.

Prerequisites & Notes

Students who specified one or more of these Programs of Study or Program Foci: Exercise Physiology (BS), Exercise Sci & Wellness Mgmt Minor, Exercise Science & Wellness Management (BS), Health Science (BSHS)

Credits: 3

FT 380 - Intro to Kinesiology

This course presents an introduction to the study of human movement, while analyzing the principles of anatomy, physiology,

and physics and how they relate to muscular control and mechanics of the body affecting athletic performance and fitness activities.

Credits: 3

FT 400 - American Council on Exercise Personal Trainer Certification

This course will give students the knowledge and understanding necessary to prepare for the ACE Personal Trainer Certification Exam and become effective personal trainers. The ACE Integrated Fitness Training+ (ACE IFT+) Model is used as a comprehensive system for designing individualized programs based on each client's unique health, fitness, and goals. Students will learn how to facilitate rapport, adherence, self-efficacy, and behavior change in clients, as well as design programs that help clients to improve posture, movement, flexibility, balance, core function, cardiorespiratory fitness, and muscular endurance and strength.

Credits: 3

FT 401 - Advanced Exercise Physiology

This course is designed to provide the student with advanced understanding of physiological changes and adaptations corresponding to exercise and the factors which affect physiological function during exercise such as nutrition, age, disease, gender, and the environment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): FT 200 - Exercise Physiology]

Credits: 3

FT 410 - Sport and Media

This course is designed to help students more critically view the role of sport media in American culture. The influence of/relationship between sport media and issues such as race, gender, sexuality (homophobia), nationalism, capitalism/consumerism, violence, and civic life will be examined. Issues in relation to journalism ethics and the production of sport media also will be examined.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CO 101 - Intro to Communication with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

FT 411 - Principles of Strength and Conditioning

This course introduces students to advanced concepts in strength and conditioning for sport performance. Special emphasis will be placed on muscle physiology, training adaptations, and strength and conditioning program design for the athletic population. Additionally, this course will include hands on strength and conditioning technique training. This course is ideal for students who wish to become NSCA Certified Strength and Conditioning Specialist.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 3

FT 431 - Exercise Pharmacology

This course is designed to provide the student with a foundation for understanding basic pharmacology including how drugs affect the physiological processes in the body and how the body handles the absorption, metabolism, and excretion of drugs.

Special emphasis is placed on how exercise can alter the efficacy of a drug and how a drug can impact performance. Additionally, sports nutrition and the ergogenic properties of nutrients will be discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 311 - Anatomy and Physiology II, CH 101 - General Chemistry I with grade greater than or equal to D-.]

Credits: 3

FT 450 - Prevention and Care of Athletic Injuries

This course will provide entry-level knowledge in sports injuries and the art of the science of injury prevention for the physically active population. The anatomy and physiology of common injuries, evaluation techniques, prevention measures, and treatment procedures will be explored.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 3

FT 460 - Health and Wellness

Lifestyle management will be studied, including health decisions about levels of physical activity, eating habits and obesity, tobacco and substance use and abuse, responsible sexual behaviors, mental health, ways to avoid injury, violence prevention, environmental quality, importance of immunization, and access to healthcare.

Credits: 3

FT 480 - Fitness, Sport and Health Management

This course will introduce students to fitness, health, and sport principles as they apply to management, leadership style, communication, and motivation. Students will learn about careers in the industry and acquire the knowledge and skills needed to be an effective manager.

Credits: 3

FT 481 - Fitness and Health Management Internship I

Students will demonstrate their understanding of fitness, health, sport, and recreation principles as they apply to management, leadership style, communication, motivations, and a career in the industry by participating in an internship. Students will begin to practice the knowledge and skills needed to be an effective athletic director, fitness coach, or industrial health promoter.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): FT 480 - Fitness, Sport & Health Mgmt with grade greater than or equal to D-.]

Credits: 3

FT 482 - Fitness and Health Management Internship II

Students will demonstrate their leadership, program management skills, communication abilities, and integration of classroom and experiential learning in an internship. Students will understand the context of program management and outcomes management.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): FT 481 - Fitness & Hlth Mgmt

Int I with grade greater than or equal to D-.]

Credits: 3

FT 483 - Fitness and Health Manageme

Students will demonstrate their understanding of fitness, sport, recreation, and health principles as they apply to organizing, planning, implementing wellness events and activities in the industry by participating in an internship. Students will practice the knowledge and skills needed to be an effective exercise physiologist, fitness and sports trainer, sport coach or health education specialist in an offsite internship with a health and wellness professional.

Credits: 6

FT 490 - Sports Special Topics

This capstone course requires independent work and an integration of all of the classroom and life experiences of students. Students will select a project with the approval of the instructor and program director. Students will complete a project that demonstrates their ability to independently integrate and apply management, leadership, communication, and career-planning skills into the final product.

Credits: 3

FT 491 - Senior Capstone

This capstone course requires independent and group work and an integration of all the classroom and life experiences of students. Students will select a project with the approval of an instructor and program director. Students will complete a project that requires management, leadership, communication, and career planning.

Credits: 3

GL 275 - Environmental Geology

Covers relationships between human activities and the geological environment. Includes the study of natural hazards, natural resources, and waste disposal in the geological environment. Required for students majoring in environmental science; open to all others.

Credits: 3

GL 289 - Earth and Space Science

This is a comprehensive introduction to physical and historical geology and astronomy. Earth's internal and external processes and characteristics, the significance of fossils, and the character and origin of selected geological formations are studied. Current cosmological concepts and theories and basic astronomic techniques are presented. 3 lecture/3 lab hrs

Credits: 4

GN 701 - Intro to Genomics

This course explores the history of genetics and genomics. Family history is discussed as a vital part of a genetic risk assessment and tool for the evaluation of inheritance patterns and penetrance of the disease. The course concludes with a review of the epigenetic influences on health and epidemiologic approaches to evaluate health and disease and applications in genomics.

Credits: 3

GN 702 - Genetic Concepts Testing and Translation to Healthcare

The course will serve as the basis for the health care professional to integrate genetics and genomics into personalized health care. The course provides a review of sources of information available to you and clinicians in genomic health care for clinical management and therapeutic applications.

Credits: 3

GN 703 - Ethical, Legal, Social Issues in Genomics and Pharmacogenomics

This course exposes students to the ethical, legal, and social issues surrounding genetic testing and available direct-to-consumer genetic testing. This course will explore approaches for engaging individuals as partners in their healthcare, as well as the expanding applications of pharmacogenomics.

Credits: 3

GN 704 - Cancer Genomics and Applications of Genomics in Health and Disease

This course focuses on the role of genetics and genomics in cancer diagnosis, prognosis, and treatment. Future directions of genetics and genomics with comprehensive genome/exome/transcriptome sequencing in oncology, polygenic risk scores, cell-free DNA, and genome-wide and phenome-wide association studies are addressed. Genomic technologies and computational approaches that are driving advances to manage health and treat disease will be reviewed.

Credits: 3

GN 710 - Principles of Genetics

This course provides you with an introduction to genetics, with a focus on transmission and molecular genetics. The course makes use of bioinformatics to explore gene function and covers pertinent applications of bioinformatics and genetics to modern biological problems. Topics include chromosome structure and replication, variations and extensions of transmission genetics, genetic linkage and mapping, regulation of gene expression, epigenetics, genetic mutations, genetics of cancer, and the principles of genetic engineering.

Credits: 3

GN 715 - Chromosomes and Human Disease

This course introduces you to the role of chromosomes in human disease and seeks to familiarize you with the field of cytogenetics, the study of chromosomes, and the relationship between chromosomal abnormalities and human disease. Topics covered include cytogenetic methodology, aneuploidy, chromosome rearrangements, chromosomes and sex determination, and chromosomes and cancer.

Credits: 3

GN 720 - Molecular Basis of Human Inherited Disease

This course seeks to familiarize you with the molecular basis of diseases of human genetics and its applications to modern research. You will undertake a comprehensive examination of the principles of human inheritance in the context of both normal human variation and human disease. The course explores mechanisms of gene regulation and introduces you to current methods in genome analysis.

Credits: 3

GN 725 - Clinical Applications of Genetics and Genomics

The course focuses on the genetic basis of disease and cytogenetic analysis for applications to clinical care. Diagnostic molecular

approaches and the clinical translation of genetic and genomic health information in a personalized healthcare environment are explored.

Credits: 3

GN 730 - Evolutionary Analysis

This course introduces you to evolutionary science and population genetics, with a focus on the importance of four factors: selection, migration, mutation, and genetic drift. You will evaluate human evolution and its impact on health.

Credits: 3

GN 735 - Human Population Genetics

The sequencing of the human genome has led to the emergence of population genomics. This course covers the basics of population genomic analysis, from SNP data to the key analyses that may be required to successfully analyze a population genetic data set. Population genetics topics will also include computational methods and machine learning techniques.

Credits: 3

GN 740 - Public Health Genetics

Public health ensures the basic conditions required for individual and population health are present. The role of genetics is evolving, as is the understanding of genetic disease. This course provides students with advances in genetic knowledge and technology that could be used to prevent disease and improve public health.

Credits: 3

GN 745 - Genomic Statistics & Research

This course provides you with an introduction to the statistical approaches used in solving problems in genetic epidemiology. Methodological expositions and practical guidelines for software selection are included. Topics include molecular genetics and Mendelian description principles, genetic markers and map distances, model-based and model-free population and family-based and genome-wide association studies, and association analyses using haplotypes.

Credits: 3

GR 101 - Elementary Ancient Greek I

This course introduces students to the elementary morphology, syntax, and vocabulary of Attic Greek, developing basic skills essential to translation, reading comprehension, and interpretation of the ancient language of classical Athens.

Credits: 3

GR 102 - Elementary Ancient Greek II

This course continues the introduction of the elementary morphology, syntax, and vocabulary of Attic Greek, developing more advanced skills essential to translation, reading comprehension, and interpretation of the ancient language of classical Athens.

Prerequisites & Notes

Prerequisite: GR 101 (or proficiency test for placement)

Credits: 3

HA 301 - US Healthcare Systems

This course provides a history of the U.S., healthcare system and an in-depth discussion of, the evolution of the modern health care system., You will also examine contemporary functions and, roles of health organizations and the healthcare, workforce. Specific focus will be placed upon, healthcare financing, as well as current policies, impacting healthcare delivery, quality, and cost, in the United States.

Credits: 3

HA 302 - Health Information Systems and Health Informatics

Today's healthcare leaders must understand the capacity of health information systems and health informatics, coupled with the intent for both domains to improve healthcare relationships and increase the success of an organization regardless of the constraints and mandates. This course offers an introduction to the many applications of information technology and information systems in U.S. healthcare delivery systems. You will explore today's health information systems (HISs) as well as potential future systems intended to improve health delivery, health policy development, biomedical and behavioral research, and population health. You will also be introduced to supporting topics such as data analytics, public health, and biomedical informatics.

Credits: 3

HA 303 - Managed Care and Insurance

In this course, you will be provided with an, introduction to the workings of health insurance, and managed care within the U.S. health care, system. This course offers a historical background, of managed care and an overview of current, organizational structures, concepts, and practices, of the health insurance and managed care industry., It also includes a thorough update on the, Affordable Care Act, including political shifts, that have effected changes in provider, reimbursement models and medical management, approaches, impacting the consumer, the provider,, managed care plans, and other insurers.

Credits: 3

HA 304 - Communication for Healthcare Managers

Today's competitive healthcare market is inextricably linked with quality of care and patient satisfaction. One key to ensuring an efficient healthcare organization with the best patient outcomes and experiences is strategic, effective, and ethical communication. Healthcare delivery is team-based, and as such, communication is rarely one-directional. An effective manager in this dynamic environment must be as self-aware and compassionate as they are directive and precise. Further, managers must understand a range of worldviews and use communication effectively in order to build consensus and further the organization's agenda. This course is designed to help students build some essential underlying characteristics central to effective management in the healthcare environment: active listening, empathy, emotional intelligence, cultural competency, and health literacy. In addition, discussions and assignments in this course offer students multiple opportunities to practice appropriate and impactful short correspondence (text, emails, and memos), long correspondence (letters and reports), and oral communications (presentations)—helping them to understand which communications vehicle is best suited to different situations

Credits: 3

HA 305 - Leadership and Supervision

This course offers practical applications of classic and current management theories and concepts in healthcare, along with useful techniques to build your management skills. This course explores environmental changes and healthcare reform activities, HIPAA, the use of social media in the workplace, performance appraisals, talent acquisition, and overtime rules. In addition, this course reinforces the importance of leadership and the competencies necessary to be a supportive leader, including the professional and personal characteristics, knowledge, values, and traits that inform a leader's actions.

Credits: 3

HA 306 - Healthcare Marketing

In this course, you will gain a perspective on the role of marketing to promote business and as part of the greater business system. You will gain an understanding of the components of a marketing plan, a strategic plan, and a business plan. Other marketing concepts to be addressed include the marketing mix, target marketing, market segmentation, forecasting methods, and branding. Additional topics to be addressed include big data, data mining, transparency, patient involvement, and medical tourism. In addition, you will create multiple presentations and complete Assignments in which you research and analyze different healthcare marketing campaigns. You will also engage in thoughtful Discussions in which you explore and debate marketing concepts, principals, and ideas.

Credits: 3

HA 307 - Human Resource Management

Human resources are the foundation of health care organizations, yet the health care industry faces severe staffing shortages, in part as a result of the aging population and workforce. In addition, it faces disparities in the geographic distribution of workers and a scarcity of primary care providers. To attract and retain valuable talent, managers must develop, nurture, and coach their staff for success. This course provides fundamental concepts in human resource management that will help health care managers be successful supervisors and leaders by offering best practices and evidence-based strategies for successfully working with employees. In addition, this course addresses diversity in health care, physician compensation, incentives, measuring productivity, legal and regulatory issues in human resources, and quality improvement.

Credits: 3

HA 310 - Introduction to Health Careers

This course offers an overview of the healthcare workforce, exploring ongoing environmental, technological, political, economic, and demographic trends and issues that impact contemporary and future human resources needed for the optimal functioning of the health care system. In addition, this course provides in-depth exploration of the major health professions, examining crucial aspects of each field, including roles and responsibilities, education and credentialing requirements, work settings, and salary forecasts. The content will also include a brief review of U.S. health delivery systems, public and private financing, reimbursement models, insurance, and new technologies influencing trends in health careers. Finally, this course will provide guidance in job search strategies, preparing a professional rTsumT, and interviewing strategies.

Credits: 3

HA 317 - Long-Term Care

This course introduces you to the continuum of long-term care services, including the roles of financing, health policy, and payment mechanisms. Specific attention will be given to the needs of the growing aging population in the United States and related concepts of (aging in place, social support, mental health, quality of life, and autonomy. This course explores many facets of long-term care facility operations and the skills necessary for long-term care administrators to deliver safe, patient-centered, cost-effective services. Other topics include community-based long-term care services, the value of informal care, and the laws and regulations governing the long-term care industry.

Credits: 3

HA 318 - Public Health

This course introduces you to the principles of public health practice, with emphasis on its history, philosophy, ecological nature, and scope. Although health promotion theories will be addressed, discussion will center on practical applications of public health, epidemiology, disease prevention, health promotion, and environmental and social/behavioral determinants of health. Additional attention will be given to federal, state, and local public health responsibilities; the core functions and essential services of public health; and professional roles in the public health sector.

Credits: 3

HA 319 - Global Health

We live in an increasingly interconnected world where it has become ever more important to ensure healthy lives and promote well-being as a foundation for building prosperous, stable, and sustainable societies. The world has made great progress over the last few decades in reducing poverty and improving health, including reducing maternal and child mortality, increasing immunization coverage, and bringing down the burden of diseases like HIV/AIDS and malaria. Yet the United Nations(2020) reports that in 2017, only a third to half of the global population was covered by essential health services. Climate change, emerging infectious diseases, and antimicrobial resistance are just some of the challenges that threaten the health of the world's population. The multidisciplinary field of global health brings together the expertise and experience of diverse partners from across the world to address these challenges and improve health and well-being. This course introduces the core concepts of global health, which include an understanding of key global health issues, the connection between health and human rights, the major actors in global health, and the strategies advanced to improve the health and well-being of the global population. You will learn about the social, economic, and environmental determinants that affect health throughout the world and the disparities that exist among countries and geographic regions. The course also highlights global trends in communicable and noncommunicable diseases, mental health, reproductive health, and nutrition. You will investigate and discuss the ways in which the World Health Organization (WHO), governments, and nongovernmental organizations(NGOs) prioritize and respond to health crises. You will also explore healthcare systems around the world and different regions' healthcare needs, public policies, values, and economies.

Credits: 3

HA 401 - Health Policy

This course will present the step-by-step process of health policy formulation and implementation. You will gain an understanding of the unique characteristics of policy development in the United States and the values that have helped shape these policies. This course will provide an overview of major health policies that have been implemented in healthcare history, including public health policies, cost-containment policies, and regulatory policies to improve healthcare quality. Emphasis will be placed on the application of health research in the policy formulation process at the state and federal levels.

Credits: 3

HA 402 - Economics of Healthcare

This course highlights the distinction between healthcare markets and other markets. The healthcare industry and its stakeholders (patients, providers, employers, and public and private payers) require a unique economic examination due to political and environmental uncertainties, mixed financing, and many other factors. To better understand ways in which healthcare organizations and financial markets function, students will be guided through the expanding field of research in health economics, combining economic theory with scientific study outcomes. Students will utilize microeconomic and macroeconomic perspectives, beginning with a microeconomic perspective at individual and organizational levels and then shifting to a macroeconomic examination of health and healthcare as an element of the greater economy.

Credits: 3

HA 403 - Financial Management

Financial management is a central responsibility of the healthcare manager. This course will provide you with the history of healthcare financial management, as well as an in-depth analysis of financial management as a subspecialty, revenue cycle planning in healthcare institutions, and the variety of reimbursement mechanisms. In addition, you will learn how to interpret and analyze financial statements for the purpose of maximizing efficiencies, reducing waste, and managing revenue for a healthcare organization.

Credits: 3

HA 404 - Quality Management

This course examines change implementation to improve the quality, safety, and effectiveness of the healthcare system. The course content addresses the roles of operations management, organizational behavior, and healthcare service delivery in maximizing quality. The challenges of implementing and institutionalizing quality improvement efforts will be addressed and illustrated with examples from a variety of healthcare organizations, including ambulatory care settings, public health departments, and hospitals. You will be introduced to the theory and processes that drive continuous quality improvement (CQI).

Credits: 3

HA 405 - Law & Ethics

In healthcare, legal and ethical issues are often intertwined. But unlike many other legal/ethical pairings in our society, the decisions and actions involved in healthcare are literally matters of life and death. This course will take you on an exploratory journey of law and ethics in healthcare. You will first receive an introduction to ethics and law in the context of healthcare and then examine healthcare ethical dilemmas and ethics committees, which can provide guidance when faced with challenges. Studying the development of laws will provide legal and governmental framework for the issues addressed throughout this course. You will then move on to the ethical and legal issues that apply to healthcare providers. The patient/caretaker relationship is ever important in healthcare, so an understanding of both employee and patient rights and responsibilities is essential. The course concludes with an examination of compliance and governmental and organizational healthcare legal and ethical issues.

Credits: 3

HA 406 - Strategy and Planning

This course provides a critical analysis of many concepts surrounding health planning, an examination of essential change in the healthcare industry, and strategic planning approaches used to manage various resources within a healthcare facility. In addition, this course investigates important marketing concepts used by healthcare leaders to plan and execute a meaningful marketing campaign. You will consider the rapidly evolving U.S. healthcare markets and their impacts on the functioning of healthcare organizations. You will also examine changing patient demographics, technological developments, and government regulation of patient care. You will be guided through the process of developing and administering a strategic plan, as well as specific strategic options such as mergers, acquisitions, reorganization, joint ventures, and some of the prevailing instruments used to analyze strategic conditions (e.g., Six Sigma, balanced scorecard, SWOT analysis).

Credits: 3

HA 407 - Research Methods

This course will provide you with an understanding of the role that research plays in the provision of healthcare services and the development of health policy. In addition, you will learn the basic skills necessary for conducting ethical health services research. You will have the opportunity to practice applying research skills toward the development of a research study that will examine a current issue in the healthcare field. You will also learn how to conduct common statistical calculations used in health services research and how to incorporate research into scientific presentations and article formats.

Credits: 3

HA 420 - Research Methods

This course will provide you with an understanding of the role that research plays in the provision of healthcare services and the development of health policy. In addition, you will learn the basic skills necessary for conducting ethical health services research. You will have the opportunity to practice applying research skills toward the development of a research study that will examine a current issue in the healthcare field. You will also learn how to conduct common statistical calculations used in health services research and how to incorporate research into scientific presentations and article formats.

Credits: 3

HA 450 - Capstone

Throughout your program, you have encountered and discussed numerous complex problems that are unique to healthcare administration. These problems are often so complex because they do not have a simple or straightforward solution. Instead, addressing these problems effectively requires you to evaluate the problem from multiple perspectives, consider the various stakeholders in the problem, and weigh the pros and cons of various mitigation strategies. In this course, you will select one complex problem in healthcare administration to evaluate. You will examine this problem from a variety of perspectives and analyze strategies that have been proposed or attempted in the past to mitigate this problem. Using what you've learned in the courses in your program of study, your insights from studying previous strategies for mitigating these problems, and your own

personal experiences, you will identify the strategies that you think are most successful for mitigating this problem. You will justify your analysis with a variety of interdisciplinary source materials from your own research, as well as relevant Readings from previous courses. At the end of the course, you will submit a Capstone Paper and record a Capstone Presentation in which you explain your problem, analyze previous attempted solutions, and propose a strategy for mitigating the problem. Throughout the course, you will add resources and reflections to an ePortfolio, which will reflect the intellectual work you have done to support your proposal. This course will help you hone your critical thinking, research, and presentation skills. You will learn how to tackle complex problems and consider issues from multiple perspectives. You will also develop a deep familiarity with a variety of research tools and methodologies. Finally, you will learn how to present your ideas in a clear and engaging manner that compels your audience to act.

Credits: 3

HA 701 - Introduction to Health Delivery and Administration

This course discusses the broad structures and, functions of the U.S. health system with careful, examination of services, cost, and quality of, healthcare. Students will gain a thorough, appreciation for the evolution of our healthcare, system through time, as a function of U.S. values,, scientific discovery, and world events. The, curriculum will provide an overview of a wide, array of features of the U.S. healthcare sytem, such as long-term care, public health, healthcare, financing, the healthcare workforce, technology,, and managed care. Further, students will gain, deeper understanding of major historical, healthcare policies impacting our current delivery, system, the current status of provisions of the, Affordable Care Act, and the future of healthcare, reform.

Credits: 3

HA 702 - Understanding Health Information Systems

Understanding Health Information Systems is the, second course in your certificate program. This, course begins by introducing you to the, terminology, hardware, and software used in health, information technology (HIT). Next, you are, introduced to electronic health records (EHRs) to, develop an understanding of their advantages and, challenges. You also learn about how data are, organized in an EHR. Then, you learn about the, systems development life cycle (SDLC) and how it, is used in decision-making. The course then shifts, to data analytics, as you explore the various, sources of data used in HIT and how data are used, in different types of healthcare facilities., Furthermore, you learn about the importance of, interoperability and the challenges of making, systems work together. The course ends by, examining how the underlying concepts in the, Foundation of Knowledge model and the, data-informationknowledge-wisdom (DIKW) paradigm, help transform data and information into knowledge, and wisdom.

Credits: 3

HA 703 - Healthcare Law, Regulation & Ethics

The inextricable link between the healthcare, delivery system and law requires healthcare, administrators to be experts in a breadth of legal, and regulatory issues. This course will introduce, students to the legal and ethical issues affecting, the administration and delivery of healthcare, services. Students will be familiarized with the, U.S. legal system, major legal issues pertaining, to the management of healthcare institutions,, regulations surrounding quality of care, the, impacts of the Affordable Care Act, and ehctical, issues in health administration. Specific, environment, including antitrust laws, patient, privacy, end of life care, and malpractice., Students will become familiar with the, responsibility of healthcare organizations to, comply with government regulations and the, important role of ethics committees for, decision-making in healthcare delivery.

Credits: 3

HA 704 - Healthcare Quality Improvement

Stakeholders at all levels rely upon healthcare, administrators to deliver safe and high-quality, services in the healthcare organization. Further,, the move toward value-based care has driven, providers to conduct more rigorous evaluation of, patient safety and performance. In this course,, students will explore the principles of quality, management and quality improvement. Utilizing case, studies and other learning methodologies, this, course will discuss quality improvement models,, proect teams, collaboration, and systems within, the healthcare organization that provide a, foundation for delivering safe, high-quality,

healthcare. The curriculum will provide an overview of the principles of and practical tools, for quality improvement, including the strategies, of lean Six Sigma and the Toyota model of quality, management. Students will also learn essential, management practices for adopting and implementing, performance goals for lasting process, improvements, strategies for assessing population, health, procedures for safe discharge planning,, laws and regulations related to healthcare, quality, and an understanding of value-based, purchasing.

Credits: 3

HA 710 - Advanced Financial Management in Healthcare

Planning, monitoring, and controlling the finances, of a healthcare organization is the responsibility, of healthcare management at all levels. In today's, complex healthcare industry, administrators must, have a firm comprehension of the basic principles, and procedures of financial management. This, course will utilize case studies from an array of, healthcare settings-long term care, home health,, and hospitals-to demonstrate tools used for, financial monitoring, budgeting, forecasting, and, strategies planning. Students will explore, practical procedures for quantifying revenues and, expenses, constructing capital expenditure and, operating budgets, and analyzing financial trends., Updated concepts such as big data, meaningful use,, ICD-10, and value-based care will also be examined, through a financial management lens.

Credits: 3

HA 715 - Healthcare Marketing and Strategic Planning

It is crucial for administrators and managers in, healthcare to comprehend marketing principles and, know how to plan for their organization, strategically with full market awareness. Leaders, in healthcare know their consumers, identify their, market, communicate the organization's value, and, meet the consumers' needs. This course will, provide the backdrop for marketing, including, exploring the internal and external influences on, strategies planning, strategies for segmenting the, market, branding, and data analysis. In addition,, students will be introduced to a step by step, guide through the marketing process while also, being made aware of challenges inherent in a, competitive marketplace. Students will have, opportunities, through case study analyses, to, apply marketing principles to realworld scenarios,, determining precisely which marketing strategies, to use in a range of situations.

Credits: 3

HA 720 - Managerial Epidemiology and Population Health for Healthcare Organizations

This course provides an introduction to population, health studies (epidemiology) for healthcare, management. Students will learn the basic, principles of epidemiology, strategies for data, analysis, and applications of epidemiology to the, planning, evaluation, and management of healthcare, for populations. In addition, students will be, introduced to the primary metrics collected and, analyzed in a variety of healthcare, settings-hospitals, long term care facilities,, emergency departments, and physician practices-in, order to ensure that effective and safe services, are being delivered.

Credits: 3

HA 725 - Operations Management in Healthcare

This course provides a comprehensive analysis of, the many aspects of healthcare operations, management, including organization finances,, patient flows, inventory management, supply chain, management, and process improvement. Students will, explore ways in which healthcare administrators, direct the complexities of the healthcare, organization and all of its elements-patients,, stakeholders, providers, payers, and government, regulators. In addition, students will be, introduced to concepts of research and data, analytics for decision-making to improve quality, and efficiency.

Credits: 3

HA 730 - Organizational Behavior, Leadership & Human Resource Management

Students will be introduced to the study of, individual and group behavior in healthcare, settings. Utilizing case studies and other, learning methodologies, students will gain a, deeper understanding of leadership models used for, motivating employees toward

positive change,, meeting organizational objectives, and job, satisfaction. Further, this course will provide an, overview of major human resource functions, such, as staffing, training and development, employee, relations, and long range planning.

Credits: 3

HA 750 - Business Communication for Healthcare Administrators

Written and verbal communication strategies are, central to effective management as well as in the, delivery of important health-related information, aimed at improviing patient outcomes and safety., This course will provide students with essential, written and spoken communication strategies used, in business, public health messaging, and health, care delivery. Students will gain confidence in, their short written communication (emails, memos,, summary statements) and long written communication, (reports), as well as greater comfort with public, and one on one speaking. This course will explore, ways in which communication is used most, effectively for problem-solving, leadership, and, research. Finally, students will gain a stronger, grasp of communication skills important for, effective management, such as briefings,, persuasion, and conflict management.

Credits: 3

HA 751 - Emergency Management in Healthcare

This course aims to help current and future, healthcare administrators develop emergency, management and operations plans for hospitals and, healthcare systems. Case studies will include, lessons learned in actual emergency management, planning and emergency responses to incidents such, as natural disasters, terrorism, and public health, emergencies. Students will be introduced to legal, and regulatory issues associated with emergency, preparedness and repsonse, hospital logistics and, laboratory operations, the roles of healthcare, personnel, risk communication and media relations,, integrating emergency response with other, community resources, physical infrastructure, security and safety, triage principles, and, infectious disease containment.

Credits: 3

HA 790 - Health Administration Master's Capstone

The American College of Healthcare Executives has identified essential competencies for the health care executive within five major domains: communication and relationship management, leadership, professionalism, knowledge of the health care environment, and business skills and knowledge. Students completing their capstone project are expected to display these competencies at a novice level. The novice level is defined by ACHE as (an individual's primary focus is understanding and gaining information in order to comprehend the skills needed. You have the level of experience gained in a classroom setting or on-the-job training. You are expected to need help when performing this skill. Upon completion of the coursework required for the master of health administration degree, the capstone project is the culmination of a student's experience, in which content from every course is integrated. The capstone project requires identifying a current problem in a real- world health care setting and the synthesizing and application of the skills and knowledge gained in this academic program to develop practical solutions. The product of this in-depth analysis will be a comprehensive report and formal presentation. Through the report and presentation, students are expected to demonstrate an understanding of the U.S. health delivery system and major business concepts; critical thinking; effective written and oral communication skills; leadership and professionalism; strategic planning; and quantitative skills in the analysis of population health, economics, financial management, and quality assessment.

Credits: 3

HE 301 - Introduction to Public Health

In this course, students will learn about the structure of the public health system in the United States. The course begins with the development of public health in the United States from the 19th century onward to present day and reviews the philosophy underlying public health. The course covers the 10 core functions and key services of public health and the various means by which these are delivered; it concludes with a module on systems thinking. This course lays the foundation for subsequent coursework and serves as a prerequisite or corequisite for all other public health courses. This course covers the Council on Education for Public Health (CEPH) accreditation requirement number three, which covers instruction in the (overview of public health. It also covers criterion B3 for exposure to systems thinking.

Credits: 3

HE 302 - Health Behavior

This course will survey the major theories of health behavior and behavior change. Students will learn to apply theories at the individual and community levels. Students are introduced to the role of health behavior in health education and promotion programs. This course meets the Council on Education for Public Health (CEPH) accreditation criterion number seven by introducing and covering (behavioral factor impacts on human health and health disparities).

Credits: 3

HE 304 - Health Communication

People receive health information from a variety of media sources and outlets. As technology continues to enhance how we communicate, we must ensure health communication keeps up with these changes. To do this, you must understand target populations, their preferences for information, and how to effectively communicate a message. In this course, through the Discussions and thought-provoking Assignments, you will develop the skills to effectively communicate health information in various settings (e.g., school, healthcare, etc.) as well as through different modalities, specifically mass and social media. You will explore health literacy and its impacts on messaging and communication with your target audience. Special emphasis is placed on choosing and developing culturally sensitive health communication strategies. You will examine health materials to determine appropriate literacy levels and gain hands-on experience creating written, graphic, and video health communication products. This course will prepare you for a role as a health communication specialist in the field of public health.

Credits: 3

HE 305 - Community Health

This course introduces students to the concepts of population and community health. The processes of community health will be covered throughout the duration of this course, with special attention to racial and ethnic minority populations. Specific interventions will be discussed, including the role of community organizing and community building in promoting health. This course will relate concepts to community health threats, including gun violence and drug overdoses. This course covers the Council on Education for Public Health (CEPH) accreditation criterion number five for (identifying and addressing population health challenges).

Credits: 3

HE 314 - Sexual Health

Sexual health has long been a public health concern. Historically the focus was limited to the field of reproductive health, wherein sexual health was examined and taught in the context of reproduction. Less importance was given to the sexual health of individuals over their lifespan or to sexual health of individuals who did not conform to heteronormative ideas. Sexual health is now considered a critical component of a person's well-being, and new approaches to sexual health promotion are holistic, accounting for physical, psychological, and sociocultural aspects of sexuality. In this course, you will learn about the biological, psychological, and sociocultural factors that contribute to human sexuality. Through discussions and thought-provoking assignments, you will explore how sexuality develops over the life span; understand key terms such as gender, sex, gender identity, and sexual orientation; examine the impact of pregnancy and childbirth on sexual health; identify sexual health disparities in the LGBTQ+ community; and study the effects of sexually transmitted infections and other diseases that impact sexual health.

Credits: 3

HE 315 - Medical Terminology

This course explores the origins of healthcare terms and how healthcare professionals use them to identify the parts and functions of the body. It also covers best practices for identifying diagnostic procedures and therapeutic interventions as well as understanding the function of human cells. The majority of terms associated with the anatomy and anatomical positions of the human body are of Greek and Latin origin, and as such, many healthcare professionals find themselves learning a "new language"

during school. Understanding anatomical roots, prefixes, and suffixes makes memorization more attainable, and the consistency of the terminology allows healthcare professionals to identify parts of the body regardless of the position of the body. During this course, you will engage regularly with classmates in Discussions aimed at enhancing your understanding of how medical terms are derived and applied to the human body. You will also complete Assignments designed to test your understanding and improve your comprehension of concepts such as anatomical labeling, diagnostic procedures, therapeutic interventions, and the meaning of benign and malignant neoplasms. We hope you enjoy the course and have a rewarding learning experience with us

Credits: 3

HE 316 - Human Disease

The study of human disease is constantly evolving and has been for centuries. As science and technology advanced, so did our knowledge of the human body and how it is impacted by disease. Today, there is more knowledge and practice around prevention and control methods. Being able to quickly and decisively determine how a disease spreads has greatly improved control methods. Diagnostic testing has improved, with some conditions being diagnosed within minutes of receiving the test. These advancements have also carried over to treatment options, which are constantly changing and improving. Today there is considerably more knowledge of the human body and disease. As you progress through the course, you will complete a close examination of the human body beginning on the cellular level. In this course, you will explore various aspects of human diseases. Through the Assignments and Discussions in the modules, you will dissect the role that genetics plays in disease susceptibility and evaluate mechanisms of disease with emphasis on the impact of cancer on different organs and systems. You will also complete a critical analysis of environmental factors in the context of their impact on diseases. By exploring real-world examples, you will have a foundational understanding of human disease in the field of public health.

Credits: 3

HE 317 - Health Mapping with ArcGIS

In this course, you will learn about the basic methods for creating maps relevant for understanding health using ArcGIS software. Throughout the course, you will learn about different features of the program, apply those features, and critically examine maps that you and your peers create to describe health issues. Some of the specific topics covered will include creating map projections and layers; working with image, raster, and vector data; locating sources for geographic health data; and working with address and zip code data. This course utilizes a hands-on approach. Throughout the semester, you will be actively using ArcGIS to explore how health outcomes and exposures differ geographically and to create maps describing the relationships between these factors. By the end of the course, you will have developed several practical skills that will allow you to learn about more advanced ArcGIS techniques, apply ArcGIS in other courses and research, and use ArcGIS in professional settings

Credits: 3

HE 318 - Health Education

This course covers a range of topics in infectious disease biology, epidemiology, and prevention. In this course, you will explore the major classifications of infectious diseases, including viral diseases, parasites, bacteria, prions (infectious proteins), and parasitic infections. Modes of infection covered include sexual, airborne, foodborne, and hospital-acquired transmission. Strategies for surveillance, outbreak investigation, and prevention, as well as global pandemics, are covered.

Prerequisites & Notes

Student has completed or is in process of completing all of the following course(s): DA 308 - Intro to Epidemiology, HE 316 - Human Disease

Credits: 3

HE 319 - Health Education

Health education and promotion are the cornerstones of all disease-prevention plans and programs. Providing people with the necessary information, tools, and skills to make healthier choices produces positive, long-lasting effects. As Benjamin Franklin famously stated, "An ounce of prevention is worth a pound of cure" (University of Cambridge, 2012). While he was talking about preventing fires, the saying holds true for health as well. For example, it is healthier and cheaper to prevent type 2 diabetes than it is to treat it and all of the complications that may arise from having diabetes. In this course, you will complete a number of

Discussions and thought-provoking Assignments. You will explore health education and its impact on health behavior. You will examine the roles that social marketing and social media play in providing health education information to a community. In the Discussions and Assignments, you will develop the skills to effectively plan health education programs and curate and create appropriate health education materials to improve the health of a community. You will identify and evaluate health education materials, approaches, and strategies for community education. Finally, you will examine how building community health coalitions and advocacy support health education.

Credits: 3

HE 321 - Nutrition and Physical Activity in Public Health

This course provides an exploration of key principles of nutrition and physical activity, including the impact of nutrition and exercise on both individual and population health. In this course, you will discover how epidemiology informs conclusions about the quality of nutrition and physical activity of people in the United States. You will analyze critical information about the best practices for collecting and analyzing data related to nutrition and physical activity. One of the defining features of this course is the examination of how culture, race, ethnicity, and socioeconomic status influence nutrition and physical activity behaviors and outcomes. In particular, you will explore how health disparities contribute to higher rates of cardiovascular disease, diabetes, alcohol abuse, and other diseases in certain populations. During this course, you will engage regularly with peers in discussions aimed at enhancing your understanding of how nutrition and physical activity can be leveraged to improve public health. You will also complete assignments designed to test your understanding and improve your comprehension of concepts such as body mass index, obesity, under-nutrition, and the correlation between health disparities and unhealthy behaviors. By the end of this course, you will be able to identify deficiencies in nutrition and physical activity. Finally, you will study interventions designed to increase physical activity and improve nutrition so that you can explain how an effective intervention is developed and implemented

Credits: 3

HE 401 - Environmental Health

This course introduces students to environmental health issues. Students will learn how research informs laws, regulation, and advocacy around environmental threats to health. This course covers the intersection of biological, chemical, and physical contributions to community health and disease. Air-, water-, and land-mediated exposures will be explored in detail. The concepts of environmental justice and environmental ethics will be discussed. This course covers the Council on Education for Public Health (CEPH) accreditation criterion number seven, (environmental, and other factors that impact human health and contribute to health disparities.)

Credits: 3

HE 402 - Public Health Ethics

This course is an upper-level introduction to the field of public health ethics, with a focus on the ethics of control of public health problems including tobacco use and infectious disease. You will explore foundational ethical theories and their applications to various aspects of public health ethics, including the trade-offs between individual liberties and community protection in control of disease epidemics.

Prerequisites & Notes

Student has completed or is in process of completing all of the following course(s): HA 401 - Health Policy, HE 301 - Introduction to Public Health, HE 403 - Health Disparities & Cultural Diversity

Credits: 3

HE 403 - Health Disparities and Cultural Diversity

Health disparities disproportionately affect minority populations in the United States. Health disparities are avoidable and unjust differences in exposure and vulnerability to health risk factors and healthcare outcomes. Disparities in health and healthcare not only affect the groups facing the disparities but also limit the overall gains in health and quality of care for the broader population and result in unnecessary costs. Understanding the societal impacts of health disparities is critical to demonstrating the need for

effective prevention methods. In order to remediate health disparities in populations, the government and healthcare systems must develop programs and policies from a social justice perspective. This requires a thoughtful examination of the core causes of health disparities in the population and a willingness to make meaningful changes to the economic, political, and social structures that impede good health for millions of Americans.

Credits: 3

HE 405 - Environmental Health

The field of environmental health is ever evolving, and new careers and professions are often created to drive positive environmental change. There are many environmental hazards that have happened in the United States—for example, the Flint, Michigan, water crisis garnered publicity around the world because it was an enormous public health crisis. This crisis is just one glimpse of how the health of an environment impacts the world you live in. The city suffers from polluted domestic water, which has resulted in negative health outcomes for all residents. This water crisis is an example of environmental injustice as the lack of community resources and lack of environmental regulation has made it possible for such an issue to occur. In this course, you will explore matters such as this and what steps are necessary at both the government and community level to prevent such environmental hazards from occurring. In this course, you will discuss environmental health challenges and take a closer look at the role that environmental epidemiology plays in protecting the health of the population. You will also explore how the concept of environmental justice aids in creating policies and regulations to reduce the possibility of health disparities

Credits: 3

HE 406 - Program Planning and Evaluation

Public health has had various definitions and functions throughout the 20th and 21st centuries. Historically, the health of community members was cared for by friends, relatives, or community physicians. Since the publication of the World Health Organization's definition for "public health" in 1947, people have viewed health as a holistic concept (physical, mental, financial, and social perspective) (Issel & Wells, 2018). In this course, you will explore program planning and community health assessments from a holistic approach and examine data-collection methods. The activities will reflect real-world tasks such as creating a standard operating procedure manual to implement program theory into practice. You will also research and create projects on logic models and program theories. Additionally, you will create a presentation explaining the process of evaluation question development. Throughout the course, you will discuss qualitative and quantitative study design efforts and examine the infrastructure of the public health pyramid. You will debate health problem prioritization and identify the steps involved in prioritizing health problems. You will also explore how to identify community strengths and needs in the program planning process

Credits: 3

HE 407 - Collaboration and Advocacy in Public Health

Collaboration and advocacy can be powerful tools for improving the health status of a community. When community partners are able to come together and form coalitions, they create a strong voice of advocacy and support for the people they seek to serve. To accomplish this goal, it is exceedingly important to have a firm understanding of the community being addressed, the steps involved in collaboration, the process of program planning, and the techniques that are critical for advocacy. In this course, through Discussions, individual and group Assignments, and a final group project, you will develop the necessary skills to effectively collaborate and form partnerships to address the health needs of a community. You will gain practical experience speaking with community organization leaders as you create a program proposal to advocate for your community. You will complete a total of five group Assignments in this course; Module 1 will introduce you to your group project, which you will continue in the Assignments for Modules 3, 6, 7, and 8. In Module 8, your group will assemble the components of the project to complete a proposal for a community health program. As you complete your group project, you will explore the roles of collaboration and advocacy in supporting the health needs of a community. You will also contact and interview an organization leader to gather information about your community that you may not readily identify through your research. By conducting a community assessment, you will identify community organizations and organization leaders that are engaged in public health issues. This course will provide you with the necessary skills to create a program proposal advocating for a community. You will examine various advocacy strategies and gain hands-on experience creating a logic model, an action plan, a program budget, an evaluation plan, and a sustainability plan as part of a program proposal. You will use each of these components to create your final group project presentation.

Credits: 3

HE 420 - Public Health Research Methods

To address issues in public health, it is necessary to first understand how to study those issues. Take cigarette smoking, for example. Almost everyone agrees that cigarette smoking causes lung cancer, but for the first half of the 20th century, there was no consensus about the relationship between the two. Fortunately, two researchers, Richard Doll and A. Bradford Hill, devised two landmark studies to examine whether there was such a relationship and confirmed that cigarette smoking does, in fact, cause lung cancer (Doll, 1950; Hill, 1954). Since then, numerous researchers have confirmed and built on these findings, and similar methods are now being applied to understand the health effects of e-cigarettes. Understanding how to apply appropriate research methods, like Doll and Hill did, is essential for generating new insights in public health.

Credits: 3

HE 450 - Public Health Capstone

The capstone project is a student-initiated and faculty-mentored culminating experience. Students may choose among a variety of projects, including epidemiologic research, policy analysis, program planning and evaluation, and health education and health promotion. Students must integrate, synthesize, and apply knowledge across multiple dimensions of their education.

Credits: 3

HE 705 - Scope and Methods in Public Health

This course provides a comprehensive introduction to public health concepts and practice. The goal is to engage students in the fundamentals of the public health system+evidence and evaluation+the components of an adequate community foundation for good health and health policy. Course content includes instruction on finding and using scientific evidence, implementing and evaluating interventions that produce new evidence, and understanding, conducting, and evaluating evidence-based programs and policies in public health. This course is designed to provide learners with the foundational knowledge, skills, and professional attitudes that are important for a career as a public health professional.

Credits: 3

HE 710 - Statistics for Public Health

This course covers basic statistical techniques that are important for analyzing data arising from epidemiology, environmental health, biomedical, and other public health-related research. The main subject areas are descriptive statistics, elements of probability, statistical inference using parametric and nonparametric methods, and analysis of variance.

Credits: 3

HE 720 - Public Health Management

This course covers analysis of public health entities, general management principles, and the impact of regional, national, and global policy relative to public health in the United States.

Credits: 3

HE 727 - Pharmacy and Public Health

The need for interprofessional education and collaborative practice is increasingly being recognized. This course introduces students to the principles and practices of public health as they relate to concepts and issues of public health pharmacy. Students will have opportunities for experiential learning designed to focus on current and future contributions of pharmacists to public health and the role of public health in pharmaceuticals and pharmacy practice.

Credits: 3

HE 729 - Leadership in Public Health Practice

Public health is undergoing increasingly rapid change and complexity. Public health professionals and healthcare leaders are being challenged to adapt and embrace these complex issues. This course introduces students to concepts and theories of leadership, presents real-world leadership challenges from public health practice, and provides opportunities for students to discover personal leadership attributes. Content areas will include leadership theory, personal leadership, leadership in organizations, and leadership in communities. Emphasis will be placed on the application of course material to real-world public health problems and issues.

Credits: 3

HE 730 - Fundamentals of Epidemiology

This course introduces principles and quantitative and qualitative methods of epidemiologic analysis of infectious and noninfectious diseases. Methods of investigating the distribution and dynamics of disease in a population that leads to our understanding of etiologic factors, modes of transmission, and pathogenesis will be covered.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 710 - Statistics for Public Health, HP 750 - Intro to Statistical Methods with grade greater than or equal to D-.]

Credits: 3

HE 740 - Environment and Human Health

This course provides an in-depth understanding of physical, chemical, and biological factors that affect human health at a local and global level. Additionally, the impact of social, psychosocial, and political factors on the environment is examined.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 710 - Statistics for Public Health with grade greater than or equal to D-.]

Credits: 3

HE 743 - Global Sustainability and Health

This course explores the major issues pertaining to the maintenance of a sustainable ecosystem as an essential prerequisite for population growth without compromising the ability of the next generation to meet its needs. Students will discuss the current challenges in global sustainability: climate stabilization, energy security, sustainable development, land use, biodiversity, population, food and water resources, climate change, energy, global public health issues, and forecast for the environment and the human condition for the next several decades. The course will explore goals for reducing greenhouse gas emissions, improving global cooperation, and creating and expanding technologies and renewable energies. The specific role of the public health professional in the development of adaptation and mitigation strategies for climate change and public health preparedness will also be discussed.

Credits: 3

HE 745 - Public Health Law and Policy

This course presents the range of legal concepts that apply in the field of public health with an emphasis on issues and controversies. Students will gain a basic understanding of the legal system and regulatory process as they apply to society+s need to protect the health of the population on a broad scale. The course provides an overview of basic areas of law that apply to public health, including the Constitution, statutes, cases, and regulations.

Credits: 3

HE 750 - Behavioral and Social Foundations of Public Health

This course focuses on behavioral aspects of health in the U.S. and the most commonly used theories and models underlying successful public health interventions. The course develops competencies that will underlie community needs assessment and planning interventions at the individual, community, and organizational level.

Credits: 3

HE 752 - Public Health Program Planning and Evaluation

This course is designed to provide students with a systematic approach to planning effective health programs. Students will learn the general principles of public health program planning including needs assessment, design, implementation, and evaluation. Various tools/models will be introduced to offer students a comparative overview of public health program planning and monitoring in community/global/international contexts. Utilizing knowledge and skills, the student should be able to develop a plan for implementing an effective global health program and/or intervention to address public health issues affecting the communities at local, national, and international levels.

Credits: 3

HE 755 - Global Health

This graduate course explores global health issues pertaining to public health and health policy. Students will discuss current challenges in global health through four key areas: health systems; infectious diseases; chronic diseases; and natural resource management. Using global case studies, students will have the opportunity to consider the public health and policy ramifications of these issues, what are the barriers to developing solutions, and how these solutions might work out, depending upon a variety of factors that include but are not limited to social, political, educational, and economic structures of different countries. Students will also learn how global health issues are occurring in this region, and demonstrating through expert speakers, that acting locally can help in the way we think about global health issues.

Credits: 3

HE 760 - Health Comm & Education

This course introduces principles and techniques of health communication to "inform, educate and empower people about health issues." Our focus will include communicating about health and science to the public through media channels, health advocacy, patient information and decision aids, as well emergency and crisis communication. Students will create multiple products for group critique with the goal of developing skills and competency.

Credits: 3

HE 761 - Health Literacy

Health literacy - or the ability to obtain, process and act on health information - is an essential patient safety and public health issue. This course provides key concepts and skills for students in health related fields to identify patients with health literacy risks; to provide clear health and medical information in oral and written formats; and to assess and modify health care delivery systems and environments to enhance patient access and understanding.

Credits: 3

HE 763 - Health Care Communication: Essential Skills for Practitioners

Health care professionals need to listen carefully and to share information clearly; to treat patients with empathy; and to be able to work with patients and colleagues of different backgrounds and abilities. This course introduces interpersonal communication skills, health literacy, and culturally competent communication skills relevant to providing health care.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing, PS 701 - Assessment I with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing, BW 703 - Info Strat for Biomed Writers, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

HE 764 - Social Media for Health and Non Profit Organizations

Students will acquire beginning competency in selecting and using social media to accomplish social marketing or health communication objectives. The course introduces the strategic use of social media through various digital platforms, as well as analytical tools to measure audience engagement. We will discuss the evidence supporting behavior change effectiveness as well as the ethics of using these media. After social media bootcamp and basic training, students will be deployed to help a non-profit client create and implement a social media strategy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing, PS 701 - Assessment I with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BW 701 - Prof Biomedical Writing, BW 703 - Info Strat for Biomed Writers, BW 704 - Regulatory Document Processes with grade greater than or equal to D-.]

Credits: 3

HE 781 - Public Health Fieldwork Experience I

The field experience courses provide students with hands-on opportunities to apply in-class knowledge to real-life public health issues in a public health or related organization. Field experiences will be conducted in local, state, federal, or international agencies and organizations and in private organizations that address significant public health issues. Students will be supervised by qualified preceptors working at the sites. Over the course of the three field experience courses, students will spend a minimum of 180 hours in supervised activities in public health settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 710 - Statistics for Public Health, HE 720 - Public Health Management, HE 730 - Fund Epidemiology, HE 740 - Environment & Human Health, HE 750 - Behavior & Soc Foundations with grade greater than or equal to D-.]

Credits: 1

HE 782 - Public Health Fieldwork Experience II

The field experience courses provide students with hands-on opportunities to apply in-class knowledge to real-life public health issues in a public health or related organization. Field experiences will be conducted in local, state, federal, or international agencies and organizations and in private organizations that address significant public health issues. Students will be supervised by qualified preceptors working at the sites. Over the course of the three field experience courses, students will spend a minimum of 180 hours in supervised activities in public health settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 710 - Statistics for Public Health, HE 720 - Public Health Management, HE 730 - Fund Epidemiology, HE 740 - Environment & Human Health, HE 750 - Behavior & Soc Foundations with grade greater than or equal to D-.]

Credits: 1

HE 783 - Public Health Fieldwork Experience III

The field experience courses provide students with hands-on opportunities to apply in-class knowledge to real-life public health issues in a public health or related organization. Field experiences will be conducted in local, state, federal, or international agencies and organizations and in private organizations that address significant public health issues. Students will be supervised by qualified preceptors working at the sites. Over the course of the three field experience courses, students will spend a minimum of 180 hours in supervised activities in public health settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 710 - Statistics for Public Health, HE 720 - Public Health Management, HE 730 - Fund Epidemiology, HE 740 - Environment & Human Health, HE 750 - Behavior & Soc Foundations with grade greater than or equal to D-.]

Credits: 1

HE 784 - Public Health Field Practice

Field experiences provide students with professional practice opportunities in which they apply public health knowledge to real-life public health issues in a public health or related organization. Field experiences will be conducted in local, state, federal, or international agencies and organizations and in private organizations that address significant public health issues.

Credits: 3

HE 797 - Independent Study in Public Health

Students will conduct an independent study under the guidance of a mentor who is a public health faculty member or public health professional with significant experience and background in public health. The independent program of study is expected to be defined and submitted in writing for approval by the director of the public health program prior to registration in the course.

Credits: 6

HE 840 - Health Policy Capstone Project

This course is the culminating experience in the MPH program. Students are expected to draw on the skills and knowledge that they acquired in their coursework and field placement to complete a major paper or similar written product that focuses on a public health issue. A presentation based on the project may also be given.

Credits: 2

HE 841 - Public Health Capstone

A culminating experience is required by the Council on Education for Public Health, the accrediting body of U.S. schools/programs of public health, for all students completing an MPH degree. The culminating experience (requires a student to synthesize and integrate the knowledge acquired in coursework and other learning experiences and to apply theory and principles in a situation that approximates some aspect of professional practice.+ Accordingly, this course provides an opportunity for students to complete a distinct work product (e.g., poster for a professional meeting and/or a written paper) based on the field practice experience, synthesizing knowledge gained and competencies mastered from MPH core and concentration courses. Students are also required to develop an electronic portfolio demonstrating knowledge and skills that they have gained during their global health training.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 784 - Field Practice with grade greater than or equal to D-.]

Credits: 3

HE 851 - Health Disparities

This course examines factors associated with racial/ethnic, socioeconomic, and gender disparities in health and healthcare as well as approaches to reduce or eliminate inequalities. The course will also examine social and other determinants of health and health disparities, as well as policy and community-level efforts to address health disparities.

Credits: 3

HI 101 - History of Western Civilization I

Examination of, and an attempt to define, the principles and assumptions before 1500 C.E. on which the Western way of life is based.

Credits: 3

HI 102 - History of Western Civilization II

Examination of, and an attempt to define, the principles and assumptions from 1500 C.E. to the present on which the Western way of life is based.

Credits: 3

HI 301 - 20th Century Europe

A survey of European political, social, economic, and cultural developments in the twentieth century.3 class hrs

Credits: 3

HI 302 - US Foreign Pol Since 1900

A survey of the foreign policy and diplomatic history of the United States from 1900 to present.3 class hrs

Credits: 3

HI 303 - Revolutions, Civil Wars

A study of the development and consequences of revolutions, civil wars, and wars of liberation throughout the world in the twentieth century.3 class hrs

Credits: 3

HI 304 - Twentieth-Century America

A study of the political, economic, and cultural history of the United States in the twentieth century.

Credits: 3

HI 305 - East Asian Civilization

An introduction to the culture and civilization of East Asia. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): IH 201 - Intellectual Heritage I, IH 202 - Intellectual Heritage II with grade greater than or equal to D-.]

Credits: 3

HI 306 - American Civil War and Reconstruction

A study of the political, social, and military events that marked the American Civil War and its aftermath. Also to be considered are broader questions such as the nature of courage, causes of conflict, reasons for victory or defeat in wars, and requirements of political leadership in democracy.

Credits: 3

HI 307 - Study in African Civ

A study of selected African civilizations and societies, focusing on the historical development of major types of African civilization and exploring common themes in African experiences. 3 class hrs

Credits: 3

HI 310 - History of Health Care Sci

This course examines the historical development of medical sciences and healthcare systems in the United States from the 1700s to the present. These developments and the social values they embody have shaped modern healthcare in many ways. Students will also develop their historical awareness by examining and discussing an assortment of books, articles, and art produced during the periods covered. 3 class hrs

Credits: 3

HI 311 - History of Modern Russia

A study of the history of Russia, with a brief review of earlier periods, but with the chief focus on the period of modernization that began in the 1860s, developed into the Communist system, and has recently entered a new phase of trying to integrate its own national traditions with the demands of modernity. 3 class hrs

Credits: 3

HI 312 - Asian-American History

A study of the history of Asian Americans from the mid-nineteenth century to present with an emphasis on immigration, immigration laws, anti-Asian movements, racism and resistance, labor, settlement, community formation, gender, and generations.

Credits: 3

HI 315 - Einstein, Bohr, and the Modern Physics Revolution

An examination of the lives and achievements of the great physicists of the first half of the twentieth century, including Albert Einstein, Niels Bohr, Werner Heisenberg, Wolfgang Pauli, and others, as they developed the basis of special relativity, general relativity, quantum physics, and nuclear physics. Considers the personal and philosophical dilemmas they faced, through an analysis of historical source materials such as letters, papers, and interview transcripts, and delves into the cultural impact of their work.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 200 - Survey of Physics, PY 202 - Introductory Physics II, PY 205 - Elements of Physics with grade greater than or equal to D-.]

Credits: 3

HI 322 - History of US Medicine and Public Health

An introduction to the historical development of medical practices and public health in American history.

Credits: 3

HI 323 - The Nuclear Age

This course seeks to improve students' understanding of the historical roots of the nuclear age, to stimulate questions about how film can shape and reflect public attitudes, and explores the legacy of nuclear weapons in the contemporary world. We will deal briefly with the issues surrounding the dropping of the atomic bombs on Japan in 1945, examine how both Japan and the U.S. have represented those events in film, and conclude by examining the four main ages of nuclear danger.

Credits: 3

HI 324 - Vietnam War in Film & History

This course examines two different ways of constructing the past, one by historians, the other by filmmakers. We will examine the origins of American involvement in Vietnam, and the course of the conflict from the late 1950s through disengagement in 1973. At the same time, we will watch films that illustrate the evolving way that the war has been represented between 1968 and 1989.

Credits: 3

HI 340 - Special Topics in History

Topics addressed in this course vary.

Credits: 3

HN 100 - Honors Orientation

Learn what it means to be a member of the University Honors Program, including requirements and benefits of participation. Through a series of discussions and reflective assignments, students will begin to explore how honors opportunities can help them achieve their goals.

Prerequisites & Notes

Student is a member of the Honors Program Student Cohort

Credits: 1

HN 200 - Honors Global Experience

Global learning is a critical analysis of and an engagement with complex, interdependent global systems and legacies (such as natural, physical, social, cultural, economic, and political) and their implications for people's lives and the earth's sustainability (from the AACU VALUES).

Prerequisites & Notes

Student is a member of the Honors Program Student Cohort

Credits: 3

HN 240 - Honors Topic

The topics addressed in the course vary. This course is designated to give students the opportunity to explore topics of relevance to Honors Program themes and objectives.

Prerequisites & Notes

Student is a member of the Honors Program Student Cohort

Credits: 3

HP 707 - Issues and Trends in Health Policy (cross-listed as PB 707)

This course provides an orientation to analytical and substantive components that are necessary for understanding current health policy issues. Students gain an awareness of the complexities of major issues, such as the uninsured, quality assessment and disparities in outcomes, their historical evolution, and the nature of how different interests and actors interact in shaping them. They also learn to apply commonly used frameworks for policy analysis to a range of current health policy issues and themes.

Credits: 3

HP 710 - Analytical Methods for Health Policy

This course presents an overview of techniques for analyzing health policy issues in business and governmental settings with an emphasis on financial analysis, including financial modeling, basic accounting, forecasting, program evaluation, cost-benefit analysis, and qualitative methods.

Credits: 3

HP 715 - Quality Measurement and Outcomes Analysis

This course presents techniques for measuring quality in healthcare and for analyzing clinical outcomes. It covers methodological, business, and policy aspects of this field. It provides students with the skills needed to understand and apply developing techniques as assessment of quality takes on increasing importance in healthcare.

Credits: 3

HP 725 - Risk Assessment, Critical Thinking, and Health

The basics of risk assessment as an analytical tool and its application to aid decision making on health issues are discussed. Examples are drawn from uses of risk assessment by health and environmental regulatory agencies, including the EPA, the FDA, the CDC, and others. Alternative techniques of risk assessment are presented. Examples from the literature and popular press are used to illustrate the application of critical thinking in the development of appropriate risk models

Credits: 3

HP 730 - Public Health Research and Epidemiology (cross-listed as HE 730)

This course introduces principles and quantitative and qualitative methods of epidemiologic analysis of infectious and noninfectious diseases threatening the health of the public. Methods of investigating the distribution and dynamics of disease in a population that leads to our understanding of etiologic factors, modes of transmission, and pathogenesis will be covered.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HP 750 - Intro to Statistical Methods with grade greater than or equal to D-.]

Credits: 3

HP 740 - Health Law and Regulation

This course provides students with tools of legal and regulatory analysis, presents principles of health law, and provides an overview of federal and state regulatory programs affecting the healthcare industry.

Credits: 3

HP 747 - Mental Health Policy and Services

This course focuses on the mental health services delivery system and how people with mental illness interact both with this system and with the overall community. This includes examining not only past and present public policy toward mental illness but also the various social perspectives and meanings that are associated with being mentally ill.

Credits: 3

HP 750 - Introduction to Statistical Methods (cross-listed as HE 710)

This course covers basic statistical techniques that are important for analyzing data arising from epidemiology, environmental health, biomedical, and other public health-related research. The main subject areas are descriptive statistics, elements of probability, statistical inference using parametric and nonparametric methods, and analysis of variance within the context of specific types of experimental designs. This course is the first part of a two-course sequence.

Credits: 3

HP 760 - Quantitative Methods

This is the second course in the statistics sequence. The course begins with a review of multiple regression and moves on to cover topics of non-linear regression, model building, hypothesis testing, and reporting of results. Topics covered include log linear models, bivariate dependent variables, sample design, data gathering, and data cleaning.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HP 750 - Intro to Statistical Methods with grade greater than or equal to D-.]

Credits: 3

HP 764 - Qualitative Methods for Health Research (cross-listed as SS 764)

This course prepares students to use qualitative research, alone or in combination with quantitative methods, for health program planning, monitoring, or evaluation. Following a unified introduction to qualitative research, students may pursue specific topics and methods that best suit their needs. All students will evaluate representative literature; formulate research questions; practice observation, interviewing and content analysis techniques; and develop a protocol and research plan consistent with ethical guidelines. Students will also learn the fundamentals of computer aided qualitative data analysis.

Credits: 3

HP 765 - Social History of Therapeutics

This course introduces students to the social history of selected healthcare professions and therapies. Particular attention will be given to examples of technology in the healthcare professions (to illustrate how tools shape practice). Students will also be introduced to archival documents and material culture (the study of objects, their manufacture, and their use) for their own studies. Owing to the rich medical and pharmaceutical heritage of Philadelphia, students will visit important permanent collections at local libraries and museums.

Credits: 3

HP 775 - Health Policies for Aging Adults

This health policy and regulation course focuses on the historical, economic, political, and cultural dimensions of Medicare, Medicaid and Social Security as applied to the elderly U.S. population. These large entitlement programs require attention as resources shrink and the number of aging adults expands. The course will focus on policy development.

Credits: 3

HP 780 - Sociology of Health and Medicine

This course explores a range of social phenomena and their impact on healthcare provision and on how we understand and attach meaning to health and illness. Students learn to understand and to apply various sociological approaches to medicine and to health policy.

Credits: 3

HP 785 - Advocacy and Health Policy

A systems approach to understanding how to advocate for improvements in policies and regulations. How values influence ideas and interpretation of outcomes. Students will identify an issue, explore options with stakeholders, develop a policy proposal, defend the ideas and assess the initial impact of their work. Community interface is required.

Credits: 3

HP 790 - Introduction to Health Economics

This course provides an introduction to and application of micro- and macroeconomics in the fields of healthcare provision and policy. Specifically, students are instructed in basic economic concepts: utility, marginal analysis, demand, elasticity, costs, supply, opportunity costs, market structure, and private, public, and social goods in terms of micro-economic theory, as well as national GDP, income, fiscal, and monetary policy described by the tenets of macro-economics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HP 750 - Intro to Statistical Methods with grade greater than or equal to D-.]

Credits: 3

HP 791 - Advanced Health Economics

This course applies economic theory to health policy issues and analysis. The focus is on current health policy debates, including insurance reform, the uninsured, hospital behavior, financing, and government involvement.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HP 790 - Intro to Health Economics with grade greater than or equal to D-.]

Credits: 3

HP 792 - Healthcare in Developing Countries

This course covers healthcare issues specific to low- and middle-income countries. It focuses on the role of health in development, financing of healthcare services, and evaluation of healthcare programs.

Credits: 3

HP 794 - Master's Capstone Paper

This course provides support and guidance for health policy students in the master+s program who are writing their master+s paper.

Credits: 2

HP 806 - Health Services & Policy I

This is the first of a two-course sequence that provides students with knowledge of the basic structure of the American healthcare system. This course provides a political science-oriented approach, where students examine the US health care system in terms of its key components and their interrelations, and refines their ability to identify health policy issues in terms of conflicts and underlying themes.

Credits: 3

HP 807 - Health Services & Policy II

This is the second of a two-course sequence that provides students with knowledge of the basic structure of the American healthcare system. Using an historical approach, the course covers the historical development of key elements of the healthcare system, and develops students+ ability to identify how institutions develop as a result of political and structural dynamics.

Credits: 3

HP 808 - Health Services and Policy

This course provides students with knowledge of the basic structure of the American healthcare system, in terms of its key components and their interrelations, and refines their ability to identify health policy issues in terms of conflicts and underlying themes

Credits: 3

HP 809 - Comparative Health Systems

This course presents a survey of health systems in industrialized and developing countries with emphasis on comparisons with the American system. Students are taught to understand the ways that health systems work in other countries and thereby to better analyze policy issues affecting American healthcare.

Credits: 3

HP 810 - Research Methods

This course will introduce students to evaluation and use of published research reports, ethical conduct of research, use of theories, models and conceptual frameworks, commonly used research methodologies, primary data collection methods, secondary data assessment, and dissemination of research findings.

Credits: 3

HP 812 - Public Health Infrastructure

This course focuses on the various systems that provide public health services. In addition to covering the basic concepts needed to understand public health infrastructure, the course focuses on Philadelphia in terms of local public health issues and providers. The central issues and principal providers related to public health in an urban setting, the degree to which this represents a coordinated infrastructure, and the gaps within this system are studied.

Credits: 3

HP 813 - Introduction to Research Design for Health Policy

This course will introduce students to evaluating and using published research reports, ethical conduct of research, use of theories, models and conceptual frameworks, commonly used research methodologies, primary data collection methods, secondary data assessment, and dissemination of research findings.

Credits: 3

HP 814 - Application of Research Methods in Health Policy

Students will collaborate to design and carry out small research projects considering conceptual frameworks, ethics, data collection and analysis, dissemination of findings. In parallel, students will develop brief project proposals and budgets for their own research topic.

Credits: 3

HP 820 - Proposal Writing

This course teaches doctoral students in health policy the elements of preparing a formal proposal for conducting research. Emphasis is placed on presenting analytical concepts in a clear and organized manner and on related writing skills that are applicable across a range of contexts.

Credits: 2

HP 821 - Proposal Writing and Progression Paper

This course provides support and guidance for health policy students in the PhD program to write a seminar-paper length, publishable piece of original research (referred to here as the progression paper). In addition, the course orients students to the process of taking comprehensive exams and starting on dissertation work.

Credits: 3

HP 850 - Public Policy Analysis

This course covers the processes of analyzing public policy decisions. Topics include description of the problem statement, modeling process to assess the economic feasibility of policy, implementation and enactment issues, and evaluation of outcomes.

Credits: 3

HP 880 - Ethical Issues in Healthcare

This course includes a critical examination of the central ethical issues in the field of health policy. There is a brief introduction to ethical theory and the various approaches to bioethics. Necessary background in moral philosophy is provided. The implications of ethical decision making for health policy are a central theme of this course.

Credits: 2

HP 890 - Health Policy Seminar

To provide students with an overview of the basic skills and tools needed to complete graduate-level work in health policy and public health. An introduction to the department, policy analysis, and graduate courses.

Credits: 1

HP 891 - Health Policy Seminar II

This course provides students with an overview of the basic skills and tools needed to complete graduate-level work in health policy and public health. An introduction to the department, policy analysis, and graduate courses.

Credits: 1

HP 899 - Doctoral Research

Doctoral students in health policy are required to fulfill their research requirements under the direction of the health policy faculty.

Credits: 12

HS 110 - Seminar for Health Sciences

This course will introduce and familiarize the student with the University. The emphasis will be on the development of skills for academic success and assimilation into the University. The course will also discuss the healthcare professions, cultural competency, and professionalism.

Credits: 1

HS 111 - Health Sciences Orientation II

Overview of health science professions with specific emphasis on professions represented in Samson College. Topics will include history of the professions, ethical issues, current healthcare issues, professional behaviors, and professional communication. The roles of various health professionals will be explored.

Credits: 1

HS 115 - Fitness & Health Management Orientation

This course is an introduction to the Fitness and Health Management major. An overview of the major and employment opportunities will be presented

Credits: 1

HS 120 - Health Science Orientation I

This course will introduce and familiarize the student with the University. The emphasis will be on the development of skills for academic success and assimilation into the University. The course will also discuss the healthcare professions, cultural competency, and professionalism.

Credits: 1

HS 205 - Health Care and Health Professions

This course will help students learn about the health care system in the United States and examine their career choices and opportunities in the health professions in light of those factors. Students will learn about the major health care issues that are likely to significantly impact professionals in the twenty-first century and match their interests and abilities with traditional and emerging professions. Students will also participate in active learning projects regarding medical terminology, information literacy, professional culture, and the educational requirements for various professions. 3 class hrs

Credits: 3

HS 210 - Health and Social Participation

Explores how participation in community and social activities affects the health of individuals and the community. Students engage in active and service-learning experiences to understand the teaching and learning process to facilitate an individual's participation in social activity. The student will be matched with community sites to develop innovative activity-based community projects and to assess and measure the health benefits of the project.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): CO 101 - Intro to

Communication, PS 101 - Intro to Psychology with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

HS 220 - Disability and Social Participation

This course will provide students with an opportunity to learn about the lived experience of persons with disabilities and their participation in society. In addition, students will study the role of the social, cultural, and physical environment in providing opportunities and/or barriers to participation of all persons. Students will participate in service-learning experiences to enhance their knowledge through interactions with people with disabilities during sports and leisure activities.

Credits: 3

HS 230 - Introduction to Mindfulness

This course will introduce students to the science and practice of mindfulness. Students will explore the physical, cognitive, and psychological effects of mindfulness practices and the use of mindfulness based interventions in healthcare. Students will also be introduced to several mindfulness practices, including mindfulness of the breath and body, thoughts, emotions, and the practice of compassion. This course is designed to be experiential in nature, and help students to establish a personal mindfulness practice.

Credits: 2

HS 240 - Stress Management & Resilience

The goal of this course is to discuss stress and its effect on health and wellness, and explore stress management and resilience-enhancing strategies from physical, cognitive, emotional, social, and spiritual perspectives. Students will define stress and explore theories of stress adaptation, understand the empirical basis of stress management interventions, experiment with physical, cognitive, emotional, social, and spiritual stress management strategies, and explore responses to failure and trauma.

Credits: 3

HS 260 - Peer Health Educator

This course provides an introduction to health education, health promotion and peer education. Students will develop communication, leadership, facilitation, and presentation skills while exploring topics relevant to the health and well-being of college students. Upon completion of the course, students will be prepared to serve as peer educators in one or more health domains/ topics. Students will also be eligible to take the BACCHUS/NASPA Certified Peer Educator certifying exam and upon successful completion of the exam, receive the Certified Peer Educator designation.

Credits: 3

HS 261 - Peer Health Educator II

This course provides further training in peer health education. Students will be mentored as they further develop their program planning and presentation skills. Students will also have the opportunity to provide health promotion workshops and presentations to the campus community under the guidance of faculty/ staff mentors.

Credits: 3

HS 310 - Human Learning

This course will present an overview of the major principles and theories of human learning that have evolved over the past century and how they have been applied in formal education and other contexts of human learning. There will be emphasis on understanding the complex issues of motivation, metacognition, and especially problem solving as a meaningful expression of

learning. Students will also have the opportunity to explore how the principles of learning have impacted their past educational experiences and will affect their future roles as patient/student educators, as well as the implications for their own personal development.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

HS 320 - Leadership in Service to the Community

This course will explore service learning, the foundations of leadership, and change theory. Students will analyze models of leadership, methods of leading, characteristics of effective leaders, and change implementation. Class participants will have the opportunity to apply knowledge gained from classroom discussions by participating in the service-learning activities focused on the administration of community programs.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

HS 330 - Health Promotion for the Elderly

This course will provide students with an opportunity to study the issues impacting the health of the older population. Students will learn how to successfully develop and implement health education programs for this population. Service-learning experiences will enhance students+ knowledge through interactions with the older population.

Credits: 3

HS 390 - Medical Terminology

This course is designed to teach medical terminology to all majors to assist students in the transition to the professional program or graduate school. This course will explore terminology and abbreviations by body systems to enable students to recognize, interpret and utilize medical terminology and abbreviations when reading medical literature, documenting in patient/client charts and working in the science and healthcare environment.

Credits: 2

HS 399 - Independent Study in Health Science

Available to students to work in an area of particular interest under the direction of a faculty member in the Samson College of Health Sciences. May be taken for one, two, or three credits.

Prerequisites & Notes

Student has received department permission for HS 399 - Ind Study in Health Science

Credits: 3

HS 400 - Interprofessional Education

This course will introduce students to the concept of interprofessional education and the core competencies for interprofessional collaborative practice which include: ethics for interprofessional practice, roles/responsibilities, interprofessional communication and teams/teamwork.

Credits: 2

HS 410 - Fieldwork

Fieldwork provides current or prospective health care students a chance to observe health care professionals in various workplace/clinical settings. The shadowing experience is designed to be an observation only experience lasting 45 hours.

Prerequisites & Notes

Student has received department permission for HS 410 - Fieldwork

Credits: 3

HS 415 - Falls in the Elderly Service Learning

The problem of falls has a profound impact on the physical functioning of community-dwelling elders and presents significant challenges to healthcare providers. This service-learning course is designed to give health professional students the opportunity to carry out health-related community service within the context of an academic-learning experience. Students will study the multiple issues regarding this specific problem, work with a community-based healthcare program to identify elders who are at risk for falls or who have a history of falling, integrate their academic and disciplinary backgrounds to determine risk factors for specific elders, and develop problem-solving skills to make recommendations for interventions to reduce those risks.

Credits: 3

HS 430 - Survey of Public Health

This survey course introduces students to major concepts and methods in public health practice. Topics include the history, scope, and techniques used by practitioners. Epidemiology, population-based health teaching, environmental health, and health policy will be explored using current events and basic economic principles to demonstrate the way that public health practitioners create and influence health policies and practices.

Credits: 3

HS 460 - Health & Wellness

This course will use a health and wellness continuum. Lifestyle management will be studied including health life decisions about levels of physical activity, eating habits and obesity, tobacco and substance use and abuse, responsible sexual behaviors, mental health, ways to avoid injury, violence prevention, environmental quality, importance of immunization and access to health care

Credits: 3

HS 480 - Fitness, Sport, & Health Management

This course will introduce students to sport principles as they apply to management, leadership style, communication, and motivation.+T-+ Students will learn about a career in the industry and acquire the knowledge and skills needed to be an effective trainer or coach

Credits: 3

HS 481 - Training Practicum I

Students will demonstrate their understanding of sport and recreation principles as they apply to management, leadership style, communication, and motivations and a career in the industry by participating in a practicum.+T-+ Students will begin to practice the knowledge and skills needed to be an effective athletic director, fitness coach or industrial health promoter

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 480 - Fitness, Sport, & Hlth Mgmt with grade greater than or equal to D-.]

Credits: 3

HS 482 - Training Practicum II

Students will demonstrate their leadership, program management skills, communication abilities and integration of classroom and experiential learning in a practicum.+T-+ Students will understand the context of program management and outcomes management

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 481 - Training Practicum I with grade greater than or equal to D-.]

Credits: 3

HS 499 - Advanced Independent Study in Health Science

Available to students to work in an area of particular interest under the direction of a faculty member in the Samson College of Health Sciences. May be taken for one, two, or three credits.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 399 - Ind Study in Health Science with grade greater than or equal to D-.]

Credits: 3

HS 521 - Teaching in Health Professions

This course teaches the essential aspects of course design and how to teach in higher education based upon current evidence-based educational literature. This course emphasizes developing teaching/learning and assessment activities in the student's own discipline.

HS 615 - Falls in the Elderly Service Learning

The problem of falls has a profound impact on the physical functioning of community-dwelling elders and presents significant challenges to health care providers. This service-learning course is designed to give health professional students the opportunity to carry out health-related community service within the context of an academic-learning experience. Students will study the multiple issues regarding this specific problem, work with a community-based healthcare program to identify elders who are at risk for falls or who have a history of falling, integrate their academic and disciplinary backgrounds to determine risk factors for specific elders, and develop problem-solving skills to make recommendations for interventions to reduce those risks. 3 class hrs

Credits: 3

HU 101 - Orientation to Humanities

Introduction to the various disciplines that constitute the humanities and the ways they may be studied at USciences. Consideration of how the humanities relate to other disciplines in the sciences, social sciences, and fine arts. Designed for majors in humanities, but open to all interested students.

Credits: 1

HU 301 - Studies in Film

This course is designed to familiarize students with the basic terminology of film analysis and criticism and features or conventions of several genres of film. A variety of classic Hollywood, foreign, and contemporary films will be examined as works of art and as valuable social, historical, and cultural artifacts.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

HU 302 - American Culture: The 1920s

Literature and the arts seen in the cultural context of the decade of the 1920s.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

HU 303 - American Culture: The 1930s

The study of American life in the 1930s using contemporary documents, literature, film, art, and music as sources.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

HU 304 - Victorian Culture

A study of the culture of Victorian England, 1830s to 1870s, emphasizing the conflict and divisions within the period, using historical documents, essays, literature, and art. 3 class hrs

Credits: 3

HU 305 - The Vietnamese-American Experience

A study of the history, literature, culture, and social experience of Vietnamese Americans from the first wave of refugees in 1975 to the present time.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

HU 313 - Quijote & Hisp Anti-Heroes

A study of significant works of Hispanic literature notable for their anti-hero (or anti-heroine), read in English translation, with emphasis on their complexities as works of art, and the relationship of literature to life. This course will also highlight the culture from which each work emerged and which it engages. 3 class hrs

Credits: 3

HU 315 - Spain through Art, Literature, and Film

A chronological survey of Spain with emphasis on the artistic works that have defined it and have contributed to the culture of the Western world.

Credits: 3

HU 317 - Medicine and Hispanics

This course explores medical and health issues among Hispanics/Latino/as from a multi-disciplinary perspective (film, literature, political science, anthropology). Special attention will be paid to helping students gain an understanding of how diverse the Hispanic/Latino population is, its historical presence in the US through conquest and immigration, the current health and medical issues affecting this population, and various policies targeting this population.

Credits: 3

HU 319 - Queer Film

This course is an introduction to some of the best queer (LGBTQ) films made in the last few decades. In attempting to answer (what is queer film?) we'll examine a range of film styles and themes related to queer identity, and explore how these portrayals shape and reflect public attitudes.

HU 325 - Art Masterpieces

This course asks "what is a masterpiece?" and identifies specific works of art from Ancient Greece to the mid-20th century that are universally hailed as masterpieces. We'll investigate how such works developed and functioned, how they looked and were experienced, as well as the effect they had on later art.

Credits: 3

HU 335 - Views of the Cosmos

An introduction to the study of the universe from scientific, religious, and philosophical standpoints. Surveys mankind's efforts to understand the nature of the cosmos, including its origins, evolution, and eventual demise. Viewpoints of many religious groups, cultures, and scientific thinkers will be discussed and compared. Contemporary debates in cosmology will be fully explored without mathematics.

Credits: 3

HU 337 - Literature & Film of the Holocaust

A historical, philosophical and literary perspective on causes, effects, and legacy of the Holocaust, 1933-1945. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): EN 101 - College Composition, WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): EN 102 - Intro to Literature with grade greater than or equal to D-.]

Credits: 3

HU 340 - Special Topics in Humanities

The topics addressed in this course vary.

Credits: 3

HU 399 - Independent Study-Humanities

Independent study projects.

Prerequisites & Notes

Student has received department permission for HU 399 - Independent Study-Humanities

Credits: 3

HU 470 - Social History of Therapeutics

This cross-disciplinary course introduces the social history of medical therapy in the United States. Using both primary and secondary sources, it emphasizes the social development of healthcare professions. In particular, to illustrate how tools shape practice, the course considers examples of technology in medicine. By examining artifacts and print materials, students will analyze their meaning and significance within both a social history and therapeutic context.

Credits: 3

HU 494 - Pre-Capstone

A preparatory independent study course, usually taken in the semester before graduation, that precedes HU 495, the senior capstone course for Humanities majors. In this course, students identify and refine their research topics, compile and read relevant sources, and begin the process of writing the first draft. Other projects, artistic or otherwise creative in nature, are subject to requirements specified by the faculty supervisor. Completed projects are usually in the 20-30 page range.

Prerequisites & Notes

Student has received department permission for HU 494 - Pre-Capstone

Credits: 3

HU 495 - Senior Seminar

A study organized around an interdisciplinary theme that represents the interests of the participating faculty and students.

Credits: 3

HU 498 - Directed Study in the Humanities

Directed study opportunities in the humanities are available to motivated students, enabling them to expand their knowledge in an area of particular interest under faculty direction. The student must plan the directed study project with the department faculty during the semester preceding the semester in which the study is to begin.

Prerequisites & Notes

Student has received department permission for HU 498 - Directed Study Humanities

Credits: 3

IF 701 - Introduction to Health Informatics

This course introduces the fundamentals of health informatics, beginning with technology and the health IT (HIT) landscape. It presents the architecture behind modern data collection, processing, and exchange mechanisms while emphasizing electronic health records (EHRs) and interoperability. Evidence-based practice (EBP) and relevant theories underscore the importance of leveraging IT in healthcare. Other topics include HIT history, data privacy and security, quality measures, and regulations and legislation shaping HIT compliance.

Credits: 3

IF 702 - Understanding Health Information Systems

This course provides an overview of the computer science and information systems that structure health information technology (HIT). Its detailed exploration of health information systems emphasizes electronic health records (EHRs), sources and utilization of data, the transformation of data and information into knowledge and wisdom, and relevant entities shaping data usage and exchange.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): IF 701 - Intro to Health Informatics with grade greater than or equal to D-.]

Credits: 3

IF 703 - Data Management and Utilization

This course covers the core concepts of data management, quality assurance, and healthcare data utilization in depth, emphasizing effective ways of leveraging Big Data to improve healthcare and optimize business gains. Other key components include database management, major programming languages and coding standards, machine learning/artificial intelligence (AI), data mining, predictive analytics, and decision-support systems (DSSs).

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): IF 702 - Health Information Systems with grade greater than or equal to D-.]

Credits: 3

IF 704 - Strategic Planning in Healthcare Informatics

This course reinforces key informatics concepts in relation to relevant management, leadership, and strategic planning mechanisms. In-depth coverage of the SDLC and health information processes includes needs assessment, RFI/RFP formulation, implementation, and evaluation of projects. The course will also cover change management theories and techniques, project management, expectation management, resource allocation, and leadership tools.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): IF 703 - Data Management Utilization with grade greater than or equal to D-.]

Credits: 3

IS 105 - Introduction to Online Information

An introduction to finding and evaluating information available in electronic formats. The skillful use of search engines and databases, the construction of effective searches, and the critical evaluation of search results will be emphasized. Elective course for any interested student.

Credits: 1

IS 205 - Scientific Information

This course explores the literature of science with particular attention to the literature of the life sciences. Students will learn the types of scientific literature, how to identify the information needed for a particular purpose, and how to find the needed information. The course includes citation managers, non-bibliographic databases, and ethical issues.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater

than or equal to D-.]

Credits: 1

LA 101 - Elementary Latin I

Elementary basic knowledge of Latin grammar, syntax, and vocabulary and the study of simple literary texts.

Credits: 3

LA 102 - Elementary Latin II

Development of the knowledge of Latin morphology and syntax. Reading from classical texts.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): LA 101 - Elementary Latin I with grade greater than or equal to D-.]

Credits: 3

MA 100 - Algebra

Simplifying polynomials, exponents, factoring, rational expressions, complex fractions, linear equations, linear literal equations, non-linear equations, systems of linear and non-linear equations, inequalities, equations of lines, introduction to functions, domain of basic functions and applications. This course does not satisfy the general education mathematics discipline requirement and credits may not be used for graduation.

Credits: 3

MA 104 - College Algebra

Introduction to functions and graphs, linear functions and equations, quadratic functions and equations, nonlinear functions and equations, exponential and logarithmic functions, systems of equations and inequalities, modeling data and solving multidisciplinary application problems. This course is designed for students not required to take calculus or physics.

Prerequisites & Notes

(Prerequisite: MA 100 or placement)

Credits: 3

MA 107 - Precalculus

Introduction to functions and graphs, polynomial functions, rational and radical functions, exponential and logarithmic functions, systems of equations, right triangle trigonometry, and trigonometric functions. Functions are used for modeling data and solving multidisciplinary application problems. This course is for students required to take calculus or physics.

Credits: 3

MA 108 - Trigonometry

Topics include Angle Measurements; Triangles; Trigonometric and Inverse Trigonometric Functions and Graphs; Solving Trigonometric Equations; Essential Trigonometric Identities; Laws of Sine, Cosine, and Tangent; Vectors; Parametric Equations; Polar Coordinates. This course will emphasize application and modeling problems related to the topics.

Prerequisites & Notes

(Prerequisite: MA104 or MA107 or placement)

Credits: 3

MA 110 - General Calculus

Topics include limits, continuity, rates of change, derivative and techniques of differentiation, analysis of functions using derivatives, relative and absolute extrema, concavity, optimization, implicit differentiation, related rates, and definite and indefinite integral, area, and integration techniques. Calculus techniques are used for modeling data and solving multidisciplinary application problems. This course is recommended for students who will not take MA 221, Calculus II.

Prerequisites & Notes

(Prerequisite: MA107 or placement)

Credits: 3

MA 122 - Calculus I

Covers limits, continuity, rates of change, derivative and techniques of differentiation, analysis of functions using derivatives, relative and absolute extrema, concavity, optimizing functions, implicit differentiation, related rates, linear approximations, definite and indefinite integrals, integration techniques, and areas. Calculus techniques are used for modeling data and solving multidisciplinary application problems. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 107 or permission of instructor)

Credits: 4

MA 201 - Mathematical Analysis III

Review of definite and indefinite integrals, areas between curves, volumes, average value of a function, integration by parts, partial fractions, improper integrals, approximate integration, arc length, area of a surface of revolution, differential equations and applications, parametric curves, and polar coordinates. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 102 or permission of instructor)

Credits: 4

MA 202 - Mathematical Analysis IV

Study of vectors, lines and planes, three-dimensional surfaces and curves, functions of several variables, partial derivatives, tangent planes, maximum and minimum values, Lagrange multipliers, double integrals, triple integrals, spherical and cylindrical coordinates, vector fields, line integrals, parametric surfaces, sequences, series, convergence tests, power series, and Taylor series. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 201)

Credits: 4

MA 221 - Calculus II

Review of definite and indefinite integrals, areas between curves, volumes, average value of a function, integration by parts, partial fractions, improper integrals, approximate integration, arc length, area of a surface of revolution, differential equations and applications, parametric curves, and polar coordinates. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 102 or MA 122 or permission of instructor)

Credits: 4

MA 222 - Calculus III

Study of vectors, lines and planes, three-dimensional surfaces and curves, functions of several variables, partial derivatives, tangent planes, maximum and minimum values, Lagrange multipliers, double integrals, triple integrals, spherical and cylindrical coordinates, vector fields, line integrals, parametric surfaces, sequences, series, convergence tests, power series, and Taylor series. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 221 or permission of instructor)

Credits: 4

MA 310 - Mathematical Foundations of Neuroscience

Topics include Differential Equations, Introduction to Dynamical Systems, the Hodgkin-Huxley Equations, and Mathematical Modeling with an emphasis on Neuroscience. Mathematical software will be used throughout the course.

Prerequisites & Notes

(Prerequisite: MA 221)

Credits: 3

MA 314 - Discrete Mathematics

This course provides the mathematical background suitable for a better understanding of, or further study in, mathematics and computer science. Topics will include propositional logic, set theory, relations, functions, proof by induction, combinations, graph theory, and Boolean algebra.

Prerequisites & Notes

(Prerequisite: MA 110, MA 122 or MA 102)

Credits: 3

MA 315 - History of Mathematics

A study of the development of mathematics and mathematical reasoning over the centuries, with special emphasis given to the contributions of many cultures and special focus given to the antecedents and future directions of modern mathematical topics and methods.

Prerequisites & Notes

(Prerequisite: MA 110, MA 122 or MA 102)

(Note: not offered every year)

Credits: 3

MA 316 - Linear Algebra

Study of systems of linear equations, matrices, vector spaces, linear transformations, determinants, inner products, eigenvalues, eigenvectors, similarity, diagonalization, and quadratic forms.

Prerequisites & Notes

(Prerequisite: MA 110, MA 122 or MA 102)

Credits: 3

MA 320 - Differential Equations

Course covers ordinary differential equations: first order equations, techniques of finding analytic and numerical solutions, higher order differential equations with constant coefficients, solving equations using Laplace transform, analyzing solutions of systems of equations, and multidisciplinary applications.

Prerequisites & Notes

(Prerequisite: MA 221 or MA 201)

Credits: 3

MA 321 - Fourier Analysis

Study of mathematical theory of Fourier series and the Fourier transform. Includes solutions to partial differential equations using separation of variables and Fourier series. Also covers applications of the Fourier transform.

Prerequisites & Notes

(Prerequisite: MA 320)

(Note: not offered every year)

Credits: 3

MA 330 - Geometry

A course in Euclidean and non-Euclidean geometries with emphasis on foundations, theories, proof, interconnections, and contemporary applications.

Prerequisites & Notes

(Prerequisite: MA 222 or MA 202)

(Note: not offered every year)

Credits: 3

MA 340 - Introduction to Graph Theory

This course is designed as an introduction to graph theory. Topics that will be covered include applications of graphs and digraphs, Eulerian graphs and digraphs, Hamiltonian graphs and digraphs, path algorithms, trees, planarity, coloring graphs, and maps.

Prerequisites & Notes

(Prerequisite: MA 221 or MA 201 or permission of department)

(Note: not offered every year)

Credits: 3

MA 355 - Mathematical Methods for the Physical Sciences (cross-listed as PY 355)

An introduction to mathematical methods used in physics and the physical sciences such as vector calculus, Fourier analysis, vector spaces and matrices, special functions, and partial differential equations. These topics are introduced in the context of specific problems in various areas of physics and physical science such as fluid dynamics, electricity and magnetism, quantum mechanics, thermodynamics, biophysics, and mechanics.

Prerequisites & Notes

(Prerequisites: PY 212 and MA 222 or MA 202)

Credits: 3

MA 360 - Topics in Mathematics with Applications to Chemistry

The following topics are covered: 1. Fourier transform, complex functions, and Fourier series with emphasis on applications to nuclear magnetic resonance and signal processing. 2. Groups, groups of symmetries, classes of groups, and subgroups, with emphasis on applications to chemistry. 3. Basics of programming and its application to recursive formulas in chemistry. Appropriate technology is used extensively throughout the course.

Prerequisites & Notes

(Prerequisite: MA 221 or MA 201)

Credits: 3

MA 370 - Mathematical Methods for the Physical Sciences I (cross-listed as PY 370)

This course, the first of the two-course sequence, is an introduction to mathematical methods used in physics, chemistry, and physical and related sciences: vector calculus, functions of complex variable, Fourier series, Fourier transform, series solutions of ordinary differential equations, and introduction to group theory.

Prerequisites & Notes

(Prerequisite: MA 222 and PY 212, or permission of instructor)

Credits: 3

MA 371 - Mathematical Methods for the Physical Sciences II (cross-listed as PY 371)

This course, the second of the two-course sequence, is an introduction to further mathematical methods used in physics, chemistry, and physical and related sciences: special functions and partial differential equations. These topics are introduced in the context of specific problems in various areas of physics and physical science such as fluid dynamics, electricity and magnetism, quantum mechanics, thermodynamics, biophysics, and mechanics.

Prerequisites & Notes

(Prerequisite: MA 320 and PY 370/MA 370, or permission of instructor)

Credits: 3

MA 410 - Numerical Analysis

Covers methods of root finding, solving linear and nonlinear systems, interpolation, data fitting and approximation, numerical differentiation and integration, and numerical solution to differential equations.

Prerequisites & Notes

(Prerequisite: MA 320 or permission of instructor)

(Note: not offered every year)

Credits: 3

MA 415 - Abstract Algebra

Provides an introduction to the theories, proofs, and methods of abstract algebra.

Prerequisites & Notes

(Prerequisite: MA 110, MA 122 or MA 102)

(Note: not offered every year)

Credits: 3

MA 422 - Mathematical Modeling

An introduction to the basic formulation of mathematical models with an emphasis on the health and natural sciences. Topics will include discrete and continuous models, dimensional analysis, steady states, and stability.

Prerequisites & Notes

(Prerequisite: MA 221 or MA 201)

(Note: not offered every year)

Credits: 3

MA 425 - Chaos and Nonlinear Dynamics (cross-listed as PY 425)

This course introduces the theoretical foundations of nonlinear dynamics and chaos. Phase space analysis, bifurcations, routes to chaos, renormalization and universality, fractals and strange attractors are presented for a variety of nonlinear systems including maps and flows. Several examples are used to illustrate the theory, from mechanical vibrations, superconducting circuits, chemical oscillations to biological rhythms and neuroscience. Simulations are used throughout the course either by numerical computations with Matlab, Mathematica, or specific software packages.

Prerequisites & Notes

(Prerequisite: MA 310 or MA 320)

Credits: 3

MA 430 - Differential Geometry

The course introduces the main ideas and techniques of differential geometry, a mathematical discipline that studies geometry using methods of multivariable calculus. Topics include the theory of curves (arc length, velocity and acceleration vectors, curvature and torsion, moving frame) and the theory of surfaces (tangent plane, curvature, Theorema Egregium, fundamental forms, flux, geodesics, curvature tensor, manifolds).

Prerequisites & Notes

(Prerequisite: MA 222 or MA 202)

Credits: 3

MA 490 - Special Topics or Research in Mathematics

Study of one or two topics in mathematics not included in other courses offered by the department. These topics would ordinarily be designed to follow one-semester courses in at least one of the following: advanced calculus, differential equations, or linear algebra. The course may be taken more than once for credit, provided the topics covered are sufficiently different or if the course represents a research project.

Prerequisites & Notes

(Prerequisite: permission of the department)

(Course is repeatable for credit)

Credits: 1 to 3

MA 725 - Advanced Nonlinear Dynamics (cross-listed PY 725)

The course covers advanced topics in chaos and nonlinear dynamics including center manifolds, homoclinic and heteroclinic tangles and chaotic transport, topology of chaos-branched manifolds, invariant sets, and universality. Also, the symmetry of chaos, chaos in Hamiltonian and conservative systems, KAM theorem, stochastic layers and diffusion, and chaos in quantum systems. Theory will be applied to various systems in physics, chemistry, biology, and other fields. Numerical and computational techniques will be presented and used in the applications.

Prerequisites & Notes

(Prerequisite: PY425 or MA425)

Credits: 3

MC 310 - Introduction to Cannabis Industry

This course provides an introduction to the cannabis industry in the US. The student will learn about federal and state laws affecting the industry and how stakeholders operate in the environment. The student will also learn about medical uses of cannabis and the endocannabinoid system which will provide a basic understanding of the pharmacology of cannabinoids. The course will further explore cannabis business opportunities and challenges.

Credits: 3

MC 320 - Health Communication in the Cannabis Industry

This course introduces principles and techniques of health communication to inform, educate and empower. The focus will be on communicating through various media channels about cannabis, such that patients can make informed decisions about use of medical cannabis and their health. Students will create multiple products for group critique with the goal of developing communication skills and competency.

Credits: 3

MC 330 - Cannabis Marketing and Sales

The course will provide an overview of the US cannabis market, including medical cannabis, adult use and the hemp industries. The student will learn basic marketing and sales techniques and how they are applied in the cannabis industry. An emphasis will be placed on the dispensary.

Credits: 3

MC 340 - Supply Chain Management in the Cannabis Industry

Students will learn the basics of the supply chain specific to the cannabis industry. The course will provide an overview of how the flow of products, information, and revenue proceed throughout the supply chain. Emphasis will be placed on the dispensary worker's role in the process.

Credits: 3

MC 701 - Introduction to the Cannabis Industry

Cannabis is an evolving industry, with industry experts predicting it has the potential to transform not just medicine but our economy and culture. In this course, you'll review the history of cannabis use in the United States from a legal and cultural standpoint, which will provide a good foundation for understanding the state of the industry. You'll also learn about the cannabis plant and cannabis pharmacology, the risks and dilemmas faced by cannabis businesses and users today and the many opportunities in the industry.

This course will provide a basic understanding of the regulations and financing framework currently shaping the cannabis industry. Topics include federal and state laws affecting the growing, processing and sale of cannabis with a focus on taxation, banking, and financing methods such as venture capital, relevant to operating a cannabis business.

Credits: 3

MC 703 - Cannabis Marketing and Sales

This course covers the distinctive features of the cannabis market in the United States, including the medical cannabis, adult-use, and hemp industries. Students will examine different strategies for marketing cannabis, such as email marketing, sampling products, pop-up shops, and collateral materials. In this course, students will review relevant consumer demographic data and gain an understanding of the marketing and sales laws from different agencies and corporations, such as the U.S. Food and Drug Administration (FDA) and Federal Trade Commission (FTC). Students will have the opportunity to develop a comprehensive, cross-functional tactical and promotional plan.

Credits: 3

MC 704 - Supply Chain Management in the Cannabis Industry

This course will help students develop the skills necessary to conceptualize, design, and implement supply chains specific to the cannabis industry. The course will cover managing the flow of products, information, and revenue streams across the supply chain and gaining an understanding of the ancillary businesses that support the cannabis industry.

Credits: 3

MC 710 - Cannabis Pharmacology

This course will provide an overview of the physiology of the endocannabinoid system and an intensive review of the pharmacology, pharmacokinetics, and pharmacodynamics of tetrahydrocannabinol (THC), cannabidiol (CBD), and other cannabinoids.

Credits: 3

MC 711 - Pharmacognosy of Cannabis

This course will provide an overview of the pharmacognosy (the study of medicines produced from natural sources) of cannabis, the botanical classification of cannabis, and the chemistry, biosynthesis, and activity of the chemical compounds found in cannabis.

Credits: 3

MC 712 - Medical Uses of Cannabis: From Theory to Practice

This course provides a list of selected qualifying conditions currently thought to benefit from cannabis use. In this course, students will examine the literature supporting the use of cannabinoids in the treatment of neurological, gastrointestinal, and psychiatric conditions. Students will also review key components of patient communication and education.

Traces the various (world views) that have dominated Western thought since the Renaissance. These outlooks resulted from revolutions in the spheres of religion, ethics, science, philosophy, art, music, and the social order.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 211 - Infinity

Consists of an in-depth study of how cultural and personal beliefs about infinity influenced the development of quantitative reasoning and science over the centuries. The course will focus on the antecedents of modern beliefs about infinity and on differing cultural notions of infinity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

MD 212 - Nature

Introduces students to divergent perspectives of nature over time and across cultures. The material is presented in four units, examining varying cultural attitudes and conceptualizations of nature as a creative, preservative, and destructive force and will include an examination of political, social, and economic factors affecting nature during our own time.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

MD 213 - Power, Democracy & Oppression

Introduces students to the history of political power structures, focusing on the fundamental concepts of power, democracy, and oppression. The course is structured around nine themes (such as absolutism, totalitarianism, and democracy) related to modern political institutions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 214 - Time

historical, and multicultural, covering diverse fields such as physics, medicine, psychology, sociology, religion, art, and

philosophy.

Prerequisites & Notes

Student has satisfied all of the following: [Latest Class Standing in the selection list U1] And Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

MD 215 - Self and Others

How do we recognize difference in our selves and in others? How is our understanding of the world influenced by stereotypes, curiosity, or fear? From maps and photography to bedtime stories, this class will explore the motivations and methods for knowing our selves and how we relate to others. We will experiment with ideas of empowerment and exploitation from the perspective of minority and majority communities. Themes that we will cover will include language, technology, disability, archives and museums, gender, visual arts and aesthetics, religion, and popular culture.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 216 - Intro to Animal Studies

This course provides an overview of Animal Studies, a new interdisciplinary field that explores the relationships between human and non-human animals. From a humanities perspective, the historical and current use of animals by humans as companions, food, labor aids, entertainment, and as artistic as well as scientific test subjects are examined for their ethical, political, social, and cultural implications; from a scientific perspective, biology, zoology, psychology, medicine, and climate studies, to name just a few, provide the requisite scientific premises underpinning the field. Students will learn, discuss, and write about a variety of topics such as animal testing, animal farming, keeping pets, animal rights, and the use of animals in entertainment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

MD 217 - The Modern Olympic Games

The purpose of this course is to critically examine the Olympic Games from multiple perspectives including the history, politics, economics, and cultural impact of the modern Olympic movement, as well as the athlete experience. We will also explore the development of the Paralympics and adapted sport. We will discuss and analyze the events of the most recent years(or concurrent) Olympic and Paralympics and compare these events to scholarly works.

Credits: 3

MD 218 - What Is Piracy?

What is Piracy? explores the socioeconomic, political and geographical conditions and themes that emerge when comparing different pirate cultures and their oppositions across history. When those conditions and themes are applied to modern global issues (copyright infringement, depleting natural resources, blackmarket trade, etc.), who exactly are pirates today and should they be stopped?

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest

Class Standing in the selection list U1]

Credits: 3

MD 220 - Darwin's Legacy

This course examines the ways in which Charles Darwin's theory of evolution is expressed in popular culture. Particular attention will be paid to the nature/nurture debate prior to the nineteenth century, the rise and influence of social Darwinism, scientific racism, eugenics, and the transhuman movement. Forms of discourse studied will include scientific literature, philosophical texts, film, and popular culture.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 221 - Medicine & Culture

This course covers major concepts, theories, events, developments, and figures in medicine. Students will gain enhanced appreciation for the rich history of the profession, knowledge of famous individuals and important medical theories and trends, a deeper understanding of major developments in basic science and patient care, and an augmented perspective on how medicine might change throughout their careers. The course is organized thematically (history of anatomy, physiology, etc.) rather than chronologically, which will allow a sharper focus on issues of interest to students.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 222 - Gender, Race, & Justice

Using insights from the disciplines of anthropology, sociology and history, this course will examine how race, class and gender shape our lived experiences related to justice. The course will also explore the ways in which theoretical and academic knowledge can be integrated with personal and political action in our communities.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MD 223 - Nature & Spirituality

This course will focus on nature-centered spirituality with an emphasis on environmentalism and its relationship to the development of nature-based spirituality. While ancient shamanism, goddess traditions, and indigenous belief systems will be introduced, the primary focus of the course will be on spiritual practice within the contemporary environmental movement.

Credits: 3

MD 225 - Ancient Science

This course draws upon the cultural context, social history, and literary, documentary, and material evidence for ancient scientific

theory and its associated historical contexts and cultural practices, in order to make a philosophical inquiry into the causes of the development of science primarily in the ancient Mediterranean but also in other well documented regions, the constitutive criteria and exceptional cases by which paradigms of ancient science were established and overturned, and the modes of literary discourse through which scientific knowledge was recorded and communicated.

Prerequisites & Notes

Prerequisite: WR 101

Credits: 3

MD 250 - The Master Builders

The Master Builders is a Multidisciplinary course that explores how writing, literature, and our built environment reflects a culture+s history, values, and vision. How can literature and environmental studies help us gain insight into a society+s built spaces or architectural texts? And finally, how can these multidisciplinary explorations allow us to appreciate (or challenge) the power of great (or dangerous) ideas?

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Latest Class Standing in the selection list U1]

Credits: 3

MI 101 - Misher Studies Orientation

Introduction to the University's majors and other programs and to the University resources available to students. Students also will learn study and other personal skills needed for academic success.

Credits: 1

MI 110 - Intro Health/Medical Profs

Students will learn about professional careers in health and medicine and the process for becoming a health or medical professional. Students will develop plans for meeting professional school requirements.

Credits: 1

MI 190 - Pre-Pharmacy Orientation

Students will: learn about campus services supporting academic success and develop their own plans for academic success; apply principles and practices of cooperative teamwork; begin to adopt exemplary personal and professional ethical standards; develop interpersonal communication and presentation skills; and begin to be self-directed learners.

Credits: 1

MI 201 - History & Physical Exam I

This course is the first of a two-part sequence designed for pre-PA students who are having their first experiences with patients. The focus is on history taking and physical exam skills. Students will develop interviewing skills to establish relationships with their patients, assess overall patient health, and learn how to take a proper medical history. The healthy individual will be used as a reference point to learn basic physical examination techniques. Students will gain laboratory experience in the Clinical Skills Lab and acquire knowledge to perform and present both a focused History & Physical Exam. The assessment of cultural and socio-economic aspects of health will be highlighted.

Prerequisites & Notes

Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci:

Biomedical Sciences with Physician Assistant Studies (BS)] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to C]

Credits: 3

MI 202 - History & Physical Exam II

This course is the second of a two-part sequence designed for pre-PA students who are having their first experiences with patients. The focus is on history taking and physical exam skills. Students will develop interviewing skills to establish relationships with their patients, assess overall patient health, and learn how to take a proper medical history. The healthy individual will be used as a reference point to learn basic physical examination techniques, normal laboratory values and normal imaging. Students will gain laboratory experience in the Clinical Skills Lab and acquire knowledge to perform and present both a complete History & complete Physical Exam. Physical examination skills for the respiratory, cardiovascular, gastrointestinal, neurological, and musculoskeletal systems will be focused.

Prerequisites & Notes

Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Biomedical Sciences with Physician Assistant Studies (BS)] And Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): MI 201 - History & Physical Exam I]

Credits: 3

MI 300 - PA Interview Seminar

This course examines the importance of interviewing for PA school. Communication skills both verbal and nonverbal are addressed. Students will learn and practice the patient interview as well as the professional interview. Medical ethics will also be addressed.

Prerequisites & Notes

Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Biomedical Sciences with Physician Assistant Studies (BS)] And Student has satisfied all of the following: [Student has satisfied all of the following: [Latest Class Standing in the selection list U1] Or Student has satisfied all of the following: [Latest Class Standing in the selection list U2] Or Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3]]

Credits: 1

MT 102 - Medical Technology Orientation II

Detailed description of med tech responsibilities and on-site lab visits. Discussion of current topics in science and healthcare.

Credits: 1

MT 201 - Medical Technology Seminar II

Emphasis is on reading and discussion of current journal articles in medical laboratory science and student preparation of a research paper. Review of application for internship positions, including resume preparation and interviewing skills.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MT 101 - Med Tech Orientation I, MT 102 - Med Tech Orientation II with grade greater than or equal to D-.]

Credits: 1

MT 218 - Hematology

Study of the blood and blood-forming tissues with emphasis on the cellular morphology and hematopoietic mechanisms of the red blood cells, white blood cells, and platelets. Also covers a wide variety of clinical disorders, particularly those involving abnormally formed cellular elements and coagulation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Medical Laboratory Science (BS)]

Credits: 3

MT 348 - Clinical Microbiology

A survey of the various bacteria that cause human infections. The type of infection caused, portal of entry, molecular basis of the infection process, treatment, and laboratory identification are discussed for each group of organisms.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): BS 243 - Microbial Science, BS 244 - Microbial Science Lab with grade greater than or equal to D-.]

Credits: 4

MT 399 - Independent Study in Med Tech

Examines clinical laboratory science topics of special interest not included in structured courses. Current issues, trends, or research in such clinical areas as hematology, microbiology, biochemistry, immunohematology, or immunology-serology may be explored by qualified students. A course may be elected more than once.

Credits: 2

MT 490 - Clinical Hem-Coagulation

Covers composition and function of blood, diseases related to blood disorders, and the role of platelets and coagulation. Includes manual and automated techniques of diagnostic tests for abnormalities.

Credits: 8

MT 491 - Clinical Immunohematology

Blood antigens, antibodies, crossmatching, hemolytic diseases, and related diagnostic tests and component preparation are covered. Includes in-depth study of blood donor service and its many facets, such as transfusions and medico-legal aspects.

Credits: 7

MT 492 - Clinical Chemistry

Examines enzymology; endocrinology; biochemistry of lipids, carbohydrates, and proteins; metabolism of nitrogenous end products; physiology and metabolism of fluids and electrolytes; and toxicology as related to the body and diseases. Technical procedures covered include colorimetry, spectrophotometry, electrophoresis, chromatography, automation, and quality control.

Credits: 11

MT 493 - Clinical Microbiology

Teaches the identification and clinical pathology of bacteria, fungi, viruses, and parasites. Techniques to isolate, stain, culture, and determine antimicrobial susceptibility and instrumentation and quality control are covered.

Credits: 10

MT 494 - Clinical Immunology/Serology

Immune response, immunoglobulins, autoimmunity, and complement, as well as related tests and diseases, are covered. Includes survey and demonstration of serological diagnostic tests.

Credits: 4

MT 495 - Clinical Seminar

Includes courses in orientation, clinical microscopy, laboratory management, venipuncture, lab math, and clinical correlation conferences.

Credits: 6

NS 101 - Neuroscience Orientation

Introduction to the neuroscience program, including current developments and future prospects. Designed to prepare students for current studies and future careers. Required for all first-year neuroscience students; open to all interested students.

Prerequisites & Notes

This section is restricted to Neuroscience majors or minors.

Credits: 1

NS 260 - Intro to Neuroscience

Introduction to neuron structure and function, synaptic transmission, organization of the nervous system, brain-behavior relationships, and current neuroscience methods.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): BS 109 - General Biology I, BS 132 - Introductory Biology I with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): CH 101 - General Chemistry I, CH 111 - Principles of Chemistry I with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): MA 104 - College Algebra, MA 107 - Precalculus, MA 110 - General Calculus with grade greater than or equal to D-.]

Credits: 1

NS 261 - Intro to Neuroscience II

This course focuses on the biological foundations of behavior and cognition. Fundamental methods and processes of the behavioral neuroscience will be emphasized including motivation, emotion, language, attention, memory, and mental illness.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

NS 263 - Neuroscience Colloquium

This course will introduce students to Neuroscience faculty, research, and career options. Students will read primary literature in the field, attend related seminars, and submit reflections or reports based on these activities.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

NS 415 - Biophysics of the Brain

This course introduces biophysical models of the brain and the nervous system functioning. In particular the physics of the neocortex is presented through the analysis of EEG studies. Simulations with software packages are employed to illustrate with various examples the models and their results. Linear electrical analogs and some basics of neural network theory are part of the course content. Elements of Biophysics of consciousness are also presented and a set of case studies is analyzed and discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 1

NS 422 - Neurodevelopmental Disorders

An introduction of Neurodevelopmental Disorders, with an emphasis on autism spectrum disorder and attention deficit-hyperactivity disorder. This course aims to expose students to clinical and scientific thinking about atypical child development. This course will include material on clinical diagnosis and treatment, as well as brain-behavior relationships.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.] [Student has completed or is in process of completing 3 Units from other PS or NS courses.]

Credits: 1

NS 424 - Developmental Cognitive Neuroscience

This course examines the relations between neural and cognitive development from birth through adolescence. Topics will include: principles of brain development, developmental elasticity, neurocognitive development in various domains (e.g., attention, memory, language), neurodevelopmental disorders, and implications for education.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): NS 261/ PS 261 - Intro to Neuroscience II, PS 200 - Psych of Human Development, PS 329 - Cognitive Proc-Memory

Credits: 1

NS 428 - Neuropsychology

This course is designed to introduce upper-level students interested in careers in medicine, clinical psychology, and related health science disciplines to the structure-function relationships of the human brain. The course emphasizes adult brain anatomy and function. The behavioral effects of brain damage (e.g., agnosia, neglect, aphasia, apraxia, amnesia) will be related to neuropsychological theories of brain function and examined in depth through readings, case material, and presentations.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 119 - General Biology II, BS 133 - Introductory Biology II with grade greater than or equal to D-.]

Credits: 1

NS 460 - Neurobiology

In-depth study of the molecular and cellular components of neurons and neural networks. Neuronal functions including synaptic transmission, neurotransmitter release, signaling pathways, and gene expression will be covered. Primary literature will be used to analyze the cellular mechanisms and components regulating neural systems including sensation, integration, sleep, learning, and memory.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

NS 495 - Seminar in Neuroscience

Current research and techniques in the field of neuroscience through primary literature review, discussion, and analysis. Topics will be chosen based on current discoveries and advancements in the field.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

NS 496 - Neuroscience Capstone

This course is the culmination of student directed research or independent study. Students will present and discuss research with the class. Students will *justify* research predictions and design, explain primary findings, and defend conclusions in the field of neuroscience.

Prerequisites & Notes

(Prerequisite: NS495)

(Special Registration Restriction: Neuroscience Majors only)

Credits: 1

OT 112 - Overview of OT Practice I

Overview of the value of occupational therapy in society. An examination of professional terminology, historical and contemporary concepts of occupation, and the use of activities as a therapeutic and healing experience.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 111 - Health Sci Orientation II with grade greater than or equal to D-.]

Credits: 1

OT 115 - Overview of OT Practice II

An overview of the importance of activity, contextual influences, and social participation in the lives of individuals and

communities, and the diversity of occupational therapy practices. Basic professional development concepts and skills are introduced.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): OT 112 - Overview of OT Practice I with grade greater than or equal to D-.]

Credits: 1

OT 405 - Overview of Occupational Therapy Practice

Overview of occupational therapy practice includes practice arenas, roles of therapists, populations treated, values of practitioners, relations with other professionals and nonprofessionals, introduction to the history of the profession, and theoretical concepts.

Prerequisites & Notes

This section is restricted to Master of Occupational Therapy and post-baccalaureate OT student only.

Credits: 2

OT 500 - Level I Experiences Seminar

This course is the introduction to fieldwork for the students in the OT program. Students will be introduced to this topic through the study of professional behaviors and review of skills necessary to be successful in both level I and level II fieldworks.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): OT 105 - Overview of OT Practice, OT 115 - Overview of OT Practice II, OT 405 - Overview of OT Practice with grade greater than or equal to D-.]

Credits: 1

OT 501 - Doctoral Seminar 1

This is the first in a series of 3 doctoral seminars which introduces the student to the concept and scope of practice of the doctorally prepared occupational therapist. Through literature exploration, the student develops a knowledge of the evolution of the doctorally prepared practitioner, not only in occupational therapy, but in other healthcare fields. There will be readings, discussions, and lectures based not only on the history of health care and public health but also current practice and future needs.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): OT 405 - Overview of OT Practice with grade greater than or equal to D-.] And Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy (DrOT_2018), Occupational Therapy (DrOT)] And (Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3] Or Student has satisfied all of the following: [Latest Class Standing in the selection list U2])

Credits: 1

OT 502 - Human Development & Occupational Performance (with Lab)

This course provides foundational knowledge of theories of human development and the developmental changes that occur throughout the lifespan. The course is designed to provide an overview of typical and atypical physical, cognitive, social, emotional aspects of human development. Contextual factors (environmental and personal) will be explored. Introduction to the analysis of developmental changes during human occupational performance will be covered.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): OT 510 - Neuroscience] And (Student has satisfied all of the following: [Students who specified one or more of these Programs

of Study or Program Foci: Occupational Therapy (DrOT_2018), Occupational Therapy (DrOT)] Or Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy, DrOT, Occupational Therapy, MOT, Occupational Therapy (MOT)]) And (Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3] Or Student has satisfied all of the following: [Latest Class Standing in the selection list U2])

Credits: 3

OT 508 - Movement Analysis

Covers osteology, surface anatomy, and kinesiology with emphasis on peripheral and cranial nerves, upper extremities, head, and neck. Regional approach will emphasize movement, performance, observation, and analysis. Lab will feature tutorial groups focusing on clinical problems and application of movement principles, kinesiology, and anatomy. Techniques for evaluating movement will be learned as a method of analysis.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): OT 310 - Neuroanatomy-Lab with grade greater than or equal to D-.]

Credits: 3

OT 510 - Neuroscience

An introduction to the function and components of the major structures of the normal and abnormal nervous systems including the study of the neurobiological substrates for behavior, learning, and human activity. Laboratory includes an examination of brain specimens.

Prerequisites & Notes

Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy, DrOT, Occupational Therapy, MOT, Occupational Therapy (MOT)]

Credits: 4

OT 519 - Introduction to Clinical Skills with Lab

This course is an introduction to basic occupational therapy clinical skills required for work in a variety of clinical settings. Students will be required to demonstrate competencies in, but not limited to, obtaining vital signs, employing safe infection control, and standard precautions. Students will develop basic interviewing, communication, and observation skills. Students will learn client positioning, functional mobility (bed mobility, transfers, and ambulation), ADL and IADL retraining skills using strategies and or compensatory adaptive equipment. Students will begin to develop skills in clinical reasoning, adaptation, teaching, and skills of writing for documenting goals and treatment notes as components of a medical record.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): OT 510 - Neuroscience with grade greater than or equal to D-.] [Student has completed or is in process of completing all of the following course(s): OT 405 - Overview of OT Practice with grade greater than or equal to D-.] And Student has satisfied any of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy, DrOT, Occupational Therapy, MOT, Occupational Therapy (MOT)] [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy (DrOT_2018), Occupational Therapy (DrOT)] And (Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3] Or Student has satisfied all of the following: [Latest Class Standing in the selection list U2])

Credits: 3

OT 531 - Clinical Medicine

Survey of clinical conditions and disease processes that affect functional performance in individuals from birth through old age.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 510 - Neuroscience with grade greater than or equal to D-.]

Credits: 3

OT 551 - Human Occupation: Concepts & Practice w/Lab

This course explores the meaning and purpose of human occupation and its relationship to the promotion of health and the prevention of disease, illness, and dysfunction for persons, groups and populations. This includes analysis and examination of occupations, activities, habits, and roles for persons, groups, and populations. Laboratory will emphasize engagement in occupations within one's contextual factors (environmental and personal).

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): OT 510 - Neuroscience with grade greater than or equal to D-.] [Student has completed or is in process of completing all of the following course(s): OT 405 - Overview of OT Practice with grade greater than or equal to D-.] And Student has satisfied any of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy, DrOT, Occupational Therapy, MOT, Occupational Therapy (MOT)] [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy (DrOT_2018), Occupational Therapy (DrOT)] And (Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3] Or Student has satisfied all of the following: [Latest Class Standing in the selection list U2])

Credits: 3

OT 555 - Evaluation and Assessment in Occupational Therapy

Course covers the selection and use of appropriate standardized and nonstandardized assessment tools for the comprehensive evaluation of patients/clients. Data will be used to establish goals, write reports, communicate findings, supervise staff, and refine interdisciplinary collaboration and home follow-up. Includes an examination of validity and reliability of assessment tools.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): OT 503 - Human Development/Performance, OT 520 - Intro to Clinical Skills, OT 562 - Theories of OT with grade greater than or equal to D-.]

Credits: 3

OT 562 - Theories of Occupational Therapy

Study of the theoretical humanistic foundations of occupational therapy practice. Focus will be on major theoretical perspectives, models for practice, and frames of references as a base for practice. Beginning links between theory, practice, and research will be made.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): OT 510 - Neuroscience with grade greater than or equal to D-.]

Credits: 3

OT 572 - Clinical Management and Supervision

Examination of general principles of administration, management, and leadership. Program design, funding, and implementation will be presented. Staffing patterns, quality assurance, reimbursement, contractual issues, program development, and reimbursement issues are discussed as they relate to management in healthcare. Effects of systems and legislative and social issues on practice will be explored.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): OT 104 - OT Orientation IV, OT 105 - Overview of OT Practice with grade greater than or equal to D-.] Or Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): OT 105 - Overview of

OT Practice, OT 115 - Overview of OT Practice II, OT 405 - Overview of OT Practice with grade greater than or equal to D-.]

Credits: 3

OT 590 - Fieldwork Level 1: Clinical Experience

Students are assigned to community sites under the supervision of a professional who is not an occupational therapist. Students are expected to participate in the daily activities of the site, engaging with both staff and clients. Students are assigned to meet with an occupational therapist weekly to process the experience and integrate academic coursework with fieldwork experiences.

Credits: 1

OT 599 - Independent Study

A student-focused project requiring research, design, and implementation under faculty guidance and supervision.

Prerequisites & Notes

Student has received department permission for OT 599 - Independent Study

Credits: 3

OT 615 - Therapeutics Groups

This course offers didactic and experiential components designed to prepare students care delivery in therapeutic groups in all areas of occupational therapy practice. Students will learn to integrate knowledge of group process, group dynamics, and implementation of occupation-based approaches to therapy through lectures and laboratories that allow them to use clinical reasoning and creative critical thinking throughout the semester. This course reinforces the general education skill area of oral communications and the general education values/attitudes area of leadership and teamwork.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 562 - Theories of OT with grade greater than or equal to D-.]

Credits: 3

OT 620 - Fieldwork Level 1: Clinical Fieldwork

Students will engage in various experiential learning experiences on or off campus throughout the course of the semester to develop clinical skills and professional behavior in preparation for level II fieldwork. Students will have the opportunity to interact with and understand the needs of clients with various diagnoses, actively engage in the OT Process under guidance, and explore acute care, acute rehab, and/or sub-acute settings through on-site visits.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): OT 662 - OT Interventions V with grade greater than or equal to D-.]

Credits: 1

OT 623 - Fieldwork I: Community Service Learning

Students are assigned to community sites under the supervision of a professional who is not an Occupational Therapist. Students are expected to participate in the daily activities of the site, engaging with both staff and clients. The focus of this level I experience is on psychosocial behaviors of clients and their environment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s):

OT 443 - OT Interv III: Psychosoc Iss, OT 642 - OT Interventions III with grade greater than or equal to D-.]

Credits: 1

OT 636 - Clinical Leadership

Students will review principles of administration, management, and leadership for clinical program design, funding, implementation, and outcomes. Students will develop an understanding of staffing patterns, quality assurance, contractual issues, program development, and reimbursement issues as they relate to healthcare management; analyze the impact of legislative and social issues on clinical practice, systems of care, and delivery of services; and understand healthcare system cultures as they relate to occupational therapist, professional, and client perspectives.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 583 - OT Fieldwork Level Ib with grade greater than or equal to D-.]

Credits: 3

OT 640 - Enhancing Cultural Competence

Building upon prior coursework and experiences, students will continue to address issues related to cultural diversity and cultural competence as they relate to occupational therapy practice. Areas of cultural awareness, cultural knowledge, and cultural skills will be addressed. Students will increase awareness of their own cultural values and beliefs as well as of the impact of culture on interpersonal exchanges; gain knowledge about cultural competence and different cultural groups; and develop skills to support effective cross-cultural experiences. Students will also create a professional development plan to support growth in cultural competence.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): OT 422 - OT Interv I: Contextual App, OT 622 - OT Interventions I with grade greater than or equal to D-.]

Credits: 3

OT 650 - Introduction to Applied Research Methods

This course is the first of a three-course research sequence. It provides an introduction to the research process. Students will obtain a basic understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data. Examples of qualitative and quantitative designs will be analyzed, and techniques of data analysis examined. Learning will occur through lectures, class discussions, readings, and assignments.

Knowledge gained through this course can be used in the evaluation of OT services and in designing and implementing beginning-level research projects. The basic concepts of evidence-based practice will be presented.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 355 - Eval & Assessment in OT with grade greater than or equal to D-.]

Credits: 3

OT 652 - Occupational Therapy Interventions IV: Cognitive Issues

This course emphasizes the identification of appropriate theoretical frameworks, goal setting, treatment planning, the use of a variety of intervention techniques to allow the client to engage in meaningful occupations, discharge planning, and termination of treatment. The focus will be on the cognitive components, including, but not limited to, level of arousal, orientation, recognition, attention span, initiation of activity, termination of activity, memory, sequencing, categorization, concept formation, spatial operations, problem solving, learning, and generalization, as they are manifested across the life span.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): OT 432 - OT Interv II: Develop Issues, OT 632 - OT Interventions II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): OT 443 - OT Interv III: Psychosoc Iss, OT 642 - OT Interventions III with grade greater than or equal to D-.]

Credits: 3

OT 653 - Rehabilitation of Work-Related Activities

Evaluates industrial, productive, and work-related activities for the adult. Emphasizes the assessment, rehabilitation, and prevention of work-related injuries. Introduces program development, policy, and legal implications of industrial rehabilitation.

Credits: 3

OT 660 - Applied Research II

This course is the second of three courses required in the occupational therapy research sequence. Building on the first research course, students are expected to develop a research proposal. This activity will provide students with the ability to translate clinical problems into research protocols by incorporating published research and class learning with clinical case studies. Learning will occur through lectures, class activities, class discussions, readings, and assignments. Knowledge gained through this course can be used in the evaluation of OT services and in designing and implementing beginning-level research projects. Basic statistics will be included.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): OT 521 - Applied Research I, OT 650 - Applied Research Methods with grade greater than or equal to D-.]

Credits: 3

OT 665 - Applied Research III

This seminar provides an in-depth examination of research and its relationship to practice. Students will obtain an advanced understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data. Learning will occur through class discussions, readings, and assignments, including the implementation of the proposal developed in the prior course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 660 - Applied Research II with grade greater than or equal to D-.]

Credits: 3

OT 668 - Evidence Based Practice

Students will develop their ability to locate, evaluate, and incorporate research evidence into the practice of occupational therapy. Students will build upon research analysis and information literacy skills from prior coursework as they develop clinical questions, conduct database searches to obtain evidence, critically analyze available evidence, and determine relevance to clinical practice.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 660 - Applied Research II with grade greater than or equal to D-.]

Credits: 3

OT 672 - Occupational Therapy Interventions VI: Assistive Technology

Assistive technology devices and services have the potential to impact the lives of persons with disabilities, resulting in increased independence and participation in their daily activities. This course will focus on learning about the various types of assistive technology devices and services including, but not limited to, evaluation and assessment, selection and training, procurement, legislation, and funding. Students will gain an understanding of these applications as they pertain to the communication, learning, and environmental issues encountered by persons with disabilities.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 555 - Eval & Assessment in Ot with grade greater than or equal to D-.]

Credits: 3

OT 675 - Research Independent Study

The course is designed to refine research skills for self-directed students who have an interest in OT research. The student will work collaboratively with a faculty mentor to develop and carry forth a research project of mutual interest. This course should result in a poster, platform presentation, or paper that can be submitted for peer review. Student(s) can elect to participate in one of many ongoing research projects within the Department of Occupational Therapy. The student(s) will gain insights into the research process through faculty mentoring and active involvement in all levels of the research process.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 665 - Applied Research III with grade greater than or equal to D-.]

Credits: 6

OT 678 - Hand Therapy Interventions

This is a comprehensive elective course specializing in hand therapy, focusing on the occupational therapy process. It will include evaluation, intervention, and outcomes for clients with common upper extremity conditions. Evidence based assessments and interventions will be examined through scholarly journals and research articles to determine appropriate use in treatment planning for clients. Class will include lectures, hands on activities, selected readings, discussions and case studies. Knowledge will prepare students to develop skills of an entry level therapist in preparation for a level II fieldwork in the specialized area of hand therapy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): OT 308 - Movement Analysis, OT 508 - Movement Analysis with grade greater than or equal to D-.]

Credits: 3

OT 681 - Occupational Therapy: Past, Present, & Future

This course is an exploration of occupational therapy practice related to social determinants of health, group/population needs assessment, political and legislative influences on therapeutic service delivery and advocacy frameworks across time. Also investigated are evaluation of the contexts of current therapeutic service delivery and considering future models required to adequately address societal needs.

Credits: 2

OT 682 - Fieldwork Level I: Community Client

The student will create adaptations and competence promoting strategies for human and non-human elements of the environment. This will be explored in a collaborative relationship with an individual living in the community. Throughout the course a needs assessment, safety evaluations, community resource finding and construction of low-technology devices will be completed by the students, who will be supervised by the OT in the lab.

Prerequisites & Notes

(Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): OT 622 - OT Interventions I with grade greater than or equal to D-.] And Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Occupational Therapy, DrOT, Occupational Therapy, MOT, Occupational Therapy (MOT)])

Credits: 1

OT 687 - Fieldwork I: Program Development

Students will engage in a fieldwork experience under the supervision of a professional, who may or may not be an occupational therapist, at a site that does not currently have an occupational therapy program. Students will engage in a needs assessment and, based on the outcome, develop a plan for an occupational therapy program. In addition, students will meet weekly in a precepting group led by an occupational therapist to process the experience.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 694 - Fieldwork Level IIa, OT 696 - Fieldwork Level IIb with grade greater than or equal to D-.]

Credits: 2

OT 692 - Current Issues in Gerontology

Students will explore selected current topics in the area of gerontology and the impact of the aging process on health and participation in occupations. Specific topics to be addressed in the course will be selected by students in collaboration with the course instructor. Students will integrate and apply knowledge from previous and current courses and field experiences.

Credits: 3

OT 694 - Fieldwork Level IIa

Fieldwork is an in-depth experience that is critical to occupational therapy education. In supervised settings, students put emphasis on application of their academically acquired body of knowledge. This occurs in varied settings where occupational therapy is provided. Potential settings include medical institutions, outpatient clinics, community-based services, and schools. This fieldwork experience will occur in a different setting than OT 696 to provide the student with a variety of experiences.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): OT 684 - OT Fieldwork Level Ie with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): OT 620 - FWK1: Clinical Fieldwork, OT 623 - FWK 1: Comm. Service Learning with grade greater than or equal to D-.]

Credits: 9

OT 696 - Fieldwork Level IIb

Fieldwork is an in-depth experience that is critical to occupational therapy education. In supervised settings, students put emphasis on application of their academically acquired body of knowledge. This occurs in varied settings where occupational therapy is provided. Potential settings include medical institutions, outpatient clinics, community-based services, and schools. This fieldwork experience will occur in a different setting than OT 694 to provide the student with a variety of experiences.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): OT 684 - OT Fieldwork Level Ie with grade greater than or equal to D-.]

Credits: 6

OT 697 - Doctoral Experiential Component

Students will engage in a fieldwork experience relative to their chosen content area under the supervision of an appropriate professional. The specific nature of the fieldwork will be defined by the student in collaboration with a faculty member and will entail a 16-week full-time experience.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): OT 600 - Advanced Seminar & Comp Exm with grade greater than or equal to D-.]

Credits: 12

OT 699 - Independent Study

An advanced student-focused project requiring research, design, and implementation under faculty guidance and supervision.

Prerequisites & Notes

Student has received department permission for OT 699 - Independent Study

Credits: 3

OT 705 - Occupational Therapy Education Practicum

Students will synthesize and evaluate current theories regarding teaching and learning in occupational therapy education and design classroom learning experiences for occupational therapy students. This course will require integration of previously acquired content knowledge and skills with both prior and new teaching and learning theories. Teaching experiences will occur within select junior- and/or senior-level courses.

Credits: 3

PA 244 - Introduction to Pharmacy and the Healthcare System

This course provides a critique and analysis of various healthcare system components as they relate to the practice of pharmacy. Professional standards, provider ethics, pharmacy practice sites, insurance issues, Medicare, and Medicaid will be examined.

Credits: 1

PA 335 - Marketing Applications in the Clinical Use of Drugs I

Part one of a two-semester course sequence includes major concepts of rational drug therapy such as basic pathophysiology, pharmacology, and outcomes assessment for major drug classes and common disease states. Decision criteria as they apply to drug product selection are emphasized.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 202 - Human Structure-Function II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): PA 442 - Health Care Systems with grade greater than or equal to D-.]

Credits: 3

PA 336 - Marketing Applications in the Clinical Use of Drugs II

Part two of a two-semester course sequence includes major concepts of rational drug therapy such as basic pathophysiology, pharmacology, and outcomes assessment for major drug classes and common disease states. Decision criteria as they apply to drug product selection are emphasized.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PA 335 - Mkt App-Clin Drug Use I with grade greater than or equal to D-.] [Student has completed or is in process of completing all of the following course(s): BS 206 - Human Structure & Func II with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): BS 212 - Funct Human Anat-Histology with grade greater than or equal to D-.] [Student has completed or is in process of completing all of the following course(s): BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 3

PA 344 - Community Pharmacy Mngmt

The course will focus on the operation and management of a community pharmacy. It will include an introduction into financial management, inventory management, personnel management, supply chain, marketing, legal considerations, integration of clinical and distributive functions with patient services. Students interested in community pharmacy or community pharmacy residencies are encouraged to enroll.

Credits: 2

PA 402 - Pharmacy Law and Ethics

Consideration of ethics and law in the context of pharmacy practice. Function, content, and enforcement of Federal Food, Drug, and Cosmetic Act; Controlled Substances Act; and state pharmacy practice acts; and professional liability. Consideration and application of ethical principles in situations occurring in pharmacy practice, as well as in other areas of personal responsibility. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PA 402R - Pharmacy Law & Ethics Rec with grade greater than or equal to D-.]

Credits: 3

PA 444 - Pharmacy Systems Management

This course will focus on issues surrounding the management of the practice of pharmacy in freestanding and organized settings. It will include an introduction to the planning process and to fiscal, marketing, and personnel administration strategies used by pharmacists-managers. Procedures and tools that pharmacists use to effect change in the drug use process will be covered, including drug use evaluation techniques, pharmacoeconomics, outcome assessment, and pharmacy and therapeutics committee functions. 3 class hrs

Credits: 4

PA 462 - Pharmacy Management

This course will focus on issues surrounding the management of the practice of pharmacy in freestanding and organized settings. It will include an introduction to personnel administration strategies used by pharmacists/managers. Tools and technologies related to the drug distribution process in various practice settings will be discussed. Policies and processes used to effect change in the drug use process will be covered, including: drug use evaluation, pharmacy and therapeutics committee functions, and medication therapy management services.

Credits: 3

PA 465 - Pharmacoeconomics and Medication Selection

This course will commence an exploration of how costs are perceived from the perspective of the insurer, provider, and consumer of healthcare. Clinical outcome measurements will then be addressed and related to the cost of therapy. The processes of medication selection and usage patterns will then be examined in the hospital setting as well as the role of the pharmacy benefits

manager. Evidence-based pharmacoeconomic studies will serve as the basis for sound economic decision making with an appreciation of both commercial and intra-institutional influences and considerations.

Credits: 2

PA 482 - Leadership for Healthcare Professionals

Leadership for Healthcare Professionals is a follow-on course to the Special Topics in Leadership course currently offered to pharmacy and healthcare business students. The course will give students the opportunity to learn different styles of leadership and to better understand the balance between leadership theory and practice. The students will develop a leadership self-assessment and plan.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 482 - Spec. Topics PHB Business 3 with grade greater than or equal to D-.]

Credits: 2

PA 495 - Project in Pharm Admin

Opportunity for qualified students to carry out a project in pharmacy administration application or research under the direction of a pharmacy administration faculty member. Each student is required to prepare a report summarizing his/her objectives, progress, and conclusions.

Credits: 3

PA 498 - Directed Study in Pharmacy Administration

Opportunity for qualified students to expand their knowledge in an area of particular interest under the direction of a pharmacy administration faculty member.

Credits: 3

PA 499 - Research in Pharmacy Administration

Opportunity for qualified students to participate in research in the social, legal, or economic aspects of pharmacy. Preparation of an acceptable paper is required.

Credits: 2

PA 547 - Managed Care Systems and Pharmacy Practice

Focus on issues surrounding the practice of pharmacy in a managed care environment, including cost, payment, and a recognition of the key stakeholders in managed care. The second half of the course will address application of managed care principles of pharmacy practice. The impact of managed care on pharmacists working in community, ambulatory, or hospital pharmacy will be examined.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PA 444 - Pharmacy Systems Management with grade greater than or equal to D-.]

Credits: 2

PA 561 - Law and Ethics

Consideration of law and ethics in the context of pharmacy practice. Function, content, and enforcement of Federal Food, Drug, and Cosmetic Act; Controlled Substances Act; and state pharmacy practice acts; as well as professional liability. Consideration

and application of ethical principles in situations occurring in pharmacy practice, as well as in other areas of personal

Credits: 2

PA 562 - Topics Pharm Law & Ethics

Consideration of selected legal, ethical, and other issues that are of importance to the profession of pharmacy and the responsibilities of individual pharmacists. Discussions build on and extend the coverage of topics in the required PA 561 - Law and Ethics course. Topics considered are those of the greatest current and/or anticipated importance at the time the course is offered.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PA 561 - Law and Ethics with grade greater than or equal to D-.]

Credits: 2

PA 564 - Clinical Pharmacoeconomics

An applied clinical introduction to pharmacy economics in healthcare delivery, with focus on the selection and monitoring of drug therapy and formulary management in the healthcare system. Various quantitative techniques will be covered.

Credits: 2

PA 565 - Applied Pharmacoeconomics

This is an applied, clinical introduction to economics in patient care and includes economic theory, therapeutic decision making, and current clinical and economic research. The focus of this pharmacoeconomic course will be on evaluating clinical outcomes, selection and monitoring of patient's drug therapy, and formulary evaluation in healthcare. Various quantitative techniques will be covered, including decision analysis, cost-benefit and cost-effectiveness analysis, epidemiological and database considerations, and drug utilization economics, as well as quality-of-life questionnaires and assessment.

Credits: 2

PA 664 - Applied Pharmacoeconomics

Clinical introduction to economic evaluation and research. Focuses on applications in therapy selection and formularies. Covers pharmacoeconomic methods, decision analysis, and quality-of-life assessment. 2 class hrs

Credits: 2

PA 697 - Directed Study in Pharmacy Administration

Opportunity for qualified students to expand their knowledge of the economic, legal, or social aspects of pharmacy or research methods under the direction of a pharmacy administration faculty member.

Credits: 6

PA 742 - Health Systems Management

consumers, providers, financiers, and regulators of health services.

Credits: 4

PA 763 - Special Topics in Pharm Admin

Students participate in research on selected subjects under faculty supervision. Students prepare a paper analyzing a health issue.

Credits: 4

PA 797 - Research in Pharm Admin

Students conduct research in the social, administrative, or economic aspects of health services and pharmacy. Preparation of an acceptable research paper is required.

Credits: 3

PA 806 - Soc and Behavioral Health I

This course will analyze the social and behavioral foundations of healthcare, including issues related to the development of healthcare professions. The social-psychological factors affecting how consumers regard cures and healing will be studied, as well as the relationship between professionals and the public.

Credits: 3

PA 807 - Social and Behavioral Health II

Societal values and needs will be compared with the domains, roles, and modalities used by health professionals. Selected public policy initiatives will also be analyzed, and options for future development in the professions will be explored.

Credits: 3

PA 808 - Health Services and Economics

Students in this course will analyze the policy and organizational foundations of healthcare including issues related to the past, present, and future of the professions. The political and economic factors affecting the healthcare process will be studied as well as the role of health practitioners relative to health institutions, government agencies, and the public.

Credits: 4

PA 840 - Health Economics

This course focuses on the development and assessment of economic evaluation tools and decision analysis for pharmaceutical interventions and health services as well as how to assess patient preferences and quality of life.

Credits: 3

PA 850 - Advanced Social/Behavioral Studies I

Credits: 3

PA 890 - Pharmacy Admin Seminar

Speakers present research findings, reviews of current literature, and analysis of health policy topics of current interest.

Credits: 1

PB 120 - Introduction to Business Seminar

This course introduces and helps develop the foundation for successful business analysis and planning. This course explores the development of the corporation into its modern form and the relationship of important business writers, their methods, and their

work on various business topics relevant to the major.

Credits: 2

PB 190 - Business Orientation

Students will develop plans that will lead to academic success. Students will review on-campus services that support academic success. Students will begin to understand and apply the principles and practices of cooperative teamwork and begin to adopt exemplary personal and professional ethical standards. Students will begin to develop interpersonal communication and presentation skills and become self-directed learners.

Prerequisites & Notes

This course is for undergraduate Pharmaceutical Business students only.

Credits: 1

PB 201 - Introduction to Microeconomics

Discussion of theory of demand, supply, elasticity, utility, production and cost, perfectly and imperfectly competitive markets, marginal productivity, and income distribution.

Credits: 3

PB 202 - Macroeconomics

Fundamentals of economic theory with discussion of national income, money and banking, determination of income and employment, economic fluctuations, monetary and fiscal policy, international trade, and balance of payments.

Credits: 3

PB 242 - Health Care Systems

Survey of various healthcare system components, including consumers, providers, financiers, and regulators of health services.

Credits: 2

PB 243 - Advanced Healthcare Systems

This course is a continuation of PB 242 and will deepen the students' understanding of the various healthcare system components as they relate to the pharmaceutical industry. This semester's work will focus on health economics, economics of firms in the pharmaceutical industry, managed care, political and governmental issues, lobbying and advocacy, and international health systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 242 - Health Care Systems with grade greater than or equal to D-.]

Credits: 3

PB 303 - Social Marketing

Social marketing is generally defined as the design and implementation of programs that introduce and promote an idea or cause that benefits society. The social marketer applies commercial marketing principles to health and human service programs.

Behavior change, rather than profit, is the goal. This course will explore the application of marketing concepts to health services marketing, health behavior change promotion, and health communications. 3 class hrs

Credits: 3

PB 314 - Business Ethics

This is a course in applied ethics with a focus on ethical issues arising in commercial life. Basic ethical theories will be studied and deployed in the analysis and evaluation of case studies on select issues in business ethics.

Credits: 3

PB 315 - Business Law

Business law principles as applied in the management of a business or professional practice. Topics include basic contract law with special emphasis on sales contracts and business organizations (proprietorships, partnerships, and corporations) and responsibility for the acts of others with reference to principal/agent and employer/employee relationships, contractual discharge, and remedies.

Credits: 3

PB 316 - Accounting Theory

Financial data is utilized as a decision-making tool in the management of a business or a professional practice. Detailed analysis of the structure and systems of accounting followed by the use of accounting information through financial statements, working capital, cash flow analysis, and the complete accounting cycle.

Credits: 3

PB 317 - Managerial Accounting

This course examines methods for organizing, reporting and analyzing data from operations as well as effective cost accounting practices. Students will explore effective methods for formulating management decisions based on accounting data and, through case studies, apply these techniques to accounting and management issues unique to the pharmaceutical and health care industry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 316 - Accounting Theory with grade greater than or equal to D-.]

Credits: 3

PB 318 - Financial Management

Introduction to the theories, techniques, and instruments used in financial management and their application. Emphasis on the time value of money, stocks, and bonds; ratio analyses; financial institutions; and the analysis of financial statements.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PA 316 - Accounting Theory with grade greater than or equal to D-.]

Credits: 3

PB 319 - Introduction to Marketing Management

An introduction to marketing activities such as product planning, promotion, pricing, and distribution. The relationship of these activities to the pharmaceutical industry, the pharmacy practitioner, and the consumer is explored.

Credits: 3

PB 321 - Mgmt Information Systems

This course is offered every other spring and introduces content, development, methodology, application, and management of computer-based systems that support the decision-making process at all organizational levels. Provides a broad overview of computer technologies and issues involved in deploying computer-based systems in organizations. Examines networking issues, including the internet, for their impact on businesses. 3 class hrs

Credits: 2

PB 323 - Principles of Management

This introductory course addresses the methods by which management can influence organizations. Topics include planning, problem solving and decision making, organizational structure, delegation, leadership, motivation, interpersonal relationships, communications, quality management, and negotiations.

Credits: 3

PB 325 - Introduction to Entrepreneurship+New Venture Creation

This course shall enable students to evaluate their personal skills and interests as they relate to becoming an entrepreneur. Participants will learn the importance of entrepreneurship and the roles of the entrepreneur and other key stakeholders that impact an entrepreneurial business endeavor. These goals will primarily be achieved through the investigation and analysis of new venture creation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 316 - Accounting Theory with grade greater than or equal to D-.]

Credits: 3

PB 333 - Supply Chain Management

This course introduces students with a full range of supply chain challenges and sound techniques to manage them. Topics include global supply networks, inventory management, material forecasting, optimum order quantities and quality assurance programs. Course concepts and quantitative solution tools will be applied as students evaluate real world cases.

Credits: 3

PB 335 - Marketing Applications in the Clinical Use of Drugs I

Part one of a two-semester course sequence includes major concepts of rational drug therapy such as basic pathophysiology, pharmacology, and outcomes assessment for major drug classes and common disease states. Decision criteria as they apply to drug product selection are emphasized.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PB 242 - Health Care Systems with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 212 - Funct Human Anat-Histology, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has received department permission for PB 335 - Mkt App-Clin Drug Use I]

Credits: 3

PB 336 - Marketing Applications in the Clinical Use of Drugs II

Part two of a two-semester course sequence includes major concepts of rational drug therapy such as basic pathophysiology, pharmacology, and outcomes assessment for major drug classes and common disease states. Decision criteria as they apply to drug product selection are emphasized.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PB 335 - Mkt App-Clin Drug Use I with grade greater than or equal to D-.] [Student has completed or is in process of completing all of the following course(s): PB 242 - Health Care Systems with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 212 - Funct Human Anat-Histology, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has received department permission for PB 336 - Mkt App-Clin Drug Use II]

Credits: 4

PB 382 - Special Topics in Pharmaceutical and Healthcare Business I

This is the first of four special topics courses, each of which focuses on relevant and important aspects of understanding the pharmaceutical and healthcare industry and developing skills needed to succeed in this business sector. The course content is subject to change from year to year and is intended to adjust content to be responsive to changing needs of the industry and educational requirements for our students.

Credits: 2

PB 383 - Special Topics in Pharmaceutical and Healthcare Business II

This is the second of four special topics courses, each of which focuses on relevant and important aspects of understanding the pharmaceutical and healthcare industry and developing skills needed to succeed in this business sector. The course content is subject to change from year to year and is intended to adjust content to be responsive to changing needs of the industry and educational requirements for our students.

Prerequisites & Notes

This course is for undergraduate Pharmaceutical Business students only.

Credits: 2

PB 425 - Consumer Behavior: Healthcare Marketing Applications

Detailed study of consumer behavior, with an emphasis on pharmaceutical and healthcare marketing application including examination of the decision-process models originally developed for marketing consumer products. Models of illness/health behavior and methods for market segmentation analysis, consumer-oriented marketing strategies, and tactics for attitude change and behavior motivation are introduced.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 319 - Intro to Marketing Mgmt with grade greater than or equal to D-.]

Credits: 3

PB 430 - Brand Management

This course focuses on the essential principles, practices and leading-edge concepts of brand management to prepare students to lead a brand-centered, cross-functional marketing team. The course is designed to introduce the critical analytical, decision making, and planning frameworks and tools effective brand managers need at all stages of the product lifecycle. The emphasis in the course is to explore (what every brand manager needs to know+ to operate successfully in any organization.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 319 - Intro to Marketing

Mgmt with grade greater than or equal to D-.]

Credits: 3

PB 435 - Advertising and Promotion

This course offers a detailed study of advertising and promotion, with an emphasis on the pharmaceutical and life sciences industry, and healthcare marketing communications. An integrated marketing communications perspective will be emphasized. The course will examine healthcare advertising and promotion utilizing a range of media outlets, including print, digital, television, consumer magazines, and other emerging channels.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 319 - Intro to Marketing Mgmt with grade greater than or equal to D-.]

Credits: 3

PB 437 - International Marketing of Pharmaceuticals

The international market for pharmaceuticals contributes a large part of the profits of many pharmaceutical companies. Decisions regarding entry and competition in these markets require knowledge of the global economy, entry strategies for international markets, licensing, contracts, cultural differences, risk management, payments, and strategies quite different from domestic policies. The course seeks to develop a basic understanding of the marketing of pharmaceuticals and medical devices in the international arena.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 319 - Intro to Marketing Mgmt with grade greater than or equal to D-.]

Credits: 2

PB 452 - Legal Aspects of Drug Development, Production, and Marketing

This course provides a critique and analysis of the various laws and regulatory bodies affecting the pharmaceutical industry. The interaction of regulatory affairs with other departments in a pharmaceutical company will be considered, with a special emphasis on research and development and marketing.

Credits: 2

PB 460 - Business Strategy

This course focuses on the conceptual and operational models of strategic planning to deliver effective business-level and corporate-level strategies to achieve value creation and competitive advantage. The course is designed to introduce a wide variety of business strategy frameworks and methodologies with an emphasis on strategy formulation, assessment and implementation from a global, regional and local market perspective.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 120 - Intro to Business Seminar, PB 319 - Intro to Marketing Mgmt with grade greater than or equal to D-.]

Credits: 3

PB 478 - Pharmaceutical Marketing Research

This course offers a general introduction to marketing research, with an emphasis upon pharmaceutical industry and healthcare marketing applications. Marketing research is at the heart of pharmaceutical strategy development, guiding research and development decisions as well as marketing management. This course examines qualitative and quantitative marketing research

techniques, including statistical methods for hypothesis testing. Study of secondary research sources will include the pharmaceutical market audits. Although the course will emphasize research methods used in the ethical pharmaceuticals segment, techniques such as observational research and mall intercepts, which are used in the OTC segment, will also be introduced.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 319 - Intro to Marketing Mgmt, ST 310 - Biostatistics I with grade greater than or equal to D-.]

Credits: 3

PB 482 - Special Topics in Pharmaceutical and Healthcare Business III

This is the third of four special topics courses, each of which focuses on relevant and important aspects of understanding the pharmaceutical and healthcare industry and developing skills needed to succeed in this business sector. The course content is subject to change from year to year and is intended to adjust content to be responsive to changing needs of the industry and educational requirements for our students.

Credits: 2

PB 483 - Special Topics in Pharmaceutical and Healthcare Business IV

This is the fourth of four special topics courses, each of which focuses on relevant and important aspects of understanding the pharmaceutical and healthcare industry and developing skills needed to succeed in this business sector. The course content is subject to change from year to year and is intended to adjust content to be responsive to changing needs of the industry and educational requirements for our students.

Prerequisites & Notes

This course is for undergraduate Pharmaceutical Business students only.

Credits: 2

PB 490 - Senior Thesis Methodology

The senior thesis is an undergraduate capstone project which includes independent, original data collection for the pharmaceutical and healthcare business (PHB) major. It is a self-directed course in which the student produces a body of work which demonstrates an integration of knowledge and skills from the courses taken while in the PHB program. In Senior Thesis Methodology, the student will select a topic area of interest to the student based on knowledge of current events and issues, analyze related literature from scholarly publications, plan and conduct data collection to support a hypothesis.

Prerequisites & Notes

This course is for undergraduate Pharmaceutical Business students only.

Credits: 2

PB 491 - Senior Thesis

The senior thesis is an undergraduate capstone project which includes independent, original data collection for the pharmaceutical and healthcare business (PHB) major. It is a self-directed course in which the student produces a body of work which demonstrates an integration of knowledge and skills from the courses taken while in the PHB program. In Senior Thesis, the student will analyze their data collection and secondary research in support of the hypothesis they selected in PB 490. The student will develop a written thesis and explain and defend their project in the senior thesis class which will include a thorough evaluation of relevant literature pertaining to the selected topic.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 490 - Sr Thesis Methodology with grade greater than or equal to D-.]

Credits: 3

PB 564 - Clinical Pharmacoeconomics

An applied clinical introduction to pharmacy economics in healthcare delivery, with focus on the selection and monitoring of drug therapy and formulary management in the healthcare system. Various quantitative techniques will be covered.

Prerequisites & Notes

This course is for undergraduate Pharmaceutical Business students only.

Credits: 2

PB 707 - Issues and Trends in Health Policy

This course provides an orientation to analytical and substantive components that are necessary for understanding current health policy issues. Students gain an awareness of the complexities of major issues, such as the uninsured, quality assessment and disparities in outcomes, their historical evolution, and the nature of how different interests and actors interact in shaping them. They also learn to apply commonly used frameworks for policy analysis to a range of current health policy issues and themes.

Credits: 3

PB 711 - Managerial and Financial Accounting

This course provides the participant with an understanding of accounting terminology, how to read and analyze financial statements, how to develop product costs, and how to analyze and measure performance in the plant, with an emphasis on how to use some of the measurements outside of the manufacturing environment. Also, activity-based costing concepts are examined and applied in exercises, in addition to applying cost/volume profit analysis to marketing situations.

Credits: 2

PB 721 - Managerial Finance

This course covers the basics concepts of finance, including the ability to read key business statements such as balance sheets, income statements, and sources and uses statements. The course discusses the main forms of business organization and the finance function itself. The course continues with an overview of financial markets and institutions, as well as a description of the various major types of debt and equity. Students will learn fundamental financial concepts such as present value and future values, risk-and-return principles, and financial portfolio analysis. The course will pay particular attention to understanding the issues involved in long-term investment decisions, which are so critical to the pharmaceutical industry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 711 - Managerial & Financial Accting with grade greater than or equal to D-.]

Credits: 2

PB 722 - Corporate Finance

This course covers concepts such as valuation principles, including the time value of money, interest rates, diversification, risk and return, debt, and equity, as well as the options. Investments and financial operations will also be addressed. The course will also examine the major questions of financial policy and planning, including long-term dividends and capital structure, investment analysis, restructuring, and long-term financial planning.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 721 - Managerial Finance with grade greater than or equal to D-.]

Credits: 2

PB 723 - Mergers and Acquisitions

The course presents the key financial and managerial issues involved in the merger and acquisition process. It covers the business reasons for making an acquisition or merger or deciding to sell a business or business unit. The course addresses evaluating and valuing a potential acquisition, forms and characteristics of mergers, and the financial alternatives involved in mergers or acquisitions. Particular attention is devoted to identifying the characteristics of successful mergers in general and in the pharmaceutical industry in particular

Credits: 2

PB 725 - Financial Management & Governance

This course covers the basics concepts of finance, including the ability to read key business statements such as balance sheets, income statements, and sources and uses statements. The course discusses the main forms of business organization and the finance function itself. The course continues with an overview of financial markets and institutions, as well as a description of the various major types of debt and equity. Students will learn fundamental financial concepts such as present value and future values, risk-and-return principles, and financial portfolio analysis. The course will pay particular attention to understanding the issues involved in long-term investment decisions, which are so critical to the pharmaceutical industry

Credits: 3

PB 726 - Capital Investments & Finance

This course covers concepts such as valuation principles, including the time value of money, interest rates, diversification, risk and return, debt, and equity, as well as the options. Investments and financial operations will also be addressed. The course will also examine the major questions of financial policy and planning, including long-term dividends and capital structure, investment analysis, restructuring, and long-term financial planning

Credits: 3

PB 731 - Business Statistics

This course provides the student with an understanding of common statistical methods used in business analysis for marketing, operations, and R&D. It examines probability, sampling methods, measurement scales, measures of central tendency, dispersion, association statistical process control, and statistical quality control, as well as univariate and multivariate distributions of data structures. The course also introduces various statistical software packages, such as SPSS and SAS.

Credits: 2

PB 732 - Pharmacoeconomics & Economics of Health

This course equips the student with an understanding of the pharmacoeconomics of specific drugs as well as macroeconomic and microeconomic concepts, how to read and analyze economic and pharmacoeconomic reports, how to develop clinical economic studies, and how to analyze and measure inputs and outcomes. Tools covered include cost-benefit, cost-effectiveness, and cost-utility analysis. In addition, the course covers how to apply economic analysis to marketing situations

Credits: 2

PB 741 - Team Dynamics-Human Resources Management

Modern complex organizations have become flatter (fewer hierarchical layers) and more dependent upon formal and informal teams to coordinate work across functional areas. As a result, teams have become central to organizational effectiveness and adaptiveness. The ability to successfully lead and perform on a team has become critical for both the organization and its members. This course covers the nature and practice of effective leadership in a team-based environment while defining the hallmarks of successful teams at both a human interaction and performance effectiveness levels. The course has the goal of

enhancing the teamwork skills of each participant as well as providing a firm grasp of the inherent human dynamics necessary for team based work.

Credits: 2

PB 742 - Leadership and Development

Modern organizations are complex systems where significant change is very difficult. Regardless of one's position or status, it is necessary to learn how to influence one's organization and potentially lead, even in the absence of formal authority. This course provides relevant theory and practical tools to help team members, middle managers and executives understand how to diagnose organizational complexity; build on natural influence skills and apply contemporary leadership theory to real work challenges. Much of the course focuses on four organizational theory categories: structure, culture, people issues and power/politics. Simulations and role plays are used to surface real world challenges and questions. The outcome of the course is a document that describes each student's individual planned approach to influence and lead.

Credits: 2

PB 751 - Introduction to Marketing

The course is designed to introduce the student to the basic concepts in marketing so students understand the similarities between pharmaceutical marketing and other industries in addition to the distinctive areas of pharmaceutical marketing. The course covers analyzing market opportunities, planning marketing programs, formulating product strategy, structuring the market mix, and managing the marketing program.

Credits: 2

PB 752 - Introduction to Market Research

This course examines qualitative methods, such as focus groups and individual in-depth interviews, and quantitative methods, such as self-administered questionnaires, conjoint analysis, discrete choice models, internet surveys, and various hybrid marketing research methods. Application of results in designing and testing marketing communications, SWOT analysis, and designing and evaluating marketing tactics will be explored.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PB 731 - Business Statistics, PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 2

PB 753 - Pharmaceutical Marketing and Sales Management

The course covers the distinctive features of the American healthcare market, including formulary decision making, managed care and third-party insurance providers, retail outlets, direct-to-consumer marketing, and government reimbursement issues. The tactical portion of the course is divided into three segments: (1) pharmaceutical marketing, (2) strategy and implementation, and (3) development of a comprehensive cross-functional tactical and promotional plan. Students will use teamwork to develop and present their plan.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 2

PB 756 - Pharmaceutical Marketing & Sales Mgmt

The course covers the distinctive features of the American healthcare market, including formulary decision making, managed care and third-party insurance providers, retail outlets, direct-to-consumer marketing, and government reimbursement issues. The

tactical portion of the course is divided into three segments: (1) pharmaceutical marketing, (2) strategy and implementation, and (3) development of a comprehensive cross-functional tactical and promotional plan. Students will work in teams to develop and present their own plan

Credits: 3

PB 757 - Marketing/Survey Research Methods

This course examines qualitative methods, such as focus groups and individual in-depth interviews, and quantitative methods, such as self-administered questionnaires, conjoint analysis, discrete choice models, Internet surveys, and various hybrid marketing research methods. Application of results in designing and testing marketing communications, SWOT analysis, and designing and evaluating marketing tactics will be explored

Credits: 3

PB 758 - Global Supply Chain

This course explores a variety of supply chain challenges facing managers using both strategic and quantitative models. Particular areas of focus include global systems, sustainable practices, government regulation and quality assurance as well as enterprise coordination with marketing, operations, risk, quality, and financial managers.

Credits: 2

PB 759 - Cannabis Marketing and Sales

The course covers the distinctive features of the American cannabis market, including medical cannabis, adult use and the hemp industries. The tactical portion of the course is divided into three segments: (1) cannabis marketing and regulations, (2) strategy and implementation, and (3) development of a comprehensive cross-functional tactical and promotional plan. Students will use teamwork to develop and present their plan.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 2

PB 761 - Competitive Analysis and Strategic Business Planning

This course provides an in-depth understanding of the process of competitive analysis and business planning in the pharmaceutical industry. Focus will be on how to analyze the competition's strengths and weaknesses, product life-cycle analysis, and therapeutic portfolio management.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 2

PB 762 - Pharmaceutical Research and Development Management

The course reviews, in depth, the elements of managing the research-and-development process in pharmaceutical companies. It includes an introduction to the major R&D components of drug discovery, preclinical development, clinical development, project management, and pharmaceuticals. The course will take students through a case study of a drug development program.

Credits: 2

PB 763 - New Product Development

This course provides an overview of portfolio analysis, the drug development process, and the factors necessary for economic success in the marketplace. Particular attention will be devoted to the role of marketing in the R&D process

Credits: 2

PB 765 - Business Strategy

This course provides an in-depth understanding of the process of competitive analysis and strategic planning in the pharmaceutical industry. It includes an overview of major schools of strategic thought and how these schools have influenced strategy in the pharmaceutical industry. Students work in teams with a senior executive from a pharmaceutical company to solve a strategic issue. Mid-term and final presentations are made to faculty and a pharmaceutical executive

Credits: 3

PB 767 - Introduction to Medical Cannabis Industry

This course provides an overview of the cannabis industry in the US. It examines the underpinning of the current laws and regulations governing the industry, reviews the growing and processing of cannabis plants, and describes the basics of the endocannabinoid system to provide a basic understanding of the pharmacology of cannabinoids. The course will further explore the business opportunities and pitfalls that the industry is facing.

Credits: 2

PB 768 - Finance and Regulation of Cannabis Industry

This course will provide a basic understanding of the regulations and financing framework currently shaping the cannabis industry. Topics include federal and state laws affecting the growing, processing, and sale of cannabis with a focus on taxation, banking, financing/venture capital and operating a cannabis business.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 711 - Managerial & Financial Accounting with grade greater than or equal to D-.]

Credits: 2

PB 771 - Regulation of Prescription Drugs and Ethical Issues

Drug regulation spans the entire scope of the pharmaceutical business. The course addresses the role of regulatory agencies in manufacturing, marketing, and marketing support material. In addition, the course examines the role of regulatory agencies outside the United States in their own markets. In-depth attention is devoted to regulatory agencies in new product development and product safety overview. The course also covers the major ethical issues in the delivery of general healthcare and pharmaceutical healthcare from the perspective of public policy and the pharmaceutical industry.

Credits: 2

PB 773 - Regs of RX drugs & Eth Issue

Drug regulation spans the entire scope of the pharmaceutical business. The course addresses the role of regulatory agencies in marketing and marketing support material. In addition, the course examines the role of regulatory agencies outside the United States. Regulation of product manufacturing is also discussed. In-depth attention is devoted to regulatory agencies in new product development and product safety overview

Credits: 3

PB 774 - Ethical Issues in Pharmaceutical Business

This course addresses the role of ethics in the U.S. pharmaceutical industry, along with a brief discussion of ethical standards in the pharmaceutical markets of Europe, Asia, and other regions. Marketing, clinical trials, compliance, sales, and other pharmaceutical-related issues will be examined from an ethical perspective. In addition to specific ethical issues in the drug industry, general business and medical ethics will also be briefly covered.

Credits: 2

PB 780 - Bus Comm & Info Strategies

This course provides new graduate students in the online MBA program with an introduction to oral, written, and virtual communication; methods for finding and evaluating course resources; online research techniques; critical thinking; the purpose and benefits of the MSM (Multidiscipline Strategic Management) project; program standards; stress and time management; and learning team process. The design of the course will also assist students in mastering the online learning environment and developing collegial relationships with their cohort members

Credits: 2

PB 790 - Multidiscipline Strategic Management III

MSM III is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of pharmaceutical research and development, regulations, pharmacoeconomics and health policies that impact product pricing, reimbursement and launch.

Prerequisites & Notes

(Prerequisites: PB 762 and PB 771)

Credits: 1

PB 790 - Multidiscipline Strategic Management III

MSM III is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of pharmaceutical research and development, regulations, pharmacoeconomics and health policies that impact product pricing, reimbursement and launch.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 762 - Ph'ceutical Res & Develop Mgmt, PB 771 - Reg of Rx Drugs & Ethical Issu with grade greater than or equal to D-.]

Credits: 1

PB 790 - Multidiscipline Strategic Management III

MSM III is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of pharmaceutical research and development, regulations, pharmacoeconomics and health policies that impact product pricing, reimbursement and launch.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 762 - Ph'ceutical Res & Develop Mgmt, PB 771 - Reg of Rx Drugs & Ethical Issu with grade greater than or equal to D-.]

Credits: 1

PB 791 - Multidiscipline Strategic Management I

MSM I is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The objective of this course is to provide beginning MBA students with an overview of relevant pharmaceutical and healthcare information. This MSM course will focus on the integration of knowledge concerning political, social and environmental factors that influence the strategy and direction of the pharmaceutical and healthcare sector.

Credits: 1

PB 792 - Multidiscipline Strategic Management II

MSM II is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of learning about market research, marketing, sales strategy, and competitive analysis.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 751 - Introduction to Marketing, PB 752 - Intro to Market Research, PB 753 - Pharm Marketing & Sales Mgmt with grade greater than or equal to D-.]

Credits: 1

PB 794 - Multidiscipline Strategic Management IV

MSM IV is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of accounting and managerial and corporate finance.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PB 711 - Managerial & Financial Accting, PB 721 - Managerial Finance, PB 722 - Corporate Finance with grade greater than or equal to D-.]

Credits: 1

PB 796 - Multi-Discipline Strategic Management II

Building on the work done in the MSM I course, MSM II provides students with a deeper understanding of how a pharmaceutical company operates, as well as covering the issues and problems that might affect or impact the company and how it might address those issues. The course is not lecture-based but is instead a student-centered-learning course. Students will continue to develop their case study of a hypothetical pharmaceutical company by developing a global strategic response to a challenge faced by the company. At the end of the semester the teams will present their findings and defend and discuss them with the faculty advisors. Guest lecturers, mentors, and written exercises will be part of the educational experience.

Credits: 2

PB 797 - Multi-Discipline Strategic Mgmt III

MSM III is the third part of a three-semester series of courses where the students get a broad, in-depth understanding of the kinds of issues that corporations must deal with in the pharmaceutical industry. The course is not lecture-based but is instead a student-centered-learning course. In MSM III, the students use the knowledge gained in MSM I and II to interact with representatives of an actual pharmaceutical company. The goal is to understand how pharmaceutical companies solve real issues by actually participating in the problem-analysis and problem-solving process

Credits: 3

PB 798 - MSM V Cannabis Industry

MSM V is one of four one-semester courses scheduled throughout the MBA program. This course is non-lecture based but is instead a student-centered-learning course. The purpose of the course is to provide students with the opportunity to apply what they have learned in one core area of the program. This MSM course will focus on the integration and application of learning about cannabis business practices, finance and regulations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PB 767 - Intro Medical Cannabis Industry, PB 768 - Finance/Reg Cannabis Ind with grade greater than or equal to D-.]

Credits: 1

PB 840 - Health Economics

This course equips the student with an understanding of the pharmacoeconomics of specific drugs as well as macroeconomic and microeconomic concepts, how to read and analyze economic and pharmacoeconomic reports, how to develop clinical economic studies, and how to analyze and measure inputs and outcomes. Tools covered include cost-benefit, cost-effectiveness, and cost-utility analysis. In addition, the course covers how to apply economic analysis to marketing situations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):

PB 870 - Internship and Independent Study in Pharmaceutical and Healthcare Business

Independent study projects available to students to work in an area of particular interest under the direction of a faculty member in Mayes College of Healthcare Business and Policy. May be taken for one, two, or three credits depending upon the scope and workload of the project.

Credits: 4

PB 875 - Future of the Healthcare System

This course seeks to develop the student's ability to analyze the environmental, political, internal, and external factors and leading indicators influencing the future structure of the healthcare industry. It provides the opportunity for students to demonstrate the synthesis and application of more basic skills learned in previous courses.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PB 752 - Intro to Market Research, PB 761 - Comp Analy & Strat Bus Plnng, PB 771 - Reg of Rx Drugs & Ethical Issu, PB 880 - International Pharma Business with grade greater than or equal to D-.]

Credits: 2

PB 880 - International Pharma Business

This course provides an overview of global markets in the pharmaceutical industry. Global competitiveness based on the effects of national regulatory environments and economic and market factors will be explored. Issues such as the drug approval process, pricing decisions, and intellectual property will be discussed. May be taken on-campus or on a study trip to either Asia or Europe.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 2

PB 888 - Methods of Inquiry/Analysis

Methods of Inquiry and Analysis is a one-semester course scheduled prior to Capstone in the MBA program. This course is both lecture-based and a student-centered learning-course. The purpose of this course is to integrate what students have learned throughout the MBA program with the goal of preparing students for Capstone. Students will develop a Capstone Proposal, which will include the following components; Background, Literature Review, Hypothesis, and Methodology.

Credits: 1

PB 890 - Capstone Global Bus Strategies

This summative capstone course provides an opportunity for students to apply integrated learnings from the MBA program in a final project. Students successfully completing the capstone project demonstrate critical thinking concerning an issue or problem within the pharmaceutical or healthcare business domain. The final project will include a presentation by the student to

PC 181 - Pharmacology/Toxicology Orientation I

Introduction to University life and to pharmacology and toxicology, including current topics, expectations, and opportunities in the field.

Credits: 1

PC 282 - Pharmacology/Toxicology Orientation II

Continuation of PC 181. Introduction to research literature in pharmacology/toxicology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 181 - Pharm-Tox Orientation I with grade greater than or equal to D-.]

Credits: 1

PC 301 - Physiology I

Correlation of morphological, biochemical, and functional organization of the human body as related to both normal physiology and disease processes. Topics include introduction to pathophysiology; hematology and immunology; and nervous, musculoskeletal, and cardiovascular systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 104 - General Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 205 - Elements of Physics with grade greater than or equal to D-.]

Credits: 4

PC 302 - Physiology II

Continuation of PC 301. Topics include gastrointestinal system with nutrition and metabolism; urinary system; respiratory system; endocrine-reproductive system; and special topics such as skin, breast, vision, and hearing.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 301 - Physiology I with grade greater than or equal to D-.]

Credits: 4

PC 305 - Fundamentals of Pharmacology

Basic principles and therapeutic approaches to the treatment of diseases. Students will be introduced to the role and actions of drugs and their classes as they relate to biological receptors, disease, health, and body systems.

Prerequisites & Notes

Func II, BS 310 - Anatomy and Physiology I with grade greater than or equal to D-.] [Student has completed any of the following course(s): CH 340 - Survey of Biochemistry, CH 346 - Biochemistry with grade greater than or equal to D-.]

Credits: 3

PC 311 - Pharmacology and Med Chem I

Basic principles of pharmacodynamics including administration, absorption, distribution, metabolism, sites and mechanisms of action, and toxicity of diagnostic and therapeutic agents. Major drug categories include antibiotics, antineoplastics, autonomic, skeletal muscle relaxants, local anesthetics, and selected central nervous system (CNS) depressants. 4 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 348 - Biochem-Molecular Bio II, PC 302 - Physiology II with grade greater than or equal to D-.]

Credits: 4

PC 312 - Pharmacology and Med Chem II

Consideration of selected central nervous system (CNS) depressants, cardiovascular (CV) agents, diuretics, nonsteroidal anti-inflammatory drugs (NSAIDs), and hormonal agents. 4 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 311 - Ph'cology and Med Chem I with grade greater than or equal to D-.]

Credits: 4

PC 315 - Introduction to Toxicology

This course introduces the basic principles of the effects of toxic substances on biological systems, including consideration of the history, scope, and applications of toxicology, toxicant exposure, the mechanisms of toxic action, some major types of toxicants, and fundamental methods of toxicology studies. Students will apply the basic principles of toxicology to evaluate the safety risks in preclinical, environmental, and forensic studies and practices.

Credits: 2

PC 320 - Techniques in Pharmacology and Toxicology

A laboratory course designed to familiarize students with standard methodology used to assess drug and chemical safety.

Credits: 2

PC 324 - Pharmacology and Toxicology Seminar I

Presentation by students and discussion of primary scientific literature in pharmacology and toxicology by students and faculty.

Credits: 1

PC 330 - Biomethods in Pharmacology and Toxicology

Survey of biological methods employed in pharmacology and toxicology to assess efficacy and safety of drugs and chemicals. Experiments are designed to illustrate pharmacological principles and to detect and evaluate potential local and systemic toxicities.

Credits: 3

PC 331 - Biochemical Pharmacology and Toxicology

Consideration of substances of pharmacological and toxicological importance with emphasis on the biochemical methodology used to assess their cellular and molecular or cellular mechanisms of action, biotransformation, and elimination.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 3

PC 340 - Introduction to Neuropsychopharmacology

This course will provide a working knowledge of the neurobiological and neurochemical basis of behavior and the mechanism by which drugs influence synaptic neurotransmission to alter behavior and function in neurologic and psychiatric disorders. No prior courses in pharmacology are required.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PC 302 - Physiology II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 3

PC 350 - Toxicology of Drug Abuse

This course will consider the toxicity of deliberately ingested, inhaled, injected materials that are used to alter the psychological state. The course will provide a working knowledge of the neurobiological and neurochemical basis of behavior and the mechanism by which drugs influence synaptic neurotransmission to alter behavior and function in Addiction. No prior courses in pharmacology are required.

Credits: 2

PC 352 - Cardiovascular Pathophysiology

This elective extends basic knowledge of cardiovascular physiology, focusing on the pathological characterization and development of cardiovascular disease. Molecular and cellular aspects of disease pathogenesis will be linked to understand etiology, symptomology, and pathology, linking diagnostic measures and biomarkers with multi-factorial processes common to age-related diseases.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 346 - Biochemistry, PC 301 - Physiology I with grade greater than or equal to D-.]

Credits: 2

PC 395 - Research Experience in Pharm/Tox

This course is a research opportunity for students to work with a faculty mentor (or faculty's lab team members) to gain insight and skills in research literature interpretation, hypothesis testing, laboratory measures, and data analysis. The course is pass/fail, with specific objectives and expectations agreed upon by mentor and students, and can be taken multiple times.

Prerequisites & Notes

Student has received department permission for PC 395 - Research Experience

Credits: 4

PC 401 - Toxicology I

Introduction, scope, and fields of toxicology, as well as methods and design of acute, subacute, and chronic toxicity studies. Introduction to pathology and mechanisms of cell injury.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 4

PC 402 - Prin of Toxicology II

An examination of the effects of toxicants on respiratory, cardiovascular, reproductive, and central nervous systems and on blood, bone marrow, liver, kidney, skin, and sensory organs.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 401 - Toxicology I with grade greater than or equal to D-.]

Credits: 4

PC 411 - Principles of Medicinal Chemistry and Molecular Pharmacology

This course will introduce concepts involved in drug actions in the body. Principles of pharmacokinetics and pharmacodynamics will be explored from a theoretical standpoint with integration of chemical and biological principles.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): BS 205 - Human Structure & Func I, BS 310 - Anatomy and Physiology I with grade greater than or equal to D-.] [Student has completed any of the following course(s): CH 346 - Biochemistry, CH 356 - Molecular Biol & Genetics with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): BS 206 - Human Structure & Func II, BS 311 - Anatomy and Physiology II with grade greater than or equal to D-.]

Credits: 4

PC 412 - Pharmacology I

This course will describe pharmacological classes of therapeutic agents with an emphasis on mechanism of action at the cellular and organ level.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 411 - Prin Med Chem Mol Pharmacol with grade greater than or equal to D-.]

Credits: 3

PC 421 - Advanced Medicinal Chemistry and Pharmacology

This course will introduce concepts involved in drug actions in the body. Principles of medicinal chemistry, pharmacokinetics, pharmacodynamics and pharmacogenomics will be explored from an theoretical standpoint with integration of chemical and biological principles.

Credits: 4

PC 422 - Special Topics in Pharmacology

This course will describe pharmacological classes of therapeutic agents with emphasis on mechanisms of actions at the cellular and organ levels. Students will also participate in interactive learning related to special topics in pharmacology.

Prerequisites & Notes

(Prerequisite: PC421 or permission of instructor)

(Special Registration Restrictions: U3 or above)

Credits: 4

PC 424 - Pharm-Tox Seminar II

Formal science-based presentations by students using primary scientific literature.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 324 - Pharm-Tox Seminar I with grade greater than or equal to D-.]

Credits: 1

PC 431 - Advanced Toxicology

This course introduces the biochemical, genetic, cellular basis of cytotoxicity. Based on this knowledge, the course will study the toxic effects and their underlying mechanisms in different organ systems (e.g., liver, kidney, lung, eye, immunity, endocrine, and reproductive system).

Credits: 3

PC 432 - Special Topics in Toxicology

This course considers special topics related to organ-specific pathology and applications of clinical toxicology. Special topics may include substance use disorders, cancer therapeutics, immunotherapy, nanotherapy, and the toxicology of medical devices. The course will provide a working knowledge of toxicology principles that impact specific disease states and therapy. No prior courses in pharmacology are required.

Prerequisites & Notes

(Prerequisite: BS 206 or BS 311; CH346 or RX330; or permission by instructors)

Credits: 3

PC 440 - Pharmacology

This course will describe pharmacological classes of therapeutic agents with an emphasis on mechanism of action at the cellular and organ level. Students will attend three lectures per week from PC 412. An additional hour will be devoted to interactive

learning and student applications of learning principles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 411 - Prin Med Chem Mol Pharmacol with grade greater than or equal to D-.]

Credits: 4

PC 450 - Analysis of Scientific and Medical Publications: Retractions, Publication Ethics, and Adverse Consequences

The purpose of this course is to use the information learned from retracted scientific papers in the medical/pharmaceutical field to teach many aspects of scientific publication. The class will discuss the specific reasons for the retractions, for example, errors in data, plagiarism, or fraudulent data including manipulated photo images. Using data from subsequent publications that led to the particular retraction, we will analyze the original data in terms of the rigor of statistics, reproducibility, and hints of data manipulation. We will also analyze the impact of the retracted papers on the scientific concepts and to public health. A retracted paper means that the particular data no longer exist in the literature; therefore in this course, we will discuss the ethics and responsibility of authorship, including coauthors. We will also discuss the process of scientific publication and the peer review process that varies widely among journals. Examples of the adverse consequences of retracted papers to medical science, to the biomedical community, and to the public at large will be given in class and discussed in terms of the responsibility of scientists and the ethics in scientific publications. For students electing to receive a letter grade in the course, two written assignments will be required.

Credits: 2

PC 495 - Independent Research Project in Pharmacology/Toxicology

This course is a research opportunity for students to work with a faculty mentor (or faculty+s lab team members) to gain insight and skills in research literature interpretation, hypothesis testing, laboratory measures, and data analysis, as well as research summarization and conclusion generation, with poster preparation and data presentation to a broad audience. Faculty mentor and student should agree upon the specific objectives and expectations for the course at the beginning of the course; usually the course will follow one or more PC 395 courses, with the added course requirement here for preparation and presentation of data at a local or regional science meeting. This course can be taken multiple times.

Prerequisites & Notes

Student has received department permission for PC 495 - Independent Research

Credits: 4

PC 512 - Pharmacology II

This course will continue descriptions of pharmacological classes of therapeutic agents with an emphasis on mechanism of action at the cellular and organ level. A portion of the course will be devoted to interactive learning and student applications of learning principles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 412 - Pharmacology I with grade greater than or equal to D-.]

Credits: 2

PC 701 - Pathophysiology I

Correlation of morphologic, biochemical, and functional organization of the human body as related to both normal physiology and disease processes. Graduate students attend scheduled lectures in PC 301, complete graduate study assignments based on relevant research literature, and take separate exams.

Credits: 4

PC 702 - Physiology II

Continuation of PC 701. Lecture attendance in PC 302, study assignments on relevant research literature, and separate exams.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 701 - Pathophysiology I with grade greater than or equal to D-.]

Credits: 4

PC 703 - Pharmacology I

Study of pharmacodynamics and toxicity of diagnostic and therapeutic agents. Principles of drug absorption, distribution, biotransformation, and elimination are covered. Consideration of antimicrobials, cancer chemotherapeutics, autonomic pharmacology, and neuropharmacologic agents. Graduate students attend lectures in PC 311, complete graduate study assignments based on relevant research literature, and take separate exams.

Credits: 4

PC 704 - Pharmacology and Med Chem II

Continuation of PC 703. Continuation of neuropharmacology and analgesic, psychotherapeutic, cardiovascular, renal, hematologic, and endocrine agents. Lecture attendance in PC 312, study assignments on relevant research literature, and separate exams. 4 class hrs, supplemental study assignments

Credits: 4

PC 711 - Principles of Medicinal Chemistry and Molecular Pharmacology

This course will introduce concepts involved in drug actions in the body. Principles of pharmacokinetics and pharmacodynamics will be explored from a theoretical standpoint with integration of chemical and biological principles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CH 346 - Biochemistry, CH 356 - Molecular Biol & Genetics with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 205 - Human Structure & Func I, BS 206 - Human Structure & Func II with grade greater than or equal to D-.] [Student has completed any of the following course(s): PC 301 - Physiology I, PC 302 - Physiology II with grade greater than or equal to D-.]

Credits: 4

PC 740 - Pharmacology

This course will describe pharmacological classes of therapeutic agents with an emphasis on mechanism of action at the cellular and organ level. Students will attend three lectures per week from PC 412. An additional hour will be devoted to interactive learning and student applications of learning principles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 711 - Ph'ology and Med Chem with grade greater than or equal to D-.]

Credits: 4

PC 760 - Biopharmaceutical Proteins: Principles and Applications

This class introduces theory, techniques, applications and ongoing research on biopharmaceutical proteins. It covers the process of translating a protein drug from bench to bedside. Students are expected to understand and analyze the processes of protein drug development (target validation, protein expression and purification, protein drug modification and formulation, and therapeutic evaluation) utilizing interdisciplinary knowledge and methods of molecular and cellular biology, structural biology, biochemistry, computational chemistry, medicinal chemistry and pharmaceuticals.

Credits: 3

PC 799 - Research

Candidates for the master of science degree complete an independent research project, equivalent to at least 10 research credits, under the direction of an Advisory Committee of graduate faculty.

Credits: 12

PC 801 - Research Literature in Pharmacology and Toxicology

Weekly presentations by graduate students and faculty on current research papers from journals relevant to the fields of pharmacology and toxicology, followed by group discussion. Attendance and active participation are required during fall and spring semesters.

Credits: 1

PC 811 - Research Techniques Laboratory

During the first year of enrollment, each student satisfactorily completes an experiential rotation through the research laboratories of at least two departmental graduate faculty and selects a primary research topic.

PC 821 - Molecular Pharmacology

This is an advanced pharmacology course with a focus on cell signal transduction. Major mammalian signaling pathways will be reviewed and how therapeutics, especially anticancer therapeutics, perturb these signaling pathways for therapeutic purposes will be discussed. Instructors will provide appropriate recent review and research papers to the class. Students are required to read these papers and actively participate in class discussion. Students are also required to write a mock research proposal and present it in class.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PC 711 - Ph'cology and Med Chem with grade greater than or equal to D-.]

Credits: 3

PC 822 - Drug Discovery for Neurodegenerative Disorders

The goal of this course is to examine the drug discovery process for neurodegenerative disorders. Using Alzheimer's disease as a model, we will examine the diagnosis, epidemiology, current therapeutics, and strategies for drug discovery. The in vitro disease models with resulting outcomes in translational studies will be discussed. At the end of the course students will utilize NIH guidelines to develop their own proposal for future studies.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PC 411 - Prin Med Chem Mol Pharmacol, PC 711 - Ph'cology and Med Chem with grade greater than or equal to D-.]

Credits: 3

PC 851 - Advanced Pharmacology I

This advanced course of molecular pharmacology focuses on cell signal transduction. It will provide students with a fundamental understanding of cell signaling mechanisms of current therapeutics. All major mammalian signaling pathways will be covered. An additional objective of this course is to give students experience in critical reading and discussing scientific literature and writing a short grant proposal.

Credits: 3

PC 852 - Advanced Pharmacology II

This advanced course will focus on organ toxic effects and mechanisms. Toxicity induced by environmental toxins, drugs, and other chemicals on major organs and systems will be covered. In addition to attending lectures, graduate students will critically review current literature and write term papers on related topics.

Credits: 3

PC 853 - Advanced Pharmacology III

Instruction and group discussion of topics related to the research interests and expertise of departmental faculty. Theory and experimental techniques, analysis and interpretation of data, and critical review of the literature are emphasized. Topics vary according to instructor preferences; two faculty members participate each semester.

PC 854 - Advanced Pharmacology IV

Instruction and group discussion of topics related to the research interests and expertise of departmental faculty. Theory and experimental techniques, analysis and interpretation of data, and critical review of the literature are emphasized. Topics vary according to instructor preferences; two faculty members participate each semester.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PC 411 - Prin Med Chem Mol Pharmacol, PC 711 - Ph'ology and Med Chem with grade greater than or equal to D-.]

Credits: 3

PC 880 - Pharmacology and Toxicology Graduate Seminar

Reports on current research topics by guest scientists, departmental faculty, and graduate students, followed by group discussion. Attendance and participation are required during fall and spring semesters.

Credits: 1

PC 899 - Doctoral Research

Candidates for the doctor of philosophy degree fulfill their thesis-directed research requirement, equivalent to at least 20 research credits, under the supervision of an Advisory Committee of graduate faculty.

Credits: 12

PE 101 - Physical Education I

Instruction in individual lifetime sports activities, group exercises, group experiences in competitive games, personal fitness programs, and corrective individual exercises.

Credits: 0

PE 102 - Physical Education II

Continuation of PE 101.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PE 101 - Physical Education I with grade greater than or equal to P.]

Credits: 1

PE 201 - The Art of Officiating

THE ART OF OFFICIATING v is an interdisciplinary course which explores the mental and physical attributes needed to officiate team sporting events. Students will demonstrate officiating techniques and styles learned in class to develop their own officiating style.

PE 202 - Coaching Team Sports

Introduction to coaching team sports will examine the basics of coaching; elements common to all team sports - communication; goal setting; creating a values-based culture; and the value of teamwork.

Credits: 3

PH 101 - Pharm Tech Orientation I

Introduction to academic life, the program, and professional issues. Includes utilization of the library and faculty presentations.1 class hr

Credits: 1

PH 103 - Pharmaceutical Sciences Orientation I

Introduction to academic life, the program, and professional issues. Includes utilization of the library and faculty presentations.

Credits: 1

PH 201 - Pharmaceutical Tech Orientation II

Discussion and presentation of current topics in pharmaceutical sciences. Includes pharmaceutical company visitation and utilization of the scientific literature.1 class hr

Credits: 1

PH 203 - Pharmaceutical Sciences Orientation II

The course introduces students to the different steps in the new drug development process and familiarizes them with FDA regulations pertaining to each of these steps.

Credits: 1

PH 302 - General Pharmaceutics

Provides the physicochemical and pharmaceutical principles for understanding the development, preparation, and stability testing of pharmaceutical dosage forms.

Credits: 3

PH 304 - Intro to Pharmaceutics

Study of the physicochemical and pharmaceutical principles used to understand the development, behavior, formulation, and stability of dosage forms.

Credits: 3

PH 305 - Pharmaceutical Calculation

Provides a common approach to interpret mathematical problems in pharmacy and a systematic methodology to solve these problems.

Credits: 1

PH 310 - Special Topics in Pharmaceutics

An introductory survey of specific current innovations that will shape drug therapy.

Credits: 3

PH 316 - Pharmaceutics and Biopharmaceutics I

Provides the physicochemical and pharmaceutical principles for understanding the development, behavior, preparation, and stability of pharmaceutical dosage forms and drug delivery systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 110 - General Calculus with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 202 - Organic Chemistry II, CH 212 - Prin of Organic Chem II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 205 - Elements of Physics, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PH 317 - Pharmaceutics and Biopharmaceutics II

Study of the fundamental principles of rate processes and their application to predicting and computing the rate of drug dissolution, absorption, distribution, metabolism, elimination, and pharmacological action.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 316 - Ph'ceutics-Bioph'ceutics I with grade greater than or equal to D-.]

Credits: 4

PH 318 - Pharmaceutics Laboratory

This course is designed to give the student practical experience in pharmaceutical compounding techniques. Students will compound such dosage forms as oral, ophthalmic, and parenteral solutions (liquid); powders, capsules, tablets, and suppositories (solid); and emulsions, suspensions, and ointments (semisolids).

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CH 202 - Organic Chemistry II, MA 102 - Mathematical Analysis II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PH 305 - Ph'ceutical Calculation, PY 202 - Introductory Physics II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of

completing all of the following course(s): PH 316 - Ph'ceutics-Bioph'ceutics I with grade greater than or equal to D-.]

Credits: 1

PH 330 - Research Techniques in Pharmaceutical Sciences

The course will familiarize students with research techniques used in the pharmaceutical sciences including drug dissolution, chromatography, electrophoresis, protein assays, ELISA, and cell culture.

Credits: 3

PH 390 - Pharmaceutical Tech Seminar I

Pharmaceutical topics of ongoing and current interest are reviewed and presented by students, followed by questions from the audience. Emphasis is placed on learning to prepare and deliver a presentation. 1 class hr

Credits: 12

PH 391 - Pharmaceutical Sciences Seminar I

Pharmaceutical topics of ongoing and current interest are reviewed and presented by students, followed by questions from the audience. Emphasis is placed on learning to prepare and deliver a presentation.

Credits: 1

PH 398 - Research Methods in Pharmaceutics

The course will familiarize students with research techniques including chromatography, dissolution, electrophoresis, protein assays, and cell culture.

Credits: 2

PH 399 - Project in Pharmaceutics

Opportunity for qualified students to carry out a research project under the direction of a pharmaceutical sciences faculty member. Preparation of a research report on the basis of primary data and/or an extensive literature search.

Prerequisites & Notes

Student has received department permission for PH 399 - Project in Pharmaceutics

Credits: 2

PH 400 - Cosmetic Science

An examination of the development and use of cosmetic products with emphasis on formulations.

Credits: 2

PH 401 - Cosmetic Science Lab

Development of cosmetic formulations using various raw material ingredients.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 400 - Cosmetic Science with

PH 402 - Controlled-Release Dosage Forms

Study of controlled-release (CR) drug dosage forms. Covers drug release profiles from conventional and nonconventional systems and their relevance in therapeutic outcomes.

Credits: 2

PH 404 - Topics in Pharmaceutics

Study of the physicochemical, pharmaceutical, and biopharmaceutical principles used in the development of drug delivery systems.

Credits: 4

PH 416 - Pharmaceutics & Biopharmaceutics I

Provides the physicochemical and pharmaceutical principles for understanding the development, behavior, preparation, and stability of pharmaceutical dosage forms and drug delivery systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 110 - General Calculus with grade greater than or equal to D-.]

Credits: 3

PH 417 - Pharmaceutics and Biopharmaceutics II

Study of the fundamental principles of rate processes and their application to predicting and computing the rate of drug dissolution, absorption, distribution, metabolism, elimination, and pharmacological actions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 305 - Pharmaceutical Calculation, PH 416 - Pharmaceutics-Biopharmaceutics I with grade greater than or equal to D-.]

Credits: 4

PH 418 - Pharmaceutics Laboratory

This course is designed to give the student practical experiences in pharmaceutical compounding techniques and to illustrate fundamental principles of pharmaceutical dosage forms.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): CH 202 - Organic Chemistry II, MA 102 - Mathematical Analysis II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 205 - Elements of Physics with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PH 305 - Pharmaceutical Calculation, PH 416 - Pharmaceutics-Biopharmaceutics I with grade

PH 450 - Manufacturing Pharmacy

Technology involved in the industrial preparation of dosage forms such as oral solids (compressed tablets and capsules) and oral fluids. Emphasis through the course is placed on good manufacturing practices (GMP).

Credits: 2

PH 451 - Manufacturing Pharmacy Laboratory

Laboratory experience to coordinate with PH 450.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 450 - Manufacturing Pharmacy with grade greater than or equal to D-.]

Credits: 1

PH 490 - Pharm Tech Seminar II

Continuation of PH 390. Includes student presentations and discussion of scientific articles. 1 class hr

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 390 - Doctoral Research with grade greater than or equal to D-.]

Credits: 1

PH 491 - Pharmaceutical Sciences Seminar II

Continuation of PH 391. Includes student presentations and discussion of scientific articles.

Credits: 1

PH 750 - Advanced Pharmaceutics

The course presents the areas of pharmaceutical sciences and drug delivery at an advanced level. The topics include physical properties of drugs, ionic equilibria, solubility and related phenomena, drug diffusion and permeability, drug stability, interfacial phenomena, colloids, micromeritics, drug dissolution, and biomaterials.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I, PH 316 - Ph'ceutics-Bioph'ceutics I with grade greater than or equal to D-.]

Credits: 4

PH 752 - Product Development

Opportunity to develop and prepare pharmaceutical products in current use.

Credits: 3

PH 755 - Application of Regulatory Sciences in Pharmaceutical Development

The student is introduced to quality guidelines, legislation, and their application to drug product development and registration. Emphasis is placed on International Conference on Harmonisation (ICH) guidelines.

Credits: 2

PH 799 - Master's Research

Students in the master of science degree program (thesis option) specializing in pharmaceuticals are required to complete a research project under the direction of a member of the graduate faculty in pharmaceuticals.

Credits: 12

PH 800 - Advanced Pharmaceutics

Topics of pharmaceutical interest including drug solubility, distribution phenomena, interfacial phenomena, solution kinetics, drug stability, and reaction pathways in pharmaceutical systems. 3 class hrs

Credits: 3

PH 803 - Equilibrium Phenomena

This course examines thermodynamic properties in pharmaceutical material and processes, thermodynamic analysis of related phenomena, and pertinent macromolecular phenomena in solution.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 3

PH 810 - Disperse Systems

Rheological, sedimentation, and flocculation behavior of dispersions. 2 class hrs

Credits: 2

PH 811 - Drug Diffusion and Controlled Delivery

This course covers the theory of drug permeation through polymer and biological membranes. The mechanistic basis for controlled delivery devices and specialized delivery systems is discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s):

Credits: 2

PH 813 - Design of Experiments

The student is provided a review of concepts in basic statistics and then a development of those concepts into approaches to the statistical design of experiments that allow screening of factors and eventual optimization of conditions. Emphasis is placed on applications to preformulation studies and formulation of drug products.

Credits: 2

PH 852 - Unit Operations

Unit operations required in pharmaceutical manufacturing and processing are presented from an engineering point of view.

Credits: 2

PH 875 - Drug Dynamics

Focuses on determination of pharmacokinetic parameters using compartment models; other topics include statistical moments, protein binding, clearance volume of distribution, nonlinear pharmacokinetics, and pharmacodynamics. Experimental data will be used to correlate practical applications with theory.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PH 317 - Ph'ceutics-Bioph'ceutics II with grade greater than or equal to D-.]

Credits: 3

PH 880 - Pharmaceutical Polymers

Covers the physical properties and characterization methods for polymeric materials, specifically as they apply to the design of pharmaceutical dosage forms and drug delivery systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): CH 321 - Physical Chemistry I with grade greater than or equal to D-.]

Credits: 3

PH 890 - Pharmaceutics Seminar

Presentation of recent research by current graduate students and invited guests will be followed by group discussion.

Credits: 2

PH 894 - Current Topics in Pharmaceutics

Topics selected by faculty. Previous topics include formulation development and experimental design.

PH 895 - Analysis of Current Literature in Pharmaceutics

Analysis and discussion of current literature in areas of interest in pharmaceutics. Papers are presented informally by students and faculty.

Credits: 2

PH 897 - Research in Pharmaceutics

The student completes two seven-week rotations through the laboratories of graduate faculty in pharmaceutics, providing experience in basic and applied techniques utilized in conducting research.

Credits: 2

PH 899 - Doctoral Research

Students in the doctor of philosophy degree program specializing in pharmaceutics are required to fulfill their research requirement under the direction of a member of the graduate faculty in pharmaceutics.

Credits: 12

PHA 100 - PA Seminar

This course will address PA students+ goals, as well as provide a brief history of the PA profession and the role of PAs today. Hands-on learning of basic PA skills such as taking patient history and vital signs, HIPPA, U.S. healthcare, and cultural awareness is included.

Credits: 1

PHA 101 - Prin and Prac Health Care I

Provides an understanding of the basic physical examination and medical terminology of the head and neck, giving a solid foundation for progression to the professional phase. History of the PA professional and the role of PAs today is discussed. (Fall only)1 class hr

Credits: 1

PHA 201 - Princ and Pract of Hlth Care

Provides an understanding of the basic physical examination and medical terminology of the body systems other than the head and neck, giving a solid foundation for progression to the professional phase. (Spring only)2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 101 - Prin and Prac Health Care I, PHA 102 - Physician Asst Orient II with grade greater than or equal to D-.]

Credits: 2

PHA 203 - Complementary and Alternative Medicine

This course is designed to introduce students to the various complementary and alternative medicines with the therapies available to patients and their impact on traditional mainstream medicine. (Covers aromatherapy, herbals, homeopathy, chiropractic, and others.)

Credits: 3

PHA 206 - PA Shadowing Experience I

Students are required to shadow a PA, physician, or NP for a semester. Students keep a journal of their experiences and prepare a case study presentation. Weekly class focuses on physical exam technique and common pathology of the HEENT and skin.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 100 - PA Seminar with grade greater than or equal to D-.]

Credits: 3

PHA 208 - PA Shadowing Experience II

Continuation of PHA 206. Shadowing plus physical exam of the cardiorespiratory, GI, musculoskeletal, and neurological systems is learned.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 100 - PA Seminar, PHA 206 - PA Shadowing Experience I with grade greater than or equal to D-.]

Credits: 3

PHA 300 - Physician Assistant Seminar

This course examines the importance of interviewing. Communication skills, verbal and nonverbal, are addressed. Students will learn and practice the patient interview as well as the professional interview. Medical ethics will also be addressed.

Credits: 1

PHA 301 - Principles & Practices of Healthcare III

PA students will be introduced to the role of drugs and their classes as they relate to disease, mental health, and body systems. 2 class hrs

Credits: 2

PHA 303 - Introduction to Pharmacology

PA students will be introduced to the role of drugs and drug classes as they relate to disease, mental health, and body systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CH 340 - Survey of Biochemistry, CH 346 - Biochemistry with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 205 - Human Structure & Func I, BS 310 - Anatomy and Physiology I with grade greater than or equal to D-.]

Credits: 3

PHA 310 - Medical Terminology I for PA

This course must be taken simultaneously with BS310 because it follows the curriculum of BS310 to coordinate anatomy and physiology with medical terminology of each body system.

Credits: 1

PHA 311 - Medical Terminology II PA

Continuation of PHA 310.

Credits: 1

PHA 399 - Independent Study

The purpose of the independent study is to gain experience (fieldwork in service learning, skill training, or research) in their field of healthcare under the supervision of a PA faculty member in the physician assistant studies program.

Credits: 3

PHA 501 - Human Anatomy

This course focuses on the study of functional and applied human anatomy. Each topic will utilize lecture and lab experiences that include prosected human cadaver specimens. When appropriate, clinical and surgical correlations are made from a diagnostic, as well as an operative, point of view. Instruction is primarily in lecture and laboratory format. Textbooks, atlases, computer software programs, and other visual aids are available for study. Applied learning based on clinically relevant cases will be emphasized.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 4

PHA 502 - Human Physiology

This course will provide students with a detailed overview of the fundamental aspects of human physiology, including the normal

function of the human body and its major organ systems. Understanding the normal physiologic processes will serve as a foundation for understanding altered health states and their therapeutic interventions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 503 - History / Physical I

This is the first course of two and is designed to provide students with the fundamental grounding and cognitive knowledge to prepare them for their clinical role. The course will provide students with the skills for interviewing patients and communication skills used to conduct age-appropriate and culturally competent histories, as well as to elicit histories from difficult patients. The course will also provide students with the skills to perform a comprehensive physical exam.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 504 - Pharmacology I

This is the first of two courses designed to provide a solid foundation in pharmacokinetics, pharmacodynamics, and the physiology associated with drug action and interaction. Drugs will be discussed by class with attention given to specific drugs, indications, contraindications, dosage, mechanism of action, side effects, similarities, and differences. Emphasis will be placed on the more common drugs in treatment of common diseases, including EENT, dermatologic, infectious, respiratory, cardiovascular, hematologic, and oncologic, and covers antibiotics and antivirals.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 505 - PA History

This course will give the new student the history, roots, and models of the physician assistant profession in medicine and look at the expected future role of the PA in medicine both in the United States and globally. Students will then explore the PA/physician relationship and the role of the PA within the medical team today. Professionalism, the Guidelines for Ethical Conduct for the Physician Assistant Profession, and stress management will also be addressed. Students will also be introduced to the state and national professional organizations and the resources they offer and learn about the certification and continuing medical education process.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 1

PHA 506 - Genetics for PAs

This one-credit online course will provide PA students with a review of the structure and function of the human genome, genes,

chromosomes, DNA, inheritance patterns, and genes associated with human disease. Genetics of common complex disorders and pharmacogenetics will also be covered.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 1

PHA 507 - Psychosocial Medicine

This course will examine the factors that influence a patient's development and will identify factors that aid in integrating psychosocial and behavioral perspectives to the practice of medicine. The physician assistant students will explore these aspects of their own personalities and evaluate how these aspects may affect interaction with their patients. Students will develop sensitivity for working with culturally diverse patient populations and outline healthcare disparities among minority groups. History taking, which is a core clinical skill, will be examined, and students will learn to elicit medical information with sensitivity and accuracy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 2

PHA 521 - Pathophysiology

This course is designed to provide students with an overview of the pathophysiology of the various organ systems of the human body. An understanding of the pathophysiology of disease and disease states is necessary to apply basic science knowledge to a clinical situation. This course will concentrate on the basic pathophysiologic understanding of disease and its clinical manifestations and will not emphasize areas of diagnosis or treatment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 522 - History/Physical II and Clinical Skills

This is the second course of two and is designed to move the student from the normal history and physical exam to a problem-focused history and physical exam in concert with abnormal findings found in various organ systems and pathologies. In addition, students will learn advanced skills required in clinical practice.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 523 - Clinical Medicine I

This course is the first of two designed to educate the student concerning diseases encountered in primary care medicine. The course will cover the etiology, epidemiology, pathophysiology, clinical findings, diagnostic studies, and pharmacologic and non-pharmacologic treatment/management plans for each disease. The topics covered include infectious, pulmonary, cardiovascular,

hematological, reproductive, dermatological, and EENT diseases and disorders. The course will be lecture format, with small group discussion, along with a supervised clinical long-term care experience that links the didactic phase with the clinical phase.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 4

PHA 524 - Pharmacology II

This is the second of two courses designed to provide a solid foundation in pharmacokinetics, pharmacodynamics, and the physiology associated with drug action and interaction. Drugs will be discussed by class with attention given to specific drugs, indications, contraindications, dosage, mechanism of action, side effects, similarities, and differences. Emphasis will be placed on the more common drugs in treatment of common diseases, including gastrointestinal, genitourinary, endocrine, neurological, musculoskeletal, psychiatric, and behavioral.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 3

PHA 525 - Diagnostics I

This course is part one of a two-semester course providing students with insight into the use of laboratory studies that aid clinicians in the diagnosis, treatment, and management of diseases. Laboratory measurements and examinations provide scientific data that are essential in the management of disease. Laboratory information is important in the prevention and screening of medical disorders and can be used to diagnose or confirm a preliminary diagnosis. Students will be instructed in the selection, indication, and interpretation of laboratory tests.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 2

PHA 526 - Introduction to Research/Evidence-Based Medicine

This course is the first of the required physician assistant research sequence. The course provides an introduction to the research process and its relationship to evidence-based practice. Students will obtain a basic understanding of theory-based research, methodological and ethical considerations in the design of research, and ways of evaluating evidence for practice. Learning will occur through lectures, class discussions, readings, and assignments.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 501 - Human Anatomy, PHA 502 - Human Physiology, PHA 503 - History / Physical I, PHA 504 - Pharmacology I, PHA 505 - PA History, PHA 506 - Genetics for PAs, PHA 507 - Psychosocial Medicine with grade greater than or equal to D-.]

Credits: 2

PHA 541 - Clinical Medicine II

This course is the second of two designed to educate the student concerning diseases encountered in primary care medicine. The

course will cover the etiology, epidemiology, pathophysiology, clinical findings, diagnostic studies, and pharmacologic and non-pharmacologic treatment/management plans for each disease. The topics covered include gastrointestinal, genitourinary, endocrine, neurological, musculoskeletal, and psychiatric/behavioral diseases and disorders. The course will be lecture format, with small group discussion, along with a supervised clinical long-term care experience that links the didactic phase with the clinical phase.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 4

PHA 542 - Diagnostics II

This course is the second of two designed to provide the student with knowledge of laboratory testing as an adjunct to the proper diagnosis, treatment, and management of disease. Laboratory testing and interpretation are essential in formulating the correct diagnosis in all patients. The course will use slides, specimens, and clinical case studies to encourage critical thinking with corresponding proper decision making. Students will be instructed in the indication, selection, and interpretation of laboratory tests and diagnostic radiology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 2

PHA 543 - Research Methods, Designs

Building on the first research course and using experiences from clinical skills courses, students are required to design and implement a research project. Students will frame a research question, write a research proposal, and prepare to implement a project. This activity will provide students with the ability to translate clinical problems into research protocols by incorporating published research and class learning with clinical cases.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 3

PHA 544 - Pediatrics

This course introduces students to the fundamentals of pediatric medicine from neonate through adolescence. Topics include normal growth and development, preventive care, immunizations, and common pediatric illnesses and their diagnosis and management, as well as other disease limited to the pediatric population.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 2

PHA 545 - Emergency Medicine

This course focuses on the specialty of emergency medicine, including an understanding of pre-hospital care (EMS), the

relationship between the ER and inpatient services, and the ER as a primary care setting. Emphasis is placed on the skills required to work in the ER. Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) accreditation will be required for successful completion of this course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 2

PHA 546 - Surgery

This course is designed to provide students with an overview of the surgical specialty. The management of acute surgical problems, critical illness, solid organ malignancies, and elective surgery procedures will be discussed, as well as pre-op and post-op care of surgical patients. Laboratory sessions will teach technical skills such as universal precautions, sterile technique, suturing, and minor surgical procedures.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 2

PHA 547 - Women's Health

This course provides an introduction to women's health issues across the life span, including diagnosis, management, and treatment of commonly encountered medical issues in both gynecology and reproductive and obstetric health.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 521 - Pathophysiology, PHA 522 - History/Physical II and Clin, PHA 523 - Clinical Medicine I, PHA 524 - Pharmacology II, PHA 525 - Diagnostics I, PHA 526 - Introduction to Research/EB with grade greater than or equal to D-.]

Credits: 2

PHA 601 - Professional Practice Issues I

This is the first of a series of three courses that will address the practical challenges that PA students face as they prepare to enter the working world of the practicing physician assistant. These courses will review and reinforce the Guidelines for Ethical Conduct for the Physician Assistant Profession, PA governance and guidelines for licensure/credentialing, electronic medical records, billing and coding, and prescribing regulations and risk management, as well as provide a self-study in medical Spanish to improve communication skills with the growing Spanish-speaking populations in the U.S. Students will also be introduced to the U.S. healthcare system, health policy, and public health.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 1

PHA 602 - Issues in Geriatrics I

This is the first of two courses that will provide the student with a broad overview of the principles of geriatric medicine from the perspective of the primary care practitioner. Major geriatric syndromes commonly encountered in clinical practice will be introduced, providing the student with practical knowledge regarding the care of geriatric patients. This course has been designed

to promote interprofessional education and practice. PA students will be expected to work with students from other health-related disciplines, including but not limited to physical therapy, occupational therapy, health and wellness, and pharmacology. Students will accomplish the stated objectives through lecture presentations, discussion posts, and critical thinking/case-based discussions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 1

PHA 603 - Professional Practice Issues II

This is the second of a series of three courses that will address the practical challenges that PA students face as they prepare to enter the working world of the practicing physician assistant. These courses will review and reinforce the Guidelines for Ethical Conduct for the Physician Assistant Profession, PA governance and guidelines for licensure/credentialing, electronic medical records, billing and coding, and prescribing regulations and risk management, as well as provide a self-study in medical Spanish to improve communication skills with the growing Spanish-speaking populations in the U.S. Students will also be introduced to the U.S. healthcare system, health policy, and public health.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 601 - Professional Prac Issues I with grade greater than or equal to D-.]

Credits: 1

PHA 604 - Capstone

This course encompasses three integrative elements. The first element outlines study skills that aid the student in preparing for the Physician Assistant National Certifying Exam (PANCE). The second element consists of a comprehensive written exam, the Objective Structured Clinical Examination (OSCE), and demonstration of clinical skills to satisfy the ARC-PA standard C3.04. The third integrative element will provide students with the opportunity to share their research projects with colleagues, faculty, and the University at large. Students will be evaluated on the quality of the presentations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PHA 651 - Primary Care Rotation I, PHA 652 - Primary Care Rotation II, PHA 653 - Internal Medicine Rotation, PHA 654 - Pediatric Rotation, PHA 655 - Women's Health Rotation, PHA 656 - Behavioral/Mental Health Ro, PHA 657 - Surgery Rotation, PHA 658 - Emergency Medicine Rotation, PHA 659 - Geriatrics Rotation, PHA 660 - Elective Rotation I, PHA 661 - Elective Rotation II with grade greater than or equal to D-.]

Credits: 2

PHA 605 - Issues in Geriatrics II

This is the second of two courses that will provide the student with a broad overview of the principles of geriatric medicine from the perspective of the primary care practitioner. Major geriatric syndromes commonly encountered in clinical practice will be introduced, providing the student with practical knowledge regarding the care of geriatric patients. This course has been designed to promote interprofessional education and practice. PA students will be expected to work with students from other health-related disciplines, including but not limited to physical therapy, occupational therapy, health and wellness, and pharmacology. Students will accomplish the stated objectives through lecture presentations, discussion posts, and critical thinking/case-based discussions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 602 - Issues in Geriatrics I with grade greater than or equal to D-.]

Credits: 1

PHA 606 - Professional Practice Issues III

This is the third of a series of three courses that will address the practical challenges that PA students face as they prepare to enter the working world of the practicing physician assistant. These courses will review and reinforce the Guidelines for Ethical Conduct for the Physician Assistant Profession, PA governance and guidelines for licensure/credentialing, electronic medical records, billing and coding, and prescribing regulations and risk management, as well as provide a self-study in medical Spanish to improve communication skills with the growing Spanish-speaking populations in the U.S. Students will also be introduced the U.S. healthcare system, health policy, and public health. During this semester students will be instructed in total quality assurance, registering for the PANCE, preparing their curriculum vitae (CV), preparing for the professional interview, and negotiating their employment contract.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 603 - Professional Practice Issues II with grade greater than or equal to D-.]

Credits: 1

PHA 651 - Primary Care Rotation I

This course is the first of two required five-week rotations that occur consecutively in which the student is assigned to a primarily outpatient setting. The goal of these rotations is to educate the physician assistant student in the diagnosis, management, and treatment of the patient in the primary care setting. These rotations can occur in both urban and rural settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 652 - Primary Care Rotation II

This course is the second of two required five-week rotations that occur consecutively in which the student is assigned to a primarily outpatient setting. The goal of these rotations is to educate the physician assistant student in the diagnosis, management, and treatment of the patient in the primary care setting. These rotations can occur in both urban and rural settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 653 - Internal Medicine Rotation

This five-week rotation provides the physician assistant student with the practical experience necessary to interpret and integrate information obtained through the comprehensive history and physical examination, to formulate diagnoses, to develop effective treatment plans, and to provide patient management throughout the hospital course. In addition, students will learn the indications, limitations, and methodology of inpatient diagnostic procedures and therapeutic regimens common to internal medicine.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 654 - Pediatric Clinical Rotation

This five-week rotation provides the physician assistant student with clinical experience in diagnosis, evaluation, and management of primary care pediatric patients encountered in the ambulatory, as well as inpatient, settings. Emphasis is placed on the recognition of normal as well as abnormal findings, diagnosis and management of common childhood illnesses, assessment of developmental milestones, immunizations, and well-child care from birth through adolescence.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 655 - Women's Health Rotation

This five-week rotation provides the physician assistant student with practical clinical experience in evaluation and management of normal and abnormal conditions in women's health. In addition, students will learn to provide prenatal and postpartum care, family planning, health education, and counseling.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 656 - Behavioral/Mental Health Clinical Rotation

This five-week rotation provides the physician assistant student with experience in a psychiatric-based facility (inpatient and/or outpatient). The student will also be provided with practical clinical experience in identification, evaluation, management, and referral of patients presenting with common and/or emergent psychiatric conditions. Students learn to recognize and treat acute and chronic health disorders, affective and cognitive disorders, and disorders associated with substance abuse.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 657 - Surgery Rotation

This five-week rotation provides the physician assistant student with practical clinical experience in data gathering, evaluation, and management of general surgical problems encountered in the hospital. Students participate in the management of surgical patients during the preoperative phase, assist during surgery, and provide postoperative and primary care management.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 658 - Emergency Medicine Clinical Rotation

This five-week rotation provides the physician assistant student with practical clinical experience working in an urban and/or rural acute care setting. This enables the student to develop a focused and systematic approach to the diagnosis and treatment of common medical and surgical emergencies. This rotation also teaches the student about the indications, limitations, and methodology of emergency room diagnostic procedures and therapeutic regimens. In addition, this rotation provides students with the opportunity to formulate organized and complete emergency room records, problem lists, and management plans. The student will gain experience in the emergency room fast track and emergency medical services and in treating more critical patients in the main emergency room.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 659 - Geriatrics Medicine Clinical Rotation

This five-week rotation provides the physician assistant student with experience in evaluating and treating common problems and challenges encountered in geriatric medicine in a variety of outpatient and inpatient settings.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 660 - Elective Clinical Rotation I

The first of two five-week rotations that provide the physician assistant student with the opportunity to choose inpatient and/or outpatient experiences in areas of the core curriculum or in a specialty that may include, but is not limited to, dermatology, gastroenterology, plastic surgery, cardiothoracic surgery, radiology, ENT, urology, gerontology, pulmonology, ophthalmology, oncology, orthopedics, or infectious diseases.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PHA 661 - Elective Clinical Rotation II

The second of two five-week rotations that provide the physician assistant student with the opportunity to choose inpatient and/or outpatient experiences in areas of the core curriculum or in a specialty that may include, but is not limited to, dermatology, gastroenterology, plastic surgery, cardiothoracic surgery, radiology, ENT, urology, gerontology, pulmonology, ophthalmology, oncology, orthopedics, or infectious diseases.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PHA 541 - Clinical Medicine II, PHA 542 - Diagnostics II, PHA 543 - Research Methods, Designs, PHA 544 - Pediatrics, PHA 545 - Emergency Medicine, PHA 546 - Surgery, PHA 547 - Women's Health with grade greater than or equal to D-.]

Credits: 4

PL 101 - Philosophy and Values

Major thinkers and writers of the Western world and the ways they have perceived the problems of human existence are presented. Opportunities for exploring and creating individual value systems in the light of the great ideas and dramatic situations of the past.

Credits: 3

PL 302 - Philosophy and History of Ed

This course examines the main pedagogical and educational theories of Western civilization in the light of philosophical principles behind them. These principles guide theory and practice, aims and objectives, content and methods, educational psychology, teacher training, administration, and research. 3 class hrs

Credits: 3

PL 313 - Philosophy of Medicine

This philosophy course puts medical practices, theories, and values in the broader context of human life, necessitating a cultural and historical approach that complements the focus on modern medicine. Particular topics include the nature of illness and the differing ideas and practices of medical care.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

PL 323 - Philosophy of Science

Scientific values, theories, and practices largely determine the ways in which modern human beings live, act, and interact. This course, therefore, introduces the student to philosophy of science and its development alongside modern science, while focusing on questions about the meaning and value of science for human life.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

PL 330 - Philosophy of Race, Class, and Gender

Experience of race, class, and gender are central to modern human life and self-understanding, though they have become important philosophical topics only recently. Philosophers have long been interested in what it means to be a person, but traditionally sought a universal account of the human being. This course, by contrast, examines experiences and conceptualizations of race, class, and gender by interrogating their significance for different people throughout recent history and today.

Credits: 3

PL 340 - Special Topics in Philosophy

Topics addressed in this course vary.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

PL 501 - Ethics and Values

Covers the nature of ethics and its place in philosophical thought, perennial ethical systems, and ethical and bioethical dilemmas in healthcare. Opportunities given to explore and examine personal values; attempts to define the good life in contemporary society.

Credits: 3

PO 101 - Introduction to Political Science and the American Government

Examination of the national governmental system, the foundation of government in the United States, and separation of powers and relations with states and citizens.

Credits: 3

PP 190 - Pharmacy Orientation

Students will develop plans that will lead to academic success. Students will review on-campus services that support academic success. Students will begin to understand and apply the principles and practices of cooperative teamwork and begin to adopt exemplary personal and professional ethical standards. Students will begin to develop interpersonal communication and presentation skills and begin to be self-directed learners.

Credits: 1

PP 283 - Dean's Seminar II

The range of career opportunities and professional responsibilities open to graduates is explored through reading, writing, and presentations by faculty and practitioners in patient-centered pharmacy care environments. Students prepare to seek entry-level training employment. (Second-year doctor of pharmacy students)1 class hr

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PP 181 - Dean's Seminar I with grade greater than or equal to D-.]

Credits: 1

PP 305 - Intro to Clin Pharm Skills

Students will be introduced to the concept and application of pharmaceutical care and will develop skills in communication with healthcare professionals and patients, medication history taking, physical assessment, therapeutic planning, and patient monitoring.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): BS 212 - Funct Human Anat-Histology with grade greater than or equal to D-.]

Credits: 2

PP 307 - Physical Assess Skills

Students are introduced to fundamental physical assessment techniques (inspection, percussion, palpation, auscultation) and skills for assessment the skin, eyes, nose, ears, oropharynx, chest, cardiovascular system, peripheral vascular system, abdomen, musculoskeletal system and nervous system. Abnormalities associated with common medical diseases and disorders and adverse

drug effects are identified.

Credits: 2

PP 308 - Physical Assessment Skills for Pharmacists

Students are introduced to fundamental physical assessment techniques (inspection, percussion, palpation, auscultation) and skills for assessing vital signs, respiratory system, cardiovascular system, nose, eyes, ears, oropharynx, and neurologic system. Abnormalities associated with common medical diseases and medications are identified.

Credits: 1

PP 309 - Clinical Reasoning

Students are introduced to the concept and application of clinical reasoning. Clinical reasoning skills are developed through application of the clinical reasoning process during in-class case-based team activities.

Credits: 2

PP 310 - Research Design

The appropriate design and application of major study types (surveys, interviews, experimental, naturalistic and participant observational, archival, and combined designs) and ethical issues and legal regulations for animal and human research are addressed. Students learn the knowledge and skills necessary to identify and select a suitable research question and develop an appropriate research protocol including data analysis techniques and budgeting.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 2

PP 321 - Immunotherapies

The immunotherapies elective course focuses on mechanism of action, indications, drug administration and adverse effects of select new immunotherapies including immune checkpoint inhibitors, adoptive cellular therapy, dendritic cell vaccines and non-cancer therapy monoclonal antibodies.

Prerequisites & Notes

(Special Registration Restrictions: P1, P2, and P3 PharmD students)

Credits: 1

PP 322 - Labs and Diagnostic Tests for Pharmacists

Students learn to assess, interpret and apply common laboratory and diagnostic tests. Laboratory tests include complete blood count, the basic metabolic panel, arterial blood gas and tests for cardiac and hepatic damage. Diagnostic tests include the electrocardiogram and chest imaging (chest X-ray, MRI and CT).

Prerequisites & Notes

(Special Registration Restrictions: PharmD students)

Credits: 1

PP 327 - Global Health Determinants and Application

This elective course will introduce and discuss important topics in global health, focusing specifically on care of the underserved in a global context. Topics discussed will include health policy and economics, determinants of health, essential medicines, community-oriented primary care, refugee health, women's health, and climate change. In addition to readings and weekly discussion groups, students enrolled in this course will have the opportunity to gain valuable practice-based skills by working with partner agencies. These opportunities are designed to focus on current and future contributions of pharmacists to global health and the role of global health in pharmaceuticals and pharmacy practice.

Prerequisites & Notes

(Special Registration Restriction: P1, P2, P3 PharmD students)

Credits: 2

PP 340 - Cultures and Therapeutics

Students are introduced to the cultural differences between the U.S. healthcare (Western) system and non-Western cultures. The course explores characteristics of non-Western cultures and potential strategies for managing pharmacotherapeutic issues with patients who have healthcare belief systems that differ from the U.S. healthcare cultural system.

Prerequisites & Notes

(Prerequisite: P1, P2, or P3 pharmacy student status)

Credits: 2

PP 359 - Pharmacist's Introduction to the Pharmaceutical Industry

This course is designed for Doctor of Pharmacy students an overview of the pharmaceutical industry, with a focus on the career options available to pharmacists. At the end of this course, the student will demonstrate skills that would be used in retrieving & evaluating medical literature to develop medical information documents that are geared for a global audience of healthcare professionals. In addition, the student will learn aspects of adverse event reporting, drug development and approval process, FDA regulations on product labeling and promotional advertising, and sales marketing.

Prerequisites & Notes

(Prerequisite: P1 status)

(Special Registration Restriction: open only to P1 to P3 registered in the pharmacy program)

Credits: 2

PP 398 - Special Topics in Pharmacy Practice

This course will address topics in contemporary pharmacy practice that are not covered in other courses.

Prerequisites & Notes

(Corequisite: May include enrollment with instructor permission)

(Special Registration Restriction: PharmD students in the professional years of P1-P3)

Credits: 1-3

PP 399 - Special Topics in Pharmacy

This course will address topics in contemporary pharmacy practice that are not covered in other courses.

Prerequisites & Notes

(Corequisite: May include enrollment with instructor permission)
(Special Registration Restrictions: PharmD students in the professional years of P1-P3)

Credits: 1-3

PP 422 - Medication Therapy Management Certificate

This advanced MTM (Medication Therapy Management) certificate course will prepare student pharmacists to improve medication use through the delivery of MTM services in a variety of practice settings. At the conclusion of this course students will have the opportunity to receive the "APhA Delivering Medication Therapy Management Services" certificate.

Prerequisites & Notes

(Special Registration Restrictions: P2 and P3 PharmD students)

Credits: 1

PP 450 - Complementary and Alternative Therapies

A consideration of complementary and alternative approaches to healthcare that involve the use of agents suggested to have therapeutic value. Natural, botanical, and herbal products, dietary supplements, nutraceuticals, and homeopathic products are among the topics included.

Prerequisites & Notes

(Prerequisite: completion of the third year of the curriculum)

Credits: 2

PP 451 - Advanced Asthma Pharmacotherapy

This course is designed to provide an in-depth understanding of the pathophysiology of asthma and evidence-based asthma therapeutics, including the drug-delivery devices, patient assessment skills, and patient education skills.

Prerequisites & Notes

(Prerequisite or corequisite: P2 or P3 doctor of pharmacy student status)

Credits: 3

PP 452 - Anticoagulation Management

Building upon a cardiovascular physiology foundation, this therapeutics elective will build student knowledge of existing and emerging oral and injectable anticoagulants, anti platelets and thromboembolic diseases. The structure and outcomes of inpatient and outpatient anti coagulation services will be discussed. The student will refine skills in monograph writing and clinical trials interpretation.

Prerequisites & Notes

(Prerequisite: PP 465; corequisite: PP 466)

Credits: 2

PP 464 - Orientation to Nuclear Pharmacy

Basic concepts of properties, development, and handling of radioactive materials and their diagnostic and therapeutic uses. Basic radiation physics and use of radiopharmaceutical preparations in diagnosis and treatment of disease states are presented.

Prerequisites & Notes

(Prerequisites: PC 301 and PY 202)

(Note: may not be offered every year)

Credits: 2

PP 483 - Special Topics: Interprofessional Longitudinal Experience to Appreciate Patient Perspectives I

This is an intraprofessional course developed in collaboration with University of Pennsylvania, Perelman School of Medicine and School of Nursing. This course will focus on the Interprofessional Collaborative Practice (IPEC) Core Competency Domains: values and ethics, roles and responsibilities, interprofessional communication and team/team work. This course will introduce students to the biopsychosocial model of healthcare, specifically as it relates to patients with chronic illnesses. iLEAPP uses a longitudinal "patient-centered learning" approach to help students focus on disease and illness from the patient's, not the provider's, point of view. This course will provide the opportunity to learn about interprofessional teams and teamwork as an integral component of the comprehensive care of patients with chronic disease, basic attributes of a good provider-patient relationship, such as patient-centered communication, trust, good listening skills, empathy, etc., and how providers can strengthen and enrich that relationship and competencies in interprofessional collaboration including roles and responsibilities, values and ethics, teams and teamwork, and interprofessional communication. The learners will participate in an initial plenary session, consistent interprofessional clinical team contact with patient, mid-semester group learning session, written assignments and reflections, shadowing interprofessional healthcare teams at various practice sites and an end-semester clinical team meeting.

Prerequisites & Notes

(Prerequisites: PP 306 and PP 317)

(Note: Three semester sequence. Students must be committed to complete all three semesters.)

Credits: 1

PP 484 - Special Topics: Interprofessional Longitudinal Experience to Appreciate Patient Perspective II

This is an intraprofessional course developed in collaboration with University of Pennsylvania, Perelman School of Medicine and School of Nursing. This course will focus on the Interprofessional Collaborative Practice (IPEC) Core Competency Domains: values and ethics, roles and responsibilities, interprofessional communication and team/team work. This course will introduce students to the biopsychosocial model of healthcare, specifically as it relates to patients with chronic illnesses. iLEAPP uses a longitudinal "patient-centered learning" approach to help students focus on disease and illness from the patient's, not the provider's, point of view. This course will provide the opportunity to learn about interprofessional teams and teamwork as an integral component of the comprehensive care of patients with chronic disease, basic attributes of a good provider-patient relationship, such as patient-centered communication, trust, good listening skills, empathy, etc., and how providers can strengthen and enrich that relationship and competencies in interprofessional collaboration including roles and responsibilities, values and ethics, teams and teamwork, and interprofessional communication. The learners will participate in an initial plenary session, consistent interprofessional clinical team contact with patient, mid-semester group learning session, written assignments and reflections, shadowing interprofessional healthcare teams at various practice sites and an end-semester clinical team meeting.

Prerequisites & Notes

(Prerequisite: PP 483)

(Note: Three semester sequence. Students must be committed to complete all three semesters.)

Credits: 1

PP 495 - Project in Pharmacy Practice

Opportunity for qualified students to carry out a project in pharmacy practice application or research under the direction of a pharmacy practice faculty member. Each student is required to prepare a report summarizing his/her objectives, progress, and conclusions.

Prerequisites & Notes

(Prerequisites: at least P2 pharmacy status and permission of instructor)

Credits: 1 to 3

PP 496 - IPPE Patient Care Project in Pharmacy Practice

This IPPE course provides an opportunity for students to work with a faculty mentor(s) in a patient-care practice setting to gain insight and skills in conduct of a scholarly project. The project is to be based on literature interpretation and hypothesis testing, laboratory measures, data analysis, professional practice standards, medication safety, medication-use evaluations, practice demonstration programs, and/or programmatic assessments; as well as project summarization and conclusion generation, with preparation of a poster or professional or committee presentation. The faculty mentor and student should agree upon the specific objectives and expectations for the course at the beginning of the course.

Prerequisites & Notes

(Prerequisites: PP 465, PP 467, PP 469, PA 462, and PC 411)

Credits: 1 to 3

PP 508 - Pharmacotherapeutics in Hospice and Palliative Care

Hospice is one of the fastest growing areas in healthcare today. Increasingly, healthcare professionals are relying on pharmacists to provide recommendations for the management of complicated symptoms at the end of life. The goal of this course is to prepare the pharmacy student to take an active role in the medical management of chronically and terminally ill patients. Students will gain an appreciation for various ethical, social, and legal issues that can impact healthcare provision at the end of life. Furthermore, students will discover the role of the pharmacist as it relates to the interdisciplinary setting of hospice and palliative care.

Prerequisites & Notes

(Corequisites: PP 565 or PP 566, and PP 567 or PP 568)

Credits: 2

PP 514 - Clinical Treatment Approaches to Psychiatric Illness

The purpose of the course is to provide an advanced lecture series on the major psychiatric disorders and related special topics with emphasis on psychopharmacologic treatment.

Prerequisites & Notes

(Prerequisites: PP 565 and PC 412)

Credits: 2

PP 521 - Advanced Pulmonary Therapeutics

This course focuses on comprehensive evidence-based therapeutics of pulmonary medical diseases and/or conditions. Using team-based learning, students will gain knowledge of drug-induced lung disease, obstructive lung disease, interstitial and inflammatory lung disease, alveolar lung disease, disorders of the pulmonary circulation, disorders of the pleural space, lung neoplasms, and lung infections.

Prerequisites & Notes

(Prerequisite: PP 466)

Credits: 2

PP 523 - Ambulatory Care Pharmacy Practice

This advanced ambulatory care pharmacy practice course will prepare students for providing pharmacy services in primary care settings. Students will build knowledge of practice models and complex therapeutic disease states, improve verbal and written communication skills with patients and providers, and gain experience with utilizing an electronic medical record.

Prerequisites & Notes

(Prerequisites: PP 565 and PP 567; corequisites: PP 566 and PP 568)

(Note: Open only to P3 PharmD students)

Credits: 2

PP 524 - Interprofessional Care of the Geriatric Patient

Students are introduced to the interprofessional nature of geriatric patient care. Focus is placed on the care of geriatric patients from a variety of different health care perspectives using simulated patient cases to continue development of students' abilities in therapeutics, problem solving, and communication.

Prerequisites & Notes

(Corequisite: PharmD P3 status)

Credits: 2

PP 525 - Pharmacist-Led Cardiovascular Disease Risk Management Course

The course will provide an in-depth understanding of the pathophysiology of cardiovascular disease, cardiovascular risk assessment, therapeutic lifestyle changes, and evidence based pharmacotherapy. This course will assist students to further develop their critical thinking, clinical decision-making, and patient/healthcare professional communication skills for managing patients with or at risk for cardiovascular disease. At the conclusion of this course, students will receive the APhA Pharmacy-Based CVD Risk Management Certificate.

Prerequisites & Notes

(Prerequisites: PP 466 and PP 565; corequisite: PP 566)

(Note: Open only to P3 PharmD students)

Credits: 2

PP 529 - Introduction to Pediatric Pharmacy Practice

This course is designed to develop skills for the management of neonatal and pediatric drug-related challenges. Basic principles governing optimal drug therapy, such as drug delivery, pharmacokinetics, and pharmacodynamics, and assessment of neonatal and pediatric patients will be reviewed. Selected pediatric dilemmas will be discussed with emphasis on medication safety and administration, pediatric resources, and dosing. Problem-solving and decision-making skills will be fostered through patient case presentations and discussions utilizing primary and tertiary resources.

Prerequisites & Notes

(Prerequisites: PP 465 and PP 466; corequisites: PP 565 and PP 569)

Credits: 2

PP 541 - Pharmacogenomics

Basic science of pharmacogenomics with an emphasis of the applications of pharmacogenomic principles to improve drug therapy outcomes.

Prerequisites & Notes

(Prerequisite: PC 411 or permission of instructor)

Credits: 2

PP 547 - Critical Care Therapeutics

The course will offer an introduction to the pharmacotherapeutic management of the critically ill patient. The pathophysiology and drug therapy of selected problems in the critically ill population will be covered. Students in the course will discuss these topics with a number of activities throughout the semester. The course will strengthen the student's ability to evaluate and apply primary literature as well as verbal presentation skills. Active participation will allow the student to hone his/her clinical skills in real-life situations.

Prerequisites & Notes

(Corequisites: PP 565 and PP 567, or PP 566 and PP 568)

Credits: 2

PP 559 - Problem-Based Approach to Acute Care Medicine

Students will focus on guidelines and evidence-based medicine to further develop the skills and knowledge base in therapeutics in order to provide optimal drug therapy to internal medicine patients who are hospitalized. Faculty will utilize a problem-based learning format in the course to facilitate critical thinking development and student-centered learning.

Prerequisites & Notes

(Prerequisites: PP 460; corequisites: PP 565 or PP 566)

Credits: 2

PP 584 - Special Topics: Interprofessional Longitudinal Experience to Appreciate Patient Perspectives (iLEAPP) III

This is an intraprofessional course developed in collaboration with University of Pennsylvania, Perelman School of Medicine and School of Nursing. This course will focus on the Interprofessional Collaborative Practice (IPEC) Core Competency Domains: values and ethics, roles and responsibilities, interprofessional communication and team/team work. This course will introduce students to the biopsychosocial model of healthcare, specifically as it relates to patients with chronic illnesses. iLEAPP uses a longitudinal (patient-centered learning+ approach to help students focus on disease and illness from the patient+s, not the provider+s, point of view. This course will provide the opportunity to learn about interprofessional teams and teamwork as an integral component of the comprehensive care of patients with chronic disease, basic attributes of a good provider-patient relationship, such as patient-centered communication, trust, good listening skills, empathy, etc., and how providers can strengthen and enrich that relationship and competencies in interprofessional collaboration including roles and responsibilities, values and ethics, teams and teamwork, and interprofessional communication. The learners will participate in an initial plenary session, consistent interprofessional clinical team contact with patient, mid-semester group learning session, written assignments and reflections, shadowing interprofessional healthcare teams at various practice sites and an end-semester clinical team meeting.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PP 484 - Special Topics: iLEAPP II with grade greater than or equal to D-.]

Credits: 1

PP 617 - APPE Preparatory Enrichment

This course, delivered over two weeks, is intended to optimize student transition from didactic education to their Advanced Pharmacy Practice Experience (APPE). Content will include orientation to APPEs, guidance on optimizing rotation experiences, and updating relevant pharmacy practice knowledge and skills.

Credits: 2

PP 618 - APPE Preparatory Enrichment II

This course is intended to assess student development and achievements during their APPE rotations and prepare students to successfully transition from their professional education to practice, including pharmacist licensure.

Credits: 1

PP 631 - APPE Community Pharmacy

The APPE Community Pharmacy rotation is a 5-week experience where PharmD students are in engaged patient-focused provision of pharmacy services in a community pharmacy. Students will provide patient counseling, OTC triage, medication therapy management, etc., under pharmacist supervision as part of an integrated community pharmacy service model.

Credits: 5

PP 632 - APPE Hospital Pharmacy Practice

The APPE Hospital Pharmacy Practice rotation is a 5-week experience where PharmD students gain experience in how medications are managed in the acute care setting and how hospital-based pharmacists oversee the appropriate and safe use of medications, including oversight of medication ordering, dispensing, and administration; use of technology and informatics; and the development and use of formularies, drug policies, procedures, and protocols.

Credits: 5

PP 633 - APPE Ambulatory Care

The APPE Ambulatory Care rotation is a 5-week experience where PharmD students are engaged in provision of patient care and chronic drug therapy medication management in an outpatient practice setting. This rotation can take place in a pharmacist-managed outpatient practice or in a physician office practice.

Credits: 5

PP 634 - APPE Acute Patient Care

The APPE Acute Patient rotation is a 5-week experience where PharmD students are engaged in provision of patient care and medication management as part of an interprofessional hospital-based medical team under the supervision of a pharmacist preceptor. Examples of patient focus may include general medicine, critical care, oncology, cardiology, or infectious diseases.

Credits: 5

PP 635 - APPE Patient Care Elective

The APPE Patient Care Elective rotation is a 5-week experience where PharmD students are able to gain additional knowledge, skills, and experience in patient-care/pharmacy practice settings such as compounding pharmacy, long-term care pharmacy, anticoagulation services, poison control centers, or home IV infusion including any core required APPE rotation.

Credits: 5

PP 636 - APPE Unrestricted Patient Care Elective I

The APPE Unrestricted Patient Care Elective I rotation is a 5-week experience where PharmD students are able to gain additional knowledge, skills, and experience in patient-care/pharmacy practice settings such as compounding pharmacy, long-term care pharmacy, anticoagulation services, poison control centers, or home IV infusion, including any core required APPE rotation.

Credits: 5

PP 637 - APPE Unrestricted Patient Care Elective II

The APPE Patient Care Elective rotation is a 5-week experience where PharmD students are able to gain additional knowledge, skills, and experience in patient care/pharmacy practice settings such as compounding pharmacy, long-term care pharmacy, anticoagulation services, poison control centers, home IV infusion, including any core required APPE rotation.

Credits: 5

PP 638 - APPE Non-Patient Care Elective I

The APPE Non-Patient Care Elective rotation is a 5-week experience where PharmD students are able to gain additional knowledge, skills, and experience in businesses, organizations, and pharmacist practices that do not directly engage patients. Common rotations include teaching, research, pharmaceutical industry, managed care, medical communications, management rotations in community and hospital pharmacy, professional organizations, nuclear pharmacy, law offices, and investigational drug services.

Credits: 5

PP 639 - APPE Non-Patient Care Elective II

The APPE Non-Patient Care Elective rotation is a 5-week experience where PharmD students are able to gain additional knowledge, skills, and experience in businesses, organizations, and pharmacist practices that do not directly engage patients. Common rotations include teaching, research, pharmaceutical industry, managed care, medical communications, management rotations in community and hospital pharmacy, professional organizations, nuclear pharmacy, law offices, and investigational drug services.

Credits: 5

PS 100 - Health Psych Orientation

Introduction to psychology and health psychology as a profession, including current developments and future perspectives.

Credits: 1

PS 101 - Introduction to Psychology

Introduction to basic concepts in psychology and an overview of how they are applied to modern human behavior.

Credits: 3

PS 102 - Philosophy of Psychology

The course is designed to give students an overview of psychology from psychophysics to modern day clinical practice in order to provide a coherent framework for future psychology coursework. The major historical figures that have shaped psychology will be covered as well as the philosophical underpinnings of their thinking. In addition, students will be exposed to scientific thinking in general and the history of discovery in several non-psychological sciences such as physics, biology, cosmology, and geology. This course is a requirement for psychology majors and is open to the general student population.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 111 - Principles of Psychology

An introduction to psychological science with an emphasis on the application of scientific inquiry and reasoning to promote understanding of the biopsychosocial factors associated with health and behavior.

Credits: 3

PS 200 - Psychology of Human Development

Human growth and development are studied as an ongoing life process that includes biological and cultural determinants.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 201 - Adolescent Psychology

A study of cognitive, physical, social, and moral development from puberty to maturity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

PS 204 - Intelligence, Creativity, and Problem Solving

An introduction to the study of how the thoughts and actions of individuals are related to the way we learn, remember, and act. The course provides a survey of theory, research, and methods for understanding intelligence, creativity, and problem solving.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

PS 261 - Intro to Neuroscience II

This course focuses on the biological foundations of behavior and cognition. Fundamental methods and processes of the behavioral neuroscience will be emphasized including motivation, emotion, language, attention, memory, and mental illness.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 3

PS 300 - Tests and Measurements

This course is designed to examine the objectives of psychological testing, procedural methods common to all testing situations, and the meaning of standardization, validity, reliability, and other terms related to understanding and evaluating tests and their use.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 301 - Social Psychology

The study of the means by which a person's thoughts, feelings, and behaviors may be influenced by the presence of others. Basic principles will be applied to life experiences.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 302 - Sensation and Perception

An introduction to the acquisition of data about the world through our senses and how these data are converted to information through the perceptual processes. Topics covered will include vision, hearing, touching, tasting, and smelling. Students will conduct a study, analyze data, and write a report. The course is open to all students and required of students in the psychology program.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 305 - Learning & Behavior

This course examines the principles and mechanisms underlying the permanent changes in organisms' behavior (called learning) that arise from their experiences in the world. A psychobiological approach will be emphasized. This course is open to all students and required of students in the psychology program.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 309 - Personality Theory

An introduction to a basic understanding of personality theory, this course will emphasize the ways in which people are unique and how their patterns of behavior persist over a lifetime. Processes such as motivation, perception, learning, levels of consciousness, and self-concept are used to form our understanding of personality, and these processes are explored within all major theoretical perspectives: psychoanalytic, dispositional, humanist, and behavioral.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 310 - Biological Psychology

Biological psychology explores the biological foundations of behavior from physiological, evolutionary, developmental, and functional perspectives. Fundamental processes of neurosciences will be emphasized: neurological functions, biology of sensations, emotion, sex, and the biological mechanisms underlying psychological disorders.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 318 - Health Psychology

An introduction to the application of psychological principles to healthcare. Health behaviors will be examined to see how they can either help maintain wellness or foster illness.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 327 - Behavior Modification

The study of behavior principles for the assessment, evaluation, and alteration of behavior, as applied to everyday life (e.g., developing healthy lifestyles) and as applied to problem behaviors such as eating disorders, anxiety, depression, sexual dysfunction, autism, aggression, chronic pain, and addiction.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

PS 329 - Cognitive Psychology

The course presents an introduction to the theories and research domains of cognitive psychology. The focus is on human information processing. Attention is paid to the encoding of information, storage, retrieval, short-term memory, long-term memory, and the physiological basis of memory.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

PS 340 - Special Topics-Psychology

Special fields of interest in psychology. May include any timely topics of interest in the field of psychology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 347 - Abnormal Psychology

Survey of the principal forms of behavior disorders with emphasis on their diagnosis, symptoms, causes, course, and treatment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 350 - Intro to Group Dynamics

Observations and analysis of social processes are made as they are experienced by students in class and structured activities.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

PS 354 - Aspects of Phys Disabled

Study of the interactions between patients and society with regard to physical disability, focusing on emotional factors in illness and disability and their influence on the process of adjustment.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

Credits: 3

PS 399 - Independent Study in Psychology

Available to students to work in an area of particular interest under the direction of a faculty member of the department. May be elected more than once for one, two, or three credits.

Prerequisites & Notes

Student has received department permission for PS 399 - Ind Study-Psychology

PS 400 - Internship in Psychology

Students participate in an internship in psychology. This will typically involve a structured series of experiences in the student's area of interest that provides exposure to work environments where psychological concepts are applied. Students work closely with an off-campus supervisor and his/her academic advisor to coordinate the experience.

Prerequisites & Notes

Student has received department permission for PS 400 - Internship in Psychology

Credits: 3

PS 401 - Counseling Theory I

This course provides an intensive overview of the various theories and systems of psychotherapy and counseling, including psychoanalytic, Jungian, Adlerian, client-centered, behavior, cognitive, Gestalt, family, and group therapies. The course addresses such issues as the therapeutic process, the therapeutic relationship, the helping alliance, specific procedures used in treatment, and the types of emotional problems amenable to therapy. Videotape presentations of the different therapy models are presented.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 102 - Philosophy of

Psychology, PS 309 - Personality Theory with grade greater than or equal to D-.]

Credits: 3

PS 402 - Counseling & Consultation Skills

This course is an intensive training program in counseling and psychotherapy skills. The textbook and course workbook are designed to increase students' skills in empathetic listening and attending behavior as well as problem definition and problem clarification. Small group procedures are used to train students in fundamental counseling skills such as posture, listening skills, empathy, reflection of emotion and feelings, confrontation, clarification, problem solving, and problem resolution. Students practice counseling skills with each other and obtain corrective feedback using one-way mirrors and video cameras. Because counseling and psychotherapy are highly interpersonal endeavors the course requires a certain amount of self-examination and self-disclosure.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 401 - Counseling Theory I with grade greater than or equal to D-.]

Credits: 3

PS 412 - Psychopharmacology

This course examines the relationship between behavior change and changes in brain chemistry produced by drugs of various types. An understanding of basic principles of behavior analysis coupled with basic neuropharmacology and determinants of drug action will preface the examination of drug usage for pharmacological treatment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PS 101 - Intro to Psychology with grade greater than or equal to D-.]

PS 415 - Biophysics of the Brain

This course introduces biophysical models of the brain and the nervous system functioning. In particular the physics of the neocortex is presented through the analysis of EEG studies. Simulations with software packages are employed to illustrate with various examples the models and their results. Linear electrical analogs and some basics of neural network theory are part of the course content. Elements of Biophysics of consciousness are also presented and a set of case studies is analyzed and discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PS 422 - Neurodevelopmental Disorders

An introduction of Neurodevelopmental Disorders, with an emphasis on autism spectrum disorder and attention deficit-hyperactivity disorder. This course aims to expose students to clinical and scientific thinking about atypical child development. This course will include material on clinical diagnosis and treatment, as well as brain-behavior relationships.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.] [Student has completed or is in process of completing 3 Units from other PS or NS courses.]

Credits: 3

PS 424 - Developmental Cognitive Neuroscience

This course examines the relations between neural and cognitive development from birth through adolescence. Topics will include: principles of brain development, developmental elasticity, neurocognitive development in various domains (e.g., attention, memory, language), neurodevelopmental disorders, and implications for education.

Prerequisites & Notes

Student has completed or is in process of completing any of the following course(s): NS 261/ PS 261 - Intro to Neuroscience II, PS 200 - Psych of Human Development, PS 329 - Cognitive Proc-Memory

Credits: 3

PS 428 - Neuropsychology

The course will study the relationship between basic human brain function and behavior. Behavioral effects of brain damage as related to neuropsychological theories and syndromes will be examined.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.]

Credits: 3

PS 431 - Psych of Prof Practice

Application of psychological concepts and principles related to development of the full personal and professional potential in selected careers.3 class hrs

Credits: 3

PS 435 - Advanced Statistics & Experimental Design for Behavioral Science

Provides in-depth coverage of research methods including descriptive studies, correlational studies, and experiments. The course will address statistical analyses including non-parametric statistics, calculation of correlation coefficients, testing the significance of correlation coefficients, testing for the difference between two correlation coefficients, t-tests for parameter estimates, t-test for the differences between organismic or experimentally derived groups, one-factor analysis of variance, and planned and post-hoc comparisons. Designed as an introductory course for undergraduates or graduate students who have not taken either a research design or statistics course as undergraduates.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing any of the following course(s): PS 101 - Intro to Psychology, PS 111 - Principles of Psychology with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 104 - College Algebra, MA 107 - Precalculus with grade greater than or equal to D-.]

Credits: 3

PS 450 - Industrial and Organizational Psychology

Survey course designed to familiarize students with the discipline of industrial and organizational psychology. The course instructional format will include a combination of lecture and workshop modes. Students will engage in a number of theme-based activities for in-class assignments.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 300 - Tests and Measurements with grade greater than or equal to D-.]

Credits: 3

PS 451 - Leadership in Work Settings

Leadership is a complex phenomenon involving the leader, the situation, and the followers. This course will examine both the science and practice of leadership in work settings. The course critically evaluates a number of leadership theories and indicates how each of the approaches contributes to leadership development.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 309 - Personality Theory, PS 450 - Industrial & Organizational with grade greater than or equal to D-.]

Credits: 3

PS 493 - Psychology Seminar

Seminar on current topics in psychological science presented by students or guest speakers. The course is a required part of the psychology capstone experience and includes the formal presentation of capstone projects in psychology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CO 101 - Intro to Communication, SS 222 - Rsrch Dsgn & Stat Analysis II, WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 1

PS 495 - Seminar in Neuroscience

Current research and techniques in the field of neuroscience through primary literature review, discussion, and analysis. Topics will be chosen based on current discoveries and advancements in the field.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): BS 260/ NS 260 - Intro to Neuroscience, PS 260 - Intro to Neuroscience with grade greater than or equal to D-.]

Credits: 1

PS 498 - Directed Research in Psychology

Independent research opportunities in psychology are available to self-directed, motivated students to expand their knowledge in an area of particular interest, under the direction of a faculty member of the department. The student must plan the independent study project with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography required. In-depth knowledge of the area selected will be expected.

Prerequisites & Notes

Student has received department permission for PS 498 - Research in Psychology

Credits: 3

PS 700 - Practicum in Health Psychology

This course is designed to permit students to gain practical experience working in either clinical or research settings. Students work a minimum of two days a week in a psychological, psychiatric, or medical setting providing diagnostic, treatment, and consultation services with clients or working in a health psychology research setting. The type of practicum site is dependent upon students' needs and goals. An experienced psychologist at the practicum site supervises students. The practicum course includes on-campus supervision seminar.

Credits: 6

PS 701 - Assessment I: Psychometric Theory and Health Psychology Assessment Methods

This course provides an in-depth coverage of modern psychometric theory and test construction and validation. The course will also cover the leading individualized and clinically oriented health measurement methods. It addresses issues such as the theoretical bases for measurement, reliability, and validity of health measurement, the current status of health measurement, guidelines for developing health measurement, and specific measurement instruments for physical disability, social functioning, psychological well-being, depression, anxiety, mental status, pain, general health functioning, and quality of life. Students will also have the opportunity to have hands-on experience administering, scoring, and interpreting a health psychology instrument. The course is required of psychology graduate students and is open to other healthcare majors and professionals.

Credits: 3

PS 702 - Assessment II: Cognitive Assessment

Assessment is an essential skill for psychologists in clinical and research settings. This course will cover the fundamentals of cognitive assessment, including test administration, scoring, interpretation, and report writing. The Wechsler tests of intelligence, achievement, and memory (e.g., WAIS-IV, WISC-IV, WMS-IV) are among the most frequently used measures in clinical psychology, and they will be highlighted in this course. We will also discuss the importance of interviewing and history taking in cognitive assessment, classic and modern conceptualizations of intelligence, ethics in assessment, and sociocultural factors. Classroom presentations and discussions will emphasize evaluation of clinical and case materials that are often the focus of clinical referral (e.g., mental retardation, attention deficit/hyperactivity disorder, and learning disabilities).

Credits: 3

PS 703 - Neuropsychology

This course provides an in-depth coverage of neuropsychology. It addresses issues such as basic adult brain functioning, theories of brain function, basic anatomy of the central nervous system, neurodevelopment, the effects of traumatic brain injury, the effects of vascular disorders and dementia, and the basic principles of neuropsychological assessment.

Credits: 3

PS 704 - Assessment III: Neuropsychological Assessment

This course emphasizes clinical application of neuropsychological research knowledge for assessment. Classroom presentations and discussion will emphasize evaluation of clinical and case materials. It will cover such issues as conceptual and procedural issues in neuropsychological assessment, neuropsychological assessment approaches and methods, empirical findings in selected disorders, and the neuropsychologist's role in prognosis estimation, treatment planning, and rehabilitation.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 702 - Assessment II, PS 703 - Neuropsychology with grade greater than or equal to D-.]

Credits: 3

PS 705 - Assessment IV: Personality Theory

Students develop an in-depth understanding of the major techniques used in clinical practice for the purpose of assessing personality. Students will learn how to administer, score, and interpret major instruments (e.g., MMPI, NEO PI-R, CISS). In addition, students will also develop the skills necessary to know when to administer personality tests, which tests to select for a particular population, and how to integrate data from these tests with other assessment data (e.g., diagnostic interview, mental status examination, and cognitive assessment procedures) for the purposes of diagnosis and treatment planning.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 702 - Assessment II with grade greater than or equal to D-.]

Credits: 3

PS 706 - Health Psychology Treatment Interventions I

This course focuses on teaching students basic interviewing and interventional skills in clinical health psychology. It provides an introduction to evidence-based practice, cognitive-behavior therapy, and basic introductory tasks related to delivery of psychosocial interventions.

Credits: 3

PS 708 - Cognitive and Intellectual Assessment

Assessment is an essential skill for psychologists in clinical and research settings. This course will cover the fundamentals of cognitive assessment, including test administration, scoring, interpretation, and report writing. The Wechsler tests of intelligence, achievement, and memory are among the most frequently used measures in clinical psychology, and they will be highlighted in this course. We will also discuss the importance of interviewing and history taking in cognitive assessment, classic and modern conceptualizations of intelligence, ethics in assessment, and sociocultural factors. Classroom presentations and discussions will emphasize evaluation of clinical and case materials that are often the focus of clinical referral (e.g., mental retardation, attention deficit [hyperactivity] disorder, and learning disabilities).

Credits: 3

PS 709 - Neuropsychological Assessment

This course emphasizes clinical application of neuropsychological principles. During the first half of the course, classroom presentations and discussions focus on conceptual and procedural issues related to neuropsychological interviewing, test selection, test administration, test scoring, interpretation, and intervention. A variety of neuropsychological domains will be covered, including attention, visuospatial ability, memory, language, and executive function. In the second half of the course, case vignettes and data are used to highlight patterns of test results associated with neurological conditions that are often the focus of clinical referral. These conditions will include, but are not limited to, traumatic brain injury, stroke, age-related neurodegenerative diseases, and epilepsy. A portion of each class will be devoted to student-directed critical review and summary of the case material and readings for that week.

Credits: 3

PS 722 - Neurodevelopmental Disorders

An introduction to neurodevelopmental disorders with an emphasis on autism spectrum disorder and attention deficit-hyperactivity disorder. This course exposes students to clinical and scientific thinking about atypical child development. This course will include material on clinical diagnosis and treatment, as well as brain-behavior relationships.

Credits: 3

PS 723 - Graduate Statistics and Experimental Design I

Designed as a first course in graduate-level statistics for students in psychology, health policy, the behavioral sciences, the health sciences, the biological sciences, and pharmacy. Assumes that students have completed an introductory statistics course and already have knowledge of correlation, and t- and Chi-square tests. Provides in-depth coverage of regression analysis and the general linear model. Addresses simple linear regression, partial and semi-partial correlation analysis, multiple regression analysis, pre- and post-test diagnostics, stepwise models, hierarchical regression analysis, path analysis, dummy coding, coding schemes for experimental data, and logistic regression.

Credits: 3

PS 724 - Developmental Cognitive Neuroscience

This course examines the relations between neural and cognitive development from birth through adolescence. Topics will include: principles of brain development, developmental plasticity, neurocognitive development in various domains (e.g., attention, memory, language), neurodevelopmental disorders, and implications for education.

Prerequisites & Notes

Student has completed or is in process of completing all of the following course(s): PS 802 - Fund of Clinical Research

Credits: 3

PS 726 - Graduate Statistics and Experimental Design II

Provides a survey of multivariate statistical methods. Focuses on developing a comprehension of what a select subsample of procedures do, how they work, when to use them, how to interpret their results, how to get results using SPSS, and how to report the results, as well as understanding their applications in research reports. Addresses procedures such as advanced multiple regression, multivariate ANOVA, factor analysis, confirmatory factor analysis, discriminant analysis, canonical correlation analysis, cluster analysis, multidimensional scaling, path analysis, and structural equation modeling.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 723 - Stats & Experimental Design I with grade greater than or equal to D-.]

Credits: 3

PS 733 - Ethics and Legal Issues

This course gives students an in-depth understanding of the American Psychological Association's ethical standards and code of conduct for psychologists, with special emphasis on the ethical dilemmas in healthcare and ethical care delivery.

Credits: 3

PS 799 - Master's Research

This course provides a platform for MS health psychology thesis track students to propose, conduct, write up, and present independent scientific research on a topic in health psychology. This course fulfills a core requirement in the health psychology thesis track master's degree program. A minimum of 10 credit hours is required for graduation in the MS health psychology thesis track program.

Credits: 12

PS 802 - Fundamentals of Clinical Research

The course will provide a comprehensive overview to clinical research. Randomized controlled trials are the strongest research design for identifying the effects of an intervention, whether aimed at prevention, treatment, or palliation. The focus will be on how to develop clinical research questions, including protocol design and the factors that should be considered in initiating a clinical research study. Study coordination, data management, and research ethics will be addressed. Additionally, one component of the course will focus on how to apply for funding (grantsmanship), critical appraisal of research studies, and how to present research data.

Credits: 3

PS 803 - Health Psych Interventions II

This advanced-level course is designed to introduce students to case conceptualization. This includes expanding interview skills, conceptualization, and treatment planning. Students will also learn cognitive-behavioral therapy, including understanding the cognitive model, structuring a therapy session, using thought records, assigning homework, and managing treatment planning.

The focus will be on evidence-based practice and the use of empirically supporting treatments.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 706 - Health Psych Interventions I with grade greater than or equal to D-.]

Credits: 3

PS 804 - Health Psychology

This course provides an upper-level introduction to the application of psychological principles to health and healthcare. The primary topics in health psychology will be examined with attention to the particular views, values, and contributions of theories of health behavior, the biopsychosocial model of health, and evidence-based practice. The aims of this course are to understand and apply psychological science to (a) the promotion and maintenance of physical health; (b) the prevention and treatment of physical illness; and (c) the identification of causal and diagnostic correlates of health and illness.

Credits: 3

PS 805 - Behavioral Medicine

Behavioral medicine is the clinical or application branch of health psychology. This class will cover a range of topics that are relevant to behavioral medicine, including theory and the importance of evidence-based practice. The biopsychosocial model will be used in understanding the presentation and treatment of specific behaviors, illnesses, and physical conditions that are part of the behavioral medicine domain, such as obesity, smoking, cancer, and diabetes.

Credits: 3

PS 806 - Cognitive Behavioral Therapy

Cognitive-behavioral therapy seeks to change the cognitions, i.e., the thoughts that are maintaining conditions of psychological disorders. Students in this course will learn about the two basic models of this therapeutic approach, cognitive restructuring and cognitive coping skills therapy. Current research in these areas will be stressed.

Credits: 3

PS 812 - Psychopathology

This advanced-level course is designed to build upon the student's understanding of psychopathology. Principal forms of behavior disorders will be discussed with emphasis on their defining characteristics; diagnostic features; etiology; course, onset, and prognosis; prevalence and impact; assessment; and treatment.

Credits: 3

PS 829 - Health Psychology Treatment Interventions III

This course focuses on advanced psychological intervention techniques such as behavioral medicine, group therapy, family therapy, pain management, couples therapy, and interpersonal therapy for psychiatric and psychological disorders and medical disorders. The exact content of the course will vary depending on the orientation of the instructor.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PS 706 - Health Psych Interventions I, PS 803 - Health Psych Interventions II with grade greater than or equal to D-.]

Credits: 3

PS 830 - Health Psychology Professional Seminar

This is a special topics seminar in health psychology. This seminar allows for specialization within the health psychology program and is designed to give students cutting-edge information about current issues in health psychology. Sample topics might include psychoneuroimmunology; psychosocial interventions for cancer; stress management; eating disorders; pain management; neurobehavioral recovery from head injury; hypnosis; alternative health treatments; interventions for chemical dependency; and the epidemiology, etiology, and treatment of depression.

Credits: 3

PS 885 - Independent Study in Health Psychology

This course provides a platform for students to study specialized, advanced topics in health psychology with a faculty member. Typically, students will be expected to write a 20-page paper describing the results of their specialized study. This course will allow students in the MS health psychology program to pursue issues such as neuropsychological testing with older adults, family therapy, group therapy, or adolescent psychology at the graduate level.

Prerequisites & Notes

Student has received department permission for PS 885 - Independent Study

Credits: 6

PT 101 - PT Orientation I

This course is the second in the orientation sequence of four classes (HS 110 - Seminar for Health Science and three orientation classes). The student, having become more accustomed to school life, will focus on professionalism, the physical therapy profession, and communication with others in the healthcare environment. 1 class hr

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 110 - Seminar for Health Sciences with grade greater than or equal to D-.]

Credits: 1

PT 103 - PT Orientation III

This orientation course is the fourth and final course in the orientation sequence. The emphasis of this class is on preparation for the professional years of study. The students are introduced to medical terminology, the medical record, note writing, and anatomical terms and movements. 1 class hr

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 101 - PT Orientation I, PT 102 - PT Orientation II with grade greater than or equal to D-.]

Credits: 1

PT 105 - Pt Orientation for Transfer Students

This course is designed for students transferring into the third year of the physical therapy curriculum. It is a synopsis of the PT Orientation I through III. This course will explore the physical therapy profession and introduce note writing, self-development and professional behavior, communication, a description of physical therapy practice, and the roles of members of the healthcare team. 1 class hr

Credits: 1

PT 300 - Medical Terminology for Physical Therapy I

This is the first course in a two-course sequence designed to teach medical terminology to majors in physical therapy. This course

will explore terminology and abbreviations by body systems to enable students to recognize, interpret, and utilize medical terminology and abbreviations when reading medical literature, documenting in patient/client charts, and working in the healthcare environment.

Credits: 1

PT 301 - Medical Terminology for Physical Therapy II

This is the second course in a two-course sequence designed to teach medical terminology to majors in physical therapy and to assist students in the transition to the professional program. This course will explore terminology and abbreviations by body systems to enable students to recognize, interpret, and apply medical terminology and abbreviations when reading medical literature, documenting in patient/client charts, and working in the healthcare environment.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 300 - Medical Terminology PT I with grade greater than or equal to B-.]

Credits: 1

PT 400 - Human Anatomy

A study of the structure and function of the human body with emphasis on the musculoskeletal, vascular, and peripheral nervous systems. Laboratory sessions involve cadaver dissection, osteology, and surface anatomy.

Credits: 6

PT 401 - Physical Therapy Examination

The course is an introduction to basic examination procedures in physical therapy across the spectrum of cardiopulmonary, integumentary, musculoskeletal, and neuromuscular impairments. Included are: 1) gross physical examination skills including vital signs, goniometry, manual muscle testing, sensory examination, and deep tendon reflexes; 2) examination of visual, language, and cognitive functions; and 3) evaluative processes to identify appropriate patient management. Students will demonstrate competence in laboratory sessions. 3 lecture/3 lab hrs

Credits: 4

PT 404 - Interventions II

An introduction to physical therapy intervention techniques across the lifespan.+T+ Includes: 1) further development of examination and evaluation techniques and 2) application and clinical decision-making in the areas of: functional mobility training, wheelchair prescription and training, principles of therapeutic exercise.+T+ Laboratory sessions and Pro Bono clinic provides opportunities to apply techniques. 3 lecture hrs/4 lab hrs

Credits: 3

PT 406 - Physical Therapy Examination

An introduction to basic examination procedures in physical therapy across the spectrum of cardiopulmonary, integumentary, musculoskeletal, and neuromuscular impairments. This course covers the first element (Examination+ of the five elements of patient/client management according to the Guide to Physical Therapist Practice. The examination is integral for determining the most appropriate interventions to achieve the desired patient outcomes. Included are 1) review of patient/client history, 2) systems review, and 3) tests and measures. Students will demonstrate psychomotor competence in laboratory sessions.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 4

PT 407 - Physical Therapy Interventions I

This course explores and integrates the basic principles of heat, cold, massage, compression, and electrotherapeutic techniques in the management of patients with impairments and functional limitations due to a variety of orthopedic, neurological, and medical conditions. Management strategies and techniques to promote healing in dermal wounds and burns will also be addressed. This course will stress a problem-solving approach for the selection and application of appropriate procedures to manage pain, edema, limitations in motion, muscle weakness, and wound healing. Clinical decision making will be practiced throughout the course to develop appropriate treatment strategies and applications for the use of these physical agents for initial treatment as well as treatment modification based on assessment of physiological and physical responses to these.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 406 - Physical Therapy Examination, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 485 - Pathophysiology I with grade greater than or equal to B-.]

Credits: 2

PT 408 - Physical Therapy Interventions II

An introduction to physical therapy intervention techniques across the life span. Includes: 1) further development of examination and evaluation techniques and 2) application and clinical decision making in the areas of functional mobility training, positioning, principles of therapeutic exercise, and wheelchair prescription/training. Laboratory sessions, field experiences, and pro bono clinic provide opportunities to apply techniques.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 406 - Physical Therapy Examination, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 485 - Pathophysiology I with grade greater than or equal to B-.]

Credits: 4

PT 409 - Medical Ethics

This course provides an overview of common ethical frameworks and theories. The focus is on identifying and analyzing ethical dilemmas facing the individual therapist and on the application of ethical principles, the APTA Code of Ethics, and the Guide for Professional Conduct to these dilemmas. The analysis also takes into account the duties, rights, and character traits that individual therapists use in solving ethical dilemmas for him/herself. This course includes aspects of constitutional, federal, state, and case law as they apply to the individual therapist, as well as how they are congruent with ethical principles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HS 400 - Interprofessional Education, PT 406 - Physical Therapy Examination, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 431 - Exercise Physiology, PT 485 - Pathophysiology I with grade greater than or equal to B-.]

Credits: 2

PT 410 - Issues in Physical Therapy III: Psychosocial Aspects of Disability and Illness

This course focuses on managing individual needs during illness and disease as well as ways to successfully interact with and enhance wellness of patients and families in health care settings. Students will be able to identify the psychosocial impacts of disability and illness using the International Classification of Functioning, Disability and Health to guide patient interactions. A variety of topics will be presented through readings, lectures, discussions and experiential activities

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 409 - Medical Ethics, PT 416 - Kinesiology & Biomech II, PT 465 - Issues II: Health Promotion,

PT 470 - Pro Bono Experience II, PT 486 - Pathophysiology II, PT 489 - Research Methods I with grade greater than or equal to D-.]

Credits: 2

PT 411 - Kinesiology and Biomechanics I

This course uses the concepts of kinesiology and biomechanics in order to explore human movement from a mechanical perspective and applies these concepts to physical therapy. The fundamental concepts of force and motion will be examined, as well as the function of biological tissues in human movement. Particular attention is paid to the study of synovial joints as the key linkages in the human mechanical system and how their movements are created and governed. The overall goals of the course are to develop the ability to biomechanically analyze normal functional movement, to determine the pathomechanics of various movement dysfunctions, and to learn to incorporate kinesiological and biochemical principles in patient examination, intervention, and documentation. 2 lecture/2 lab hrs

Credits: 3

PT 412 - Kinesiology and Biomechanics II

This second of the two-course sequence continues to study the principles of kinesiology and biomechanics, particularly in relationship to movement disorders that are encountered in physical therapy. The course will emphasize the understanding of the multiple factors that affect human motion, including biomechanics, physiology, age, gender, neurological function, and psychological function. The overall goals of the course are to develop the ability to analyze normal functional movement, to determine the pathomechanics of various movement dysfunctions, and to learn to incorporate kinesiological and biomechanical principles in further coursework dealing with patient management. 1.5 class hrs

Credits: 2

PT 414 - Human Anatomy for Physical Therapists

A regional study of the structure, function, and development of the human body with emphasis on the musculoskeletal, vascular and peripheral nervous systems. Select pathologies will be used to explore the clinical relevance of anatomic relationships to human movement and function.

Credits: 6

PT 415 - Kinesiology and Biomechanics I

This first course in a two-course sequence presents an intensive study of the principles of kinesiology and biomechanics, particularly in relationship to movement disorders that are encountered in physical therapy practice. The course will emphasize the understanding of the multiple factors that affect human motion through the life span. The overall goals of the course are to develop the ability to analyze normal functional movement, to determine the pathomechanics of various movement dysfunctions, and to learn to incorporate kinesiological and biomechanical principles as a tool for solving patient problems.

Credits: 3

PT 416 - Kinesiology and Biomechanics II

This second course in a two-course sequence presents an intensive study of the principles of kinesiology and biomechanics, particularly in relationship to movement disorders that are encountered in physical therapy. The course will emphasize the understanding of the multiple factors that affect human motion, including biomechanics, physiology, age, gender, neurological function, and psychological function. The overall goals of the course are to develop the ability to analyze normal functional movement, to determine the pathomechanics of various movement dysfunctions, and to learn to incorporate kinesiological and biomechanical principles in further coursework dealing with patient management.

Credits: 2

PT 421 - Neuroscience

A study of the basic principles and concepts related to the nervous system. Emphasis is placed on the role of the nervous system in normal physiologic function, with particular emphasis on sensorimotor behavior. Neuroanatomy and neurophysiology and an introduction to neuropathology are included. 3 class hrs

Credits: 3

PT 425 - Neuroscience

A study of the basic principles and concepts related to the nervous system. The development and changes of the nervous system, and subsequently the individual, across the life span provides the foundation for understanding the brain behavior relationships. Emphasis is placed on the role of the nervous system in normal physiologic function, with particular emphasis on sensorimotor behavior inclusive of motor development, motor learning and motor control theory. Neuroanatomy, neurophysiology, and an introduction to neuropathology are included.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 4

PT 431 - Exercise Physiology

This course provides a foundation in the fundamentals of exercise physiology. Concepts learned in this class will include the acute and chronic physiological changes that occur with exercise in the healthy population. Students will also develop an understanding of the scientific basis for aerobic and strength training, exercise testing principles, and the fundamentals of prescribing an exercise program. The course will focus on primary prevention for the healthy client throughout the life span with minor emphasis on exercise prescription for the person with disease. Students will use the literature to direct the clinical decision-making process relevant to course topics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 3

PT 435 - Pro Bono Experience I

This is the first course in a series designed to provide all USciences DPT students with structured experiential learning opportunities that are integrated into the curriculum in a step-wise progression beginning in the fall of the first professional year through the completion of the third professional year.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 0

PT 461 - Issues in PT: Documentation

Issues in PT I is the first course of a five course sequence that covers aspects essential to physical therapy practice today over the three years of the professional phase of the program. This course provides the student with an introduction to taxonomy and to the nature of decision making in the clinical environment. Students are introduced to the Guide to Physical Therapist Practice as a framing device for decision making in physical therapy. Includes discussion about medical terminology and the medical record, history taking, clinical documentation, and professional socialization. 2 class hrs

Credits: 2

PT 462 - Issues in PT: Life Span Development

Issues in PT II is a two-credit course that emphasizes the development of clinical reasoning, problem-solving and decision making skills and the critical appraisal of evidence for physical therapy test and measures as it pertains to normal individuals across the life span. The Guide to Physical Therapist Practice is utilized with the focus on prevention and wellness activities. The course will be designed to promote learning of new material and to integrate content from other courses. 2 class hrs

Credits: 2

PT 463 - Physical Therapy Issues I: Documentation & Communication

This course focuses on the development of written and verbal communication skills required for professional interactions with patients, caregivers, and other healthcare providers. Students will be introduced to the Guide to Physical Therapist Practice as a framing device for decision making in physical therapy. Students will have the opportunity to interact with patients and other healthcare providers throughout this course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 2

PT 465 - Physical Therapy Issues II: Health Promotion and Wellness

This course emphasizes the development of clinical-reasoning, problem-solving, and decision-making skills as they pertain to normal individuals across the life span. The course focuses on prevention and wellness and the impact of psychosocial issues on the client and caregiver. Client screenings and wellness activities will be designed to promote learning of new material and to integrate content from other courses. A learner-centered format will be utilized to afford students the opportunity to work in groups and as members of a healthcare team.

Credits: 2

PT 470 - Pro Bono Experience II

This is the second course in a series designed to provide all USciences DPT students with structured experiential learning opportunities that are integrated into the curriculum in a step-wise progression beginning in the fall of the first professional year through the completion of the third professional year. Students will build on skills acquired in P1 fall.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 435 - Pro Bono Experience I with grade greater than or equal to P.]

Credits: 0

PT 481 - Pathophysiology I

This is the first of a two-course sequence that will present an overview of the pathophysiology of disorders frequently encountered by physical therapists, particularly those affecting the cardiopulmonary, integumentary, musculoskeletal, and neuromuscular systems and other major clinical medicine disorders. The course will emphasize the relationships of pathological processes to patient symptoms and function through the life span. 4 class hrs

Credits: 4

PT 482 - Pathophysiology II

This second part of a two-course sequence will present an overview of the pathophysiology of disorders frequently encountered by physical therapists, particularly those affecting the cardiopulmonary, integumentary, musculoskeletal, and neuromuscular systems and other major clinical medicine disorders. The course will emphasize the relationships of pathological processes to patient symptoms and function through the life span. 4 class hrs

Credits: 4

PT 483 - Health Promotion & Wellness

This course addresses the role physical therapists have in the area of promoting optimal health by the use of prevention and wellness programs and exercise physiology. Students will be presented with information on screening, the role of exercise and risk reduction in prevention and wellness, and the development of these programs for clients, groups, and communities. 2 class hrs

Credits: 2

PT 484 - Research Methods I

This course is the first of two parts of the required physical therapy research sequence. The course provides an introduction to the research process, its relationship to practice, and the foundation for evidence-based practice. Students will obtain a basic understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data. Students develop analytical and problem-solving skills in the research arena. Knowledge gained through this course can be used in the evaluation of PT services. 2 class hrs

Credits: 2

PT 485 - Pathophysiology I

This is the first part of a two-course sequence that will present an overview of the pathophysiology of disorders frequently encountered by physical therapists. The first part of the sequence will focus on diseases of the cardiopulmonary, immune, endocrine, oncologic, and musculoskeletal systems, and other major clinical medicine disorders. The course will emphasize the relationships of pathological processes to patient symptoms and function through the lifespan.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 400 - Human Anatomy with grade greater than or equal to B-.]

Credits: 3

PT 486 - Pathophysiology II

This course is the second of a two-course sequence that will present an overview of the pathophysiology of disorders frequently encountered by physical therapists, particularly those affecting the gastrointestinal, integumentary, and the neuromuscular systems as well as other clinical medicine disorders such as infectious disease. Disease processes across the life span are presented. Basic pharmacological intervention is discussed. The course will emphasize the relationships of pathological processes to patient symptoms and function through the lifespan.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): HS 400 - Interprofessional Education, PT 406 - Physical Therapy Examination, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 435 - Pro Bono Experience I, PT 485 - Pathophysiology I with grade greater than or equal to P.]

Credits: 3

PT 489 - Research Methods I

This course is the first of three parts of the required physical therapy research sequence. The course provides an introduction to the research process and its relationship to evidence-based practice. Students will obtain a basic understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): HS 400 - Interprofessional Education, PT 406 - Physical Therapy Examination, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 431 - Exercise Physiology, PT 485 - Pathophysiology I with grade greater than or equal to B-.]

Credits: 2

PT 500 - Intro Applied Research Methods

This course is the first of three parts of the required physical therapy research sequence. The course provides an introduction to the research process and its relationship to evidence-based practice. Students will obtain a basic understanding of theory-based research, methodological considerations in the design of research, ways of evaluating practice, and approaches to analyzing data.
2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to B-.]

Credits: 2

PT 501 - Qualitative Research Methods

This is the second course in a three-semester required research sequence in the doctor of physical therapy program. The purpose of this course is to expose students to the use of qualitative research techniques across the healthcare continuum. Qualitative research methods will be explored, including development of relevant research questions and conceptual frameworks, data collection strategies, data analysis, interpretation of results, and data management software. Blending of qualitative and quantitative research perspectives to develop and conduct comprehensive and clinically meaningful research will be discussed.
2 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion, PT 486 - Pathophysiology II with grade greater than or equal to D-.]

Credits: 2

PT 502 - Geriatric Physical Therapy

This course is designed to provide the student with an understanding of the biological, pathological, psychological, and social aspects of aging. Examination and intervention techniques will be presented, focusing on the overall management of the geriatric patient/client. Discussion will emphasize the use of current literature to promote evidence-based practice.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion, PT 486 - Pathophysiology II, PT 489 - Research Methods I with grade greater than or equal to D-.]

Credits: 2

PT 503 - Differential Diagnosis

This course explores the differential diagnostic process within physical therapy. Discussion focuses on the use of differential

diagnostic skills to direct patient/client management, as described in the Guide to Physical Therapist Practice. Topics include specific screening examinations, diagnostic images, and laboratory tests commonly used to aid diagnosis within the musculoskeletal, neuromuscular, integumentary, and cardiovascular systems. Emphasis is placed on the use of problem solving and clinical decision making for the process of determining when it is most appropriate to: 1) implement physical therapy care, 2) consult with other health care providers regarding patient care, or 3) refer the patient to another health care provider, in order to maximize individual patient outcomes. 3 class hrs

Credits: 3

PT 504 - Pt Issues III Psychosocial Aspects of

This course focuses on managing individual needs during illness and disease as well as ways to successfully interact with and enhance wellness of patients and families in healthcare settings. A variety of topics will be presented through readings, lectures, discussions, and experiential activities. Topics include a person's needs during disability and acute as well as chronic illness, mind-body relationship, complementary and alternative medicine, and death and dying. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 406 - Physical Therapy Examination, PT 409 - Medical Ethics, PT 415 - Kinesiology & Biomech I, PT 425 - Neuroscience, PT 463 - PT Issues I: Doc & Comm, PT 485 - Pathophysiology I with grade greater than or equal to B-.]

Credits: 2

PT 505 - Neuromuscular Physical Therapy I

This course is the first in a three course sequence. The primary focus is performing examination skills including the use of valid and reliable outcome measures to comprehensively understand the impact of neurological dysfunction on all levels of the International Classification of Functioning, Disability and Health model for persons with primary neuromuscular pathology. In this course students will develop clinical decision making skills for the physical therapy management of individuals with neuromuscular pathology and psychosocial issues surrounding patients and their support system, across the lifespan, including contextual, personal and environmental factors. Students will utilize current literature and examination findings to make appropriate PT diagnoses and prognoses, and perform interventions for patients with (non progressive) primary neuromuscular diagnoses.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 409 - Medical Ethics, PT 416 - Kinesiology & Biomech II, PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion, PT 470 - Pro Bono Experience II, PT 486 - Pathophysiology II, PT 489 - Research Methods I with grade greater than or equal to B-.]

Credits: 4

PT 506 - Neuromuscular Physical Therapy II

This course is the second in a three course sequence. In this course students will develop clinical decision making skills for the physical therapy management, consistent with the International Classification for Functioning, Disability and Health for persons with primary neuromuscular pathology. Specific to this course is an understanding of medical management of neuromuscular pathology, psychosocial issues surrounding patients and support system for pediatric, adult and older adult populations across the continuum of practice settings. Students will gain an understanding of working as part of a healthcare team that uses evidence to direct the evaluation and treatment planning of patients presented throughout the course.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 410 - Issues III: Psychosocial, PT 502 - Geriatric Physical Therapy, PT 505 - Neuromuscular I, PT 507 - Musculoskeletal I, PT 536 - Cardiopulmonary PT I, PT 554 - Clinical Decision Making, PT 575 - Pro Bono Experience III with grade greater than or equal to D-.]

Credits: 4

PT 507 - Musculoskeletal Physical Therapy I

This is the first course within a three-course sequence. This course will introduce the student to physical therapy examination and intervention for musculoskeletal dysfunction from disease, disuse, trauma, surgery, and the aging process. The course will use musculoskeletal conditions with primarily inflammatory, degenerative, traumatic, and post-surgical etiologies as the basis for formulating a fundamental musculoskeletal exam and treatment plan. Emphasis is placed on musculoskeletal differential diagnosis, clinical decision-making, and the components of patient/client management, consistent with the International Classification of Functioning, Disability and Health (ICF). Management of the patient/client will be related to principles of tissue healing, impairments, and knowledge of pathology and pathomechanics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion, PT 486 - Pathophysiology II, PT 489 - Research Methods I with grade greater than or equal to D-.]

Credits: 4

PT 508 - Musculoskeletal Physical Therapy II

This is the second course within a three-course sequence. This course will build on the student's physical therapy examination and intervention skills, expanding these to intermediate level musculoskeletal conditions including a focus on physical therapy classification systems for musculoskeletal conditions of the spine. Students will also learn about physical therapy management of patients with lower extremity amputations, lower extremity prosthetics, orthotics, and physical therapy management of pediatric musculoskeletal conditions. Emphasis continues to be placed on musculoskeletal differential diagnosis, clinical decision-making, and the components of patient/client management, consistent with the International Classification of Functioning, Disability, and Health (ICF).

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 502 - Geriatric Physical Therapy, PT 505 - Neuromuscular I, PT 507 - Musculoskeletal I, PT 536 - Cardiopulmonary PT I, PT 554 - Clinical Decision Making with grade greater than or equal to D-.]

Credits: 4

PT 509 - Differential Diagnosis

This course explores the differential diagnostic process within physical therapy, screening for the presence of medical disease or other pathologies and conditions whose treatment is beyond the scope of physical therapist practice. Discussion focuses on the use of differential diagnostic skills to direct patient/client management, as described in the International Classification of Functioning, Disability, and Health (ICF). Topics include specific screening examinations (subjective and objective), diagnostic images, electrodiagnostic and laboratory tests commonly used to rule out the presence of systemic disease whose symptoms may present as musculoskeletal or neuromuscular conditions. Emphasis is placed on the use of problem-solving and clinical decision-making for the process of determining when it is most appropriate to: 1) implement physical therapy care, 2) consult with other healthcare providers regarding patient care, or 3) refer the patient to another healthcare provider, in order to maximize individual patient outcomes.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 410 - Issues III: Psychosocial, PT 502 - Geriatric Physical Therapy, PT 505 - Neuromuscular I, PT 507 - Musculoskeletal I, PT 536 - Cardiopulmonary PT I, PT 554 - Clinical Decision Making, PT 575 - Pro Bono Experience III with grade greater than or equal to D-.]

Credits: 3

PT 511 - Biomechanics/Kinesiology I

This is the first course, in a two-course sequence, studying the principles of kinesiology and biomechanics in relationship to movement disorders of the lumbar spine and lower extremity. Participants will develop the ability to analyze normal and abnormal functional movement, determine pathomechanics of movement dysfunctions, and incorporate kinesiological and biomechanical principles for solving movement dysfunctions

Credits: 2

PT 512 - Biomechanics/ Kinesiology II

This is the second course, in a two-course sequence, studying the principles of kinesiology and biomechanics, in relationship to movement disorders of the upper extremity, cervical and thoracic spine. Participants will develop the ability to analyze normal and abnormal functional movement, determine pathomechanics of movement dysfunctions, and incorporate kinesiological and biomechanical principles for solving movement dysfunctions.

Credits: 2

PT 515 - Musculoskeletal I

This is the first course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with knowledge of the pathology and pathomechanics of musculoskeletal dysfunction from disease, trauma, disuse, and the aging process in the extremities of the human body. Examination and intervention techniques are presented and integrated with previously learned biomechanical, musculoskeletal, and neuromuscular examination and therapeutic exercise principles. Emphasis is placed on differential diagnosis, clinical decision making, and the components of patient/client management, consistent with the Guide to Physical Therapist Practice , in order to maximize individual patient outcomes. Students will practice the development, implementation, and progression of appropriate interventions as part of an overall physical therapy plan of care. 4 lecture/4 lab hrs (12-week format)

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to B-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion with grade greater than or equal to B-.]

Credits: 5

PT 516 - Musculoskeletal II

This is the second course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with knowledge of the pathology and pathomechanics of musculoskeletal dysfunction from disease, trauma, disuse, and the aging process in the lower quarter of the human body. Examination and intervention principles, including the therapeutic exercise and joint manipulation, are presented. Emphasis is placed on differential diagnosis, clinical decision making, and the components of patient/client management, consistent with the Guide to Physical Therapist Practice , in order to maximize individual patient outcomes. Students will practice the development, implementation, and progression of appropriate interventions as part of an overall physical therapy plan of care. 3 lecture/3 lab hrs (12-week format)

Credits: 4

PT 518 - Musculoskeletal I

This is the first course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with knowledge of the pathology and pathomechanics of musculoskeletal dysfunction from disease, trauma, disuse, and the aging process in the lower quarter of the human body. Examination and intervention techniques are presented and integrated with previously learned biomechanical, musculoskeletal, and neuromuscular examination and therapeutic exercise principles. Emphasis is placed on differential diagnosis, clinical decision making, and the components of patient/client management, consistent with the Guide to Physical Therapist Practice, in order to maximize individual patient outcomes.

Students will practice the development, implementation, and progression of appropriate interventions as part of an overall physical therapy plan of care. 4 lecture/4 lab hrs (12-week format)

Credits: 5

PT 519 - Musculoskeletal II

This is the second course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with knowledge of the pathology and pathomechanics of musculoskeletal dysfunction from disease, trauma, disuse, and the aging process in the upper quarter of the human body. Examination and intervention techniques are presented and integrated with previously learned biomechanical, musculoskeletal, and neuromuscular examination and therapeutic exercise principles. Emphasis is placed on differential diagnosis, clinical decision making and the components of patient/client management, consistent with the Guide to Physical Therapist Practice, in order to maximize individual patient outcomes. Students will practice the development, implementation, and progression of appropriate interventions as part of an overall physical therapy plan of care. 3 lecture/3 lab hrs (12-week format)

Credits: 4

PT 521 - Physical Therapy Examination and Intervention I

An introduction to basic examination procedures, movement assessment, and intervention techniques in physical therapy of the lower quarter across the lifespan consistent with PT patient management model and International Classification of Functioning, Disability, and Health (ICF).

Credits: 2

PT 522 - Neuromuscular Physical Therapy I

Focuses on the examination of individuals with neuromuscular pathology and movement disorders. Laboratory sessions provide students with the opportunity to practice clinical decision making for clients with neuromuscular dysfunction in the areas of physical therapy diagnosis, factors affecting prognosis, development of physical therapy plan of care, and development of outcomes assessment plan. Includes examination and intervention for vestibular and non-vestibular postural control dysfunction. 3 lecture/3 lab hrs (12-week format)

Credits: 4

PT 527 - Neuromuscular PT I

This course is the first in a three-course sequence. In this course students will develop clinical decision-making skills for physical therapy management, consistent with the Guide to Physical Therapist Practice, for persons with primary neuromuscular pathology. Specific to this course is an understanding of physical therapy management of neuromuscular pathology and psychosocial issues surrounding patients and their support system, across the life span. Students will perform examination and intervention skills and learn to make prognoses for patients with (non-progressive) primary neuromuscular diagnoses. Use of the literature to direct the clinical decision-making process relevant to course topics will also be included. 3.5 lecture/3.5 lab hrs

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to B-.]

Credits: 5

PT 529 - Neuromuscular Physical Therapy II

This course is the second in a three-course sequence. In this course students will develop clinical-decision making skills for physical therapy management consistent with the Guide to Physical Therapist Practice for persons with primary neuromuscular pathology. Specific to this course is an understanding of medical management of neuromuscular pathology, psychosocial issues

surrounding patients and support systems, and health policy issues in pediatric, adult, and older adult populations. Students will use the literature to complete a case study. 3 lecture/3 lab hrs (12-week format)

Credits: 4

PT 531 - Clinical Practice I

The Clinical Practice course series gives students a variety of exposures to clinical situations and experiences to integrate classroom learning with real and simulated patient encounters from the first- through the third-professional year. These encounters are designed in step wise fashion to guide the development of interpersonal, communication, and decision-making skills while affording the student an opportunity to practice select clinical skills. Didactic sessions in this first course of the series will introduce patient communication and mobility skills.

Credits: 2

PT 532 - Clinical Practice II

The Clinical Practice course series gives students a variety of exposures to clinical situations and experiences to integrate classroom learning with real and simulated patient encounters from the first- through the third-professional year. These encounters are designed in step wise fashion to guide the development of interpersonal, communication, and decision-making skills while affording the student an opportunity to practice select clinical skills. Didactic sessions in this second course of the series will focus on patient history, documentation skills, and patient teaching

Credits: 2

PT 536 - Cardiovascular and Pulmonary Physical Therapy I

The first course in a two-course sequence will focus on the examination, evaluation, and treatment of patients with primary cardiac, vascular, and pulmonary disorders. Students will be able to make fundamental clinical treatment decisions, incorporating evidence from disease risk factors, cardiovascular and pulmonary pathophysiology, medical diagnostics, and pharmacology.

Students will begin to incorporate patient specific information into the plan of care including age, culture, and learning preferences.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to D-.]

Credits: 3

PT 537 - Cardiovascular and Pulmonary Physical Therapy II

PT 537 is the second in a two-course sequence. In this course students will further develop clinical decision-making skills for the management of person with primary or secondary cardiac, vascular, and/or pulmonary pathology across the lifespan. This course will focus on the evaluation and treatment of the critical care patient, outpatient cardiac and pulmonary conditions. Students will be able to interpret commonly used diagnostic tools including radiology, vital sign response, medications to modify their physical therapy interventions. Students will be exposed to nutrition for health promotion as well as nutrition for the patient with cardiac, vascular or pulmonary disease. Finally, students will reinforce and apply fundamentals of ethics, core values, and fiscal constraints relevant to cardiovascular and pulmonary physical therapy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 536 - Cardiopulmonary PT I with grade greater than or equal to B-.]

Credits: 3

PT 541 - Exercise Physiology for Physical Therapy

Concepts learned in this class will include the acute and chronic physiological changes that occur with exercise in the healthy population. You will develop an understanding of the scientific basis for aerobic and anaerobic training, exercise testing principles, fundamentals of exercise prescription, nutrition and recognize when appropriate to refer to appropriate health care professionals.

Credits: 3

PT 544 - Examination and Intervention of Integument

This course will focus on the examination and interventions of patients with integument disorders. In this course students will use the International Classification of Functioning, Disability, and Health to develop clinical decision-making skills for physical therapy management. Emphasis is placed on examination and intervention of patients with integument disorders. Individual patient problems will be used to reinforce clinical decision-making skills

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 410 - Issues III: Psychosocial, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to B-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion with grade greater than or equal to B-.]

Credits: 3

PT 547 - Physical Therapy Examination & Intervention of Specific Systems

This is a course focusing on the Physical Therapy of specific systems. In this course students will develop clinical decision-making skills for physical therapy management consistent with the International Classification of Functioning, Disability, and Health to for people with endocrine and metabolic conditions, primary or secondary genitourinary pathology, women+s health issues, oncology, lymphedema, concussion, HIV disease, and osteoporosis.

Credits: 3

PT 554 - Clinical Decision Making

This course requires students to use their identified clinical decision-making framework from the previous semesters to evaluate and treat real and simulated patients. The patient experiences will include patients who present with diagnoses across the four practice patterns: cardiopulmonary, integumentary, musculoskeletal, and neuromuscular.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 407 - PT Interventions I, PT 408 - PT Interventions II, PT 416 - Kinesiology & Biomech II, PT 486 - Pathophysiology II with grade greater than or equal to D-.] And Student has satisfied all of the following: [Student has completed all of the following course(s): PT 431 - Exercise Physiology, PT 465 - Issues II: Health Promotion with grade greater than or equal to B-.]

Credits: 2

PT 556 - Clinical Education I

Initial, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to gain practice opportunities in patient evaluation, goal setting, program planning, and intervention implementation with patients in an acute care, outpatient, or subacute setting. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into the acute care setting.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PT 410 - Issues III: Psychosocial, PT 502 - Geriatric Physical Therapy, PT 515 - Musculoskeletal I, PT 527 - Neuromuscular PT I, PT 536 - Cardiopulmonary PT I, PT 554 - Clinical Decision Making with grade greater than or equal to B-.]

Credits: 4

PT 561 - Ethics in Healthcare

This course provides an overview of common ethical frameworks and theories. The focus is on identifying and analyzing ethical issues and dilemmas facing the individual therapist and on the application of ethical principles and the APTA Code of Ethics to these dilemmas. The APTA Core Values will also be explored in the context of professional behavior and in relationship to the APTA Code of Ethics. This course includes aspects of federal, state, and case law as they apply to the individual therapist, as well as how they fit with ethical principles.

Credits: 2

PT 563 - PT III-Clin Ed/Prof Dev

This course provides an overview of the legal, ethical, and professional development issues that health care professionals encounter within the clinical environment. Students will work in small and large groups to debate and discuss topics such as delegation of PT services, state practice acts, elder/domestic abuse, ethical dilemmas, and cultural diversity. Issues in PT III will prepare the student for a smooth transition into the initial full-time clinical education experience. 2 class hrs

Credits: 2

PT 564 - Issues in PT IV: Evidence-Based

This course will be the second in the two course research sequence. In this course, students will evaluate clinical problems using evidence-based practice methods and the skills learned in the Intro to Research course. Learning will occur through lectures, class discussions, readings, exercises, and assignments. Students will pick clinical questions to use as the basis for literature searches and reviews of the literature. These activities will provide students with the background needed to establish evidence-based practice as part of the clinical decision-making process. 2 class hrs

Credits: 2

PT 565 - Ethics in the PT Profession

Students will participate in this capstone course experience, building on the knowledge of ethics in physical therapy practice and the health care environment that is threaded throughout the professional phase of the curriculum. By applying their clinical experiences, students will actively solve the ethical dilemmas that they will face as practitioners and members of society. 3 class hrs

Credits: 2

PT 567 - Issues in PT IV: Using Evidence-Based

This course will be the third in the three-course research sequence. In this course students will evaluate clinical problems using evidence-based practice methods and the skills learned in Research Methods and Qualitative Research Methods. Learning will occur through lectures, class discussions, readings, exercises, and assignments. Students will pick clinical questions to use as the bases for literature searches and reviews of the literature. These activities will provide students with the background needed to establish evidence-based practice as part of the clinical decision-making process.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PT 410 - Issues III: Psychosocial, PT 502 - Geriatric Physical Therapy, PT 515 - Musculoskeletal I, PT 527 - Neuromuscular PT I, PT 536 - Cardiopulmonary PT I, PT 554 - Clinical Decision Making with grade greater than or equal to B-.]

Credits: 2

PT 568 - PT Issues III Clin Ed

This course provides an overview of the legal, ethical, and professional development issues that healthcare professionals encounter within the clinical environment. Students will work in small and large groups to debate and discuss topics such as delegation of PT services, state practice acts, elder/domestic abuse, ethical dilemmas, and cultural diversity. Issues in PT III will prepare the student for smooth transition into the initial full-time clinical education experience. 2 class hrs

Credits: 2

PT 571 - Movement Science Across the Lifespan

This course explores typical age-related changes in human movement across the lifespan, with an emphasis on infants and older adults. Task-specific examples are used as the framework to integrate information from multiple diverse fields such as movement science, gerontology, developmental science, and biomechanics to provide the student with an understanding of the evolution of movement with age.

Credits: 2

PT 575 - Pro Bono Experience III

This is the third course in a series designed to provide all USciences DPT students with structured experiential learning opportunities that are integrated into the curriculum in a step-wise progression beginning in the fall of the first professional year through the completion of the third professional year. Students will build on skills acquired throughout the first professional year.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 435 - Pro Bono Experience I, PT 470 - Pro Bono Experience II with grade greater than or equal to P.]

Credits: 0

PT 580 - Pro Bono Experience IV

This is the fourth course in a series designed to provide all USciences DPT students with structured experiential learning opportunities that are integrated into the curriculum in a step-wise progression beginning in the fall of the first professional year through the completion of the third professional year. Students will build on skills acquired throughout the first professional year.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 435 - Pro Bono Experience I, PT 470 - Pro Bono Experience II, PT 575 - Pro Bono Experience III with grade greater than or equal to P.]

Credits: 0

PT 581 - Medical Management I

This is the first part of a two-course sequence that will present an overview of the pathophysiology and medical management of disorders frequently encountered by physical therapists, pain science, and the application of therapeutic modalities. Specific pathologies covered include diseases of the immune, endocrine, and musculoskeletal systems as well as other major clinical medicined is orders. Medical management includes modalities and basic pharmacologic and radiologic principles, relevant to physical therapists. A problem-solving approach with a focus on clinical decision making will be emphasized for the selection and application of appropriate procedures to manage pain, edema, limitations in motion, muscle weakness, and wound healing.

Credits: 3

PT 600 - Neuromuscular PT III

This course is the third in a three-course sequence and will focus on advanced physical therapy management of patients with

neuromuscular pathology across different healthcare delivery systems. In this course, students will integrate clinical decision making consistent with the Guide to Physical Therapist Practice for patients with neuromuscular pathology. Specific to this course is the application of clinical research to contemporary practice across the life span, and students will use available literature to guide clinical decision making. Medical management of neuromuscular pathology, psychosocial issues surrounding patients and support systems, and health policy issues relevant to complex patients with neuromuscular pathology will be discussed.3 lecture/4 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 4

PT 601 - Neuromuscular PT III

This course is the third in a three-course sequence and will focus on advanced physical therapy management of patients with neuromuscular pathology across different healthcare delivery systems. In this course, students will integrate clinical decision making consistent with the Guide to Physical Therapist Practice for patients with neuromuscular pathology. Specific to this course is the application of clinical research to contemporary practice across the life span, and students will use available literature to guide clinical decision making. Medical management of neuromuscular pathology, psychosocial issues surrounding patients and support systems, and health policy issues relevant to complex patients with neuromuscular pathology will be discussed.2 lecture/4 lab hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 3

PT 602 - Pediatric Physical Therapy

This course provides students the opportunity to learn about physical therapy examination and evaluation, diagnosis/prognosis, and interventions of the pediatric client in light of family-centered care. Additionally, this course provides students with experiential learning through video case studies and interactive labs.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 2

PT 603 - Neuromuscular Physical Therapy III

This course is the third in a three course sequence and will focus on advanced physical therapy management of patients with neuromuscular pathology which is progressive in nature and across different healthcare delivery systems. Students will utilize the International Classification of Functioning, Disability and Health. Specific to this course is the application of clinical research to contemporary practice across the lifespan, and students will use available literature to guide clinical decision making. Medical management of neuromuscular pathology that is progressive in nature, psychosocial issues surrounding patients and support systems, and health policy issues relevant to complex patients with neuromuscular pathology will be discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 506 - Neuromuscular PT II, PT 508 - Musculoskeletal II, PT 509 - Differential Diagnosis, PT 537 - Cardiopulmonary PT II, PT 544 - Examination & Intervention, PT 567 - Issues in PT IV: Evidence, PT 580 - Pro Bono Experience IV with grade greater than or equal to D-.]

Credits: 4

PT 604 - Musculoskeletal Physical Therapy III

This is the third course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with additional knowledge of the pathology and pathomechanics of musculoskeletal dysfunction throughout the body and across the lifespan. Special topics will be covered to enhance problem solving and clinical decision-making skills and improve overall patient management. Emphasis continues to be placed on clinical decision-making and the components of patient/client management, consistent with the International Classification of Functioning, Disability, and Health (ICF). Students will practice the development, implementation and progression of appropriate patient/client management principles as well as synthesis and integration of recent evidence pertaining to musculoskeletal physical therapy.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 506 - Neuromuscular PT II, PT 508 - Musculoskeletal II, PT 509 - Differential Diagnosis, PT 537 - Cardiopulmonary PT II, PT 544 - Examination & Intervention, PT 567 - Issues in PT IV: Evidence with grade greater than or equal to D-.]

Credits: 4

PT 610 - Leadership in Physical Therapy

This course will explore the concept and process of leadership and management in general and how it specifically applies to physical therapy. It will provide a framework for allow students to act as advocates at various levels within physical therapy and the health care environment. Students will analyze the implementation and effectiveness of differing leadership styles and management principles within the context of current health care systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 603 - Neuromuscular III, PT 604 - Musculoskeletal PT III, PT 635 - Health & Business Policy, PT 661 - Issues V: Mgmt of Complex Pt with grade greater than or equal to D-.]

Credits: 2

PT 611 - Cardiovascular Rehabilitation

This course will examine the impact of cardiovascular diseases on the movement system. Students will develop clinical skills inclusive of decision making for the physical therapy management of those with primary and secondary cardiovascular disorders across the lifespan in order to optimize movement, promote health and wellness, to mitigate the progression of impairments, and to prevent the development of, or the progression of, disability.

Credits: 2

PT 612 - Pulmonary Rehabilitation

This course will examine the impact of pulmonary diseases on the movement system. Students will develop skills and decision making for the physical therapy management of those with primary and secondary pulmonary disorders across the lifespan in order to optimize movement, promote health and wellness, to mitigate the progression of impairments, and to prevent the development of, or the progression of, disability.

Credits: 2

PT 615 - Musculoskeletal III

This is the third course within a three-course sequence focusing on musculoskeletal physical therapy. This course is designed to provide the student with additional knowledge of the pathology and pathomechanics of musculoskeletal dysfunction throughout the body. Special topics will be covered to enhance problem solving and clinical decision-making skills and improve overall patient management. Emphasis continues to be placed on differential diagnosis, clinical decision making, and the components of patient/client management, consistent with the Guide to Physical Therapist Practice, in order to maximize individual patient

outcomes. Students will practice the development, implementation, and progression of appropriate patient/client management principles as well as synthesis and integration of recent evidence pertaining to musculoskeletal physical therapy. 3 class hrs

Credits: 3

PT 620 - Leadership

This course will explore the concept of leadership and the traits, values, and actions of effective leaders. Students will analyze the implementation and effectiveness of different leadership styles and management principles within the context of current health care systems, practices, and other professional arenas. Students will formulate a plan for their own continued professional growth as they create a portfolio of evidence of leadership activities.

Credits: 2

PT 631 - Clinical Practice IV

The Clinical Practice course series gives students a variety of exposures to clinical situations and experiences to integrate classroom learning with real and simulated patient encounters from the first- through the third-professional year. These encounters are designed in stepwise fashion to guide the development of interpersonal, communication, and decision-making skills while affording the student an opportunity to practice select clinical skills. Didactic sessions in this fourth course of the series will focus on clinical reasoning and focused exam procedures.

Credits: 1

PT 633 - Clinical Practice VI

The Clinical Practice course series gives students a variety of exposures to clinical situations and experiences to integrate classroom learning with real and simulated patient encounters from the first- through the third-professional year. These encounters are designed in stepwise fashion to guide the development of interpersonal, communication, and decision-making skills while affording the student an opportunity to practice select clinical skills. Didactic sessions in this sixth course of the series will focus on mentorship and peer teaching.

Credits: 1

PT 634 - Clinical Practice VII

The Clinical Practice course series gives students a variety of exposures to clinical situations and experiences to integrate classroom learning with real and simulated patient encounters from the first- through the third-professional year. These encounters are designed in step wise fashion to guide the development of interpersonal, communication, and decision-making skills while affording the student an opportunity to practice select clinical skills. Didactic sessions in this seventh and final course of the series will focus on coordination of care and complex decision making.

Credits: 1

PT 635 - Health & Business Policy

This course will orient the student to the principles of business administration and the role of the physical therapist as patient advocate, manager, and business owner. Students will design a new program or product that will be presented to the class in the final project. The project will include components such as access to healthcare, marketing, human resources, and reimbursement as well as appraise their ability to identify health policy issues and effect change.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 3

PT 640 - Pro Bono Experience V

The is the fifth and final course in a series designed to provide all USciences DPT students with structured experiential learning opportunities that are integrated into the curriculum in a step-wise progression beginning in the fall of the first professional year through the completion of the third professional year. Students will build on skills acquired throughout the first and second professional years.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 435 - Pro Bono Experience I, PT 470 - Pro Bono Experience II, PT 535 - Treat Neuromuscular Dysfunc, PT 560 - Research Methods with grade greater than or equal to D-.]

Credits: 1

PT 641 - Integumentary Physical Therapy

This course will examine the impact of the integument and its related disorders on the movement system. Students will develop skills and decision making for the physical therapy management of those with primary and secondary integumentary disorders in order to optimize movement, promote health and wellness, to mitigate the progression of impairments, and to prevent the development of, or the progression of, disability.

Credits: 3

PT 650 - Research III

The student will participate in the development and implementation of a research related capstone project. The student will gain insights into working with peers while engaging in faculty mentored capstone project. This capstone practicum is intended to provide a learning opportunity for the student(s) to integrate didactic knowledge and clinical experience into critical inquiry related to administration, clinical practice, research or teaching.

Credits: 1

PT 651 - Research IV

The student will continue to implement and progress in a research related capstone project while engaging with peers and faculty mentors. The capstone project provides opportunity for students to integrate their didactic and experiential education into a capstone project within the context of administration, clinical practice, research or teaching.

Credits: 1

PT 652 - Research V

This course is the final research related capstone course in the DPT curriculum, which provides opportunity for students to integrate their didactic and experiential education into a capstone critical inquiry project within the context of administration, clinical practice, research or teaching. The students complete the capstone critical inquiry process by developing several avenues of disseminating project results and analyses.

Credits: 1

PT 654 - Clinical Education II/III

Intermediate, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist which is second in the series of clinical education. The purpose of this experience is to develop skill and efficiency in the areas of patient examination, evaluation, clinical reasoning, goal setting, program planning, and intervention implementation for patients in an acute care, post-acute, homecare, or outpatient setting. Through interactions with patients and other healthcare disciplines,

students will have the opportunity to integrate academic coursework into this patient setting.

Credits: 4

PT 655 - Clinical Education II

Intermediate, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to develop skill and efficiency in the areas of patient evaluation, evaluation, clinical reasoning, goal setting, program planning, and treatment implementation for patients in an acute care, post-acute, homecare, or outpatient setting. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into this patient setting.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): PT 506 - Neuromuscular PT II, PT 508 - Musculoskeletal II, PT 509 - Differential Diagnosis, PT 537 - Cardiopulmonary PT II, PT 544 - Examination & Intervention, PT 567 - Issues in PT IV: Evidence with grade greater than or equal to B-.]

Credits: 4

PT 656 - Clinical Education III

Intermediate, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist following Clinical Education II. The purpose of this experience is to develop skill and efficiency in the areas of patient examination, evaluation, clinical reasoning, goal setting, program planning, and intervention implementation for patients in a rehabilitation setting. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into this patient setting. This rotation may be completed in an acute care, post-acute, homecare or outpatient setting.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 506 - Neuromuscular PT II, PT 508 - Musculoskeletal II, PT 509 - Differential Diagnosis, PT 537 - Cardiopulmonary PT II, PT 544 - Examination & Intervention, PT 567 - Issues in PT IV: Evidence with grade greater than or equal to D-.]

Credits: 4

PT 657 - Clinical Education II/III

Intermediate, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist which is second in the series of clinical education. The purpose of this experience is to develop skill and efficiency in the areas of patient examination, evaluation, clinical reasoning, goal setting, program planning, and intervention implementation for patients in an acute care, post-acute, homecare, or outpatient setting. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into this patient setting.

Credits: 5

PT 661 - PT Issues V: Management of Complex Patients

Emphasizes the development of clinical-reasoning, problem-solving, and decision-making skills and the critical appraisal of evidence for the management of complex patients across the life span. The focus is on comprehensive patient management, including issues related to cultural diversity, psychosocial aspects of disability, and end-of-life issues. Students will design a comprehensive intervention program that is based on reasonable theoretical rationale and is reflective of the research literature and current practice trends.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 506 - Neuromuscular PT II, PT 508 - Musculoskeletal II, PT 509 - Differential Diagnosis, PT 537 - Cardiopulmonary PT II, PT 544 - Examination & Intervention, PT 567 - Issues in PT IV: Evidence, PT 580 - Pro Bono Experience IV with grade greater than or equal to D-.]

Credits: 2

PT 662 - Issues in PT V: Management of Complex

Issues in PT V emphasizes the development of clinical-reasoning, problem-solving and decision-making skills and the critical appraisal of evidence for the management of complex patients. The focus is on comprehensive patient management, including issues related to cultural diversity, psychosocial aspects of disability, and end-of-life issues. Students will design a comprehensive intervention program that is based on reasonable theoretical rationale and is reflective of the research literature and current practice trends. 2 class hrs

Credits: 4

PT 666 - Seminar in Contemporary Physical Therapy Practice

This course is the capstone course for the DPT curriculum. There are two broad themes. First, this course is designed to give students the opportunity to integrate their didactic and experiential education into a capstone project within the context of administration, clinical practice, research, or teaching. Students will work collaboratively with faculty to develop a project with defined objectives, timelines, and anticipated outcomes. Second, students will participate in group discussions that will address issues that prepare them for the contemporary practice of physical therapy in today's challenging healthcare environment.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 603 - Neuromuscular III, PT 604 - Musculoskeletal PT III, PT 635 - Health & Business Policy, PT 661 - Issues V: Mgmt of Complex Pt with grade greater than or equal to D-.]

Credits: 2

PT 670 - Clinical Education IV

Culminating, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote independence and proficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, clinical decision making, and administrative planning in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, subacute rehabilitation unit, outpatient center, skilled nursing facility, rehabilitative center, early intervention/school setting, home care, specialty care, or combination of above

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 4

PT 671 - Rehabilitation across the lifespan

This course is designed to provide the student with an understanding of the biological, pathological, psychological and social aspects of development and aging from birth through end of life. Examination and intervention techniques will be presented focusing on the overall management of pediatric and geriatric patients/clients. Discussion will emphasize the use of current literature to promote evidence-based practice.

Credits: 2

PT 672 - Integrative Management I

This is the first of two case-based courses designed to give students the skills to make advanced clinical decisions, identifying needs across multiple body systems and integrating these with the resources and challenges patients encounter in the healthcare system and within their own social support systems. In this first course, students will draw and expand on their knowledge of

select pediatric conditions to create comprehensive treatment plans that are relevant to settings across the continuum of care. Lab sessions will give students practice adapting evidence-based exam and intervention skills to younger populations.

Credits: 2

PT 673 - Integrative Management II

This is the second of two case-based courses designed to give students the skills to make advanced clinical decisions, identifying needs across multiple body systems and integrating these with the resources and challenges patients encounter in the healthcare system and within their own social support systems. In this second course, students will draw and expand on their knowledge of select geriatric conditions to create comprehensive treatment plans that are relevant to settings across the continuum of care. Lab sessions will give students practice adapting evidence-based exam and intervention skills to older populations.

Credits: 3

PT 676 - Ethics/Health & Business Policy

The first course of this two-course capstone series integrates the basic ethics, leadership, business, and health policy issues that were threaded throughout the first two years of the professional curriculum. In the initial class, the students solidify foundational knowledge in each of the four areas of study through a series of self-assessment exercises. 2 class hrs

Credits: 2

PT 677 - Ethics/Leadership

The second-course of this two-course capstone series integrates the basic ethics, leadership, business and health policy issues that were threaded throughout the first two years of the professional curriculum. In the second class of the series, students explore actual scenarios raised in their clinical experiences, current national and international news events, and movies with ethical themes to develop ethical decision-making and business management skills. The culminating projects include a professional portfolio and a business plan for a niche business for future practice. 2 class hrs

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 612 - Musculoskeletal III, PT 622 - Neuromuscular III with grade greater than or equal to B-.]

Credits: 2

PT 679 - Clinical Education IV

This course is a continuation of PT 670. Culminating, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote independence and proficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, clinical decision making, and administrative planning in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, subacute rehabilitation unit, outpatient center, skilled nursing facility, rehabilitative center, early intervention/school setting, home care, specialty area, or combination of above

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 603 - Neuromuscular III, PT 635 - Health & Business Policy, PT 656 - Clinical Education III, PT 661 - Issues V: Mgmt of Complex Pt, PT 670 - Clinical Education IV A with grade greater than or equal to D-.]

Credits: 4

PT 680 - Clinical Education IVa

This course is the first part of a culminating, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote independence and proficiency in the areas of patient

examination, evaluation, goal setting, program planning, intervention implementation, clinical decision-making, and administrative planning in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, post-acute rehabilitation unit, outpatient center, early intervention/school setting, home care, specialty care, or combination of above.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PT 655 - Clinical Education II, PT 656 - Clinical Education III with grade greater than or equal to P.]

Credits: 4

PT 681 - Clinical Education IVb

This course is a continuation of PT 670. Culminating, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote independence and proficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, clinical decision making, and administrative planning in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, post-acute rehabilitation unit, outpatient center, early interventions/school setting, home care, specialty area or combination of above.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PT 680 - Clinical Education IVa

PT 682 - Clinical Education IVc

This course is the first part of a culminating, full-time clinical education experience occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote independence and proficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, clinical decision-making and administrative planning in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, post-acute rehabilitation unit, outpatient center, early intervention/school setting, home care, specialty area or combination of above.

Credits: 5

PT 690 - Independent Study in Physical Therapy

Students work independently on a special project under the direction of a preceptor.

Prerequisites & Notes

Student has received department permission for PT 690 - Independent Study in PT

Credits: 3

PT 691 - Clinical Education II

This course is the first of two terminal full-time clinical education experiences occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to refine professional behavior, as well as skill and efficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, and clinical decision-making in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, post-acute rehabilitation unit, skilled nursing facility, outpatient center, early intervention/school setting, home care, specialty care, or a combination of above.

Credits: 12

PT 692 - Clinical Education Experience III

This course is the second of two terminal full-time clinical education experiences occurring under the direct supervision of a licensed physical therapist. The purpose of this experience is to promote professional behavior, as well as independence and proficiency in the areas of patient examination, evaluation, goal setting, program planning, intervention implementation, and clinical decision-making in a setting that will meet the educational needs of each student individually. Through interactions with patients and other healthcare disciplines, students will have the opportunity to integrate academic coursework into a variety of patient settings. This rotation may be completed in an acute care hospital, post-acute rehabilitation unit, skilled nursing facility, outpatient center, early intervention/school setting, home care, specialty care, or a combination of above.

Credits: 12

PT 699 - Research Practicum

PT 701 - Evidence Based Decision Making

Provides the student with the ability to use juried scientific literature to interpret patient evaluation findings, propose effective treatment plans, accurately predict outcomes, and justify reimbursement of services

Credits: 3

PT 702 - Differential Diagnosis

Enables the students to formulate the physical therapy diagnoses, the foundation of an effective treatment program, enabling the physical therapist to advance patient care and his/her role on the healthcare team

Credits: 3

PT 703 - Drug Therapy for PT Practice

Builds on the material presented in the MPT curriculum to interpret drug interactions in complex patients, apply new research on designer and off-label drugs, and recognize the behavioral and functional impact of medications on patients

Credits: 3

PT 704 - Clinical Research

This capstone course is designed to hone analytical abilities by bringing together student-articulated case examples, updated research findings, information from evidence-based and differential diagnosis coursework and reflections on practice

Credits: 3

PT 705 - Clinical Decision Making

This course explores the principles, concepts, and theoretical bases central to the Patient/Client Management model as outlined in the Guide to Physical Therapist Practice . Clinical assessment will be examined in relation to the standards of clinical measurement and assessment of patient outcomes. The scope of clinical decision making in contemporary clinical practice is analyzed and applied within the framework of interdependent autonomous practice relative to the current challenges of the health care environment

Credits: 3

PY 100 - Physics Orientation

In this orientation course students are presented with an overview of all aspects of physics, including current topics, career opportunities in the field, academic standards, and integrity, as well as general information about the University and services that help students achieve academic success.

Credits: 1

PY 200 - Survey of Physics

Covers the basic concepts in physics, including biological and medical applications of pressures and fluids, bioelectricity, biodynamics, and kinesiology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): MA 107 - Precalculus with grade greater than or equal to D-.] [Student has completed or is in process of completing any of the following course(s): MA 110 - General Calculus, MA 122 - Calculus I with grade greater than or equal to D-.]

Credits: 4

PY 201 - Introductory Physics I

Algebra- and trigonometry-based general physics course covering principles of mechanics and heat with applications to the health sciences. First course in a two-semester course sequence. This course is not interchangeable with one-semester physics courses such as PY 200 or PY 205.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): MA 107 - Precalculus with grade greater than or equal to D-.]

Credits: 4

PY 202 - Introductory Physics II

Algebra- and trigonometry-based general physics course covering principles of wave motion, electricity and magnetism, optics, and modern physics with applications to the health sciences. Second course in a two-semester course sequence. This course is not interchangeable with one-semester physics courses such as PY 200 or PY 205.

Credits: 4

PY 205 - Elements of Physics

An introduction to some of the elements of classical physics, with emphasis on Newtonian mechanics, energy, momentum, fluids, electricity, magnetism, and geometric optics. Open to students in the doctor of pharmacy program only.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 110 - General Calculus, MA 122 - Calculus I with grade greater than or equal to D-.]

Credits: 4

PY 211 - Physics I

First semester of a three-semester, calculus-based general physics course sequence. It covers principles of mechanics and heat with applications to the health sciences. The course may involve the use of physics web resources, computer-controlled laboratory experiments, and spreadsheets for data analysis. This course meets the PY 201 prerequisite for all physics electives where applicable.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 110 - General Calculus, MA 122 - Calculus I with grade greater than or equal to D-.]

Credits: 4

PY 212 - Physics II

Second semester of a three-semester, calculus-based general physics course sequence. It covers principles of waves, electricity, magnetism, optics, and modern physics with applications to the health sciences. The course may involve the use of physics web resources, computer-controlled laboratory experiments, and spreadsheets for data analysis. This course meets the PY 202 prerequisite for all physics elective courses where applicable.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 211 - Physics I with grade greater than or equal to D-.]

Credits: 4

PY 213 - Physics III

Third semester of a three-semester, calculus-based general physics course sequence. It is an introduction to the physics of waves, geometrical optics, fluids, and classical thermodynamics. The course may involve the use of physics web resources and computer-controlled laboratory experiments.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 221 - Calculus II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 4

PY 301 - Modern Physics I

Cover atomic nature of matter, electricity and radiation, models of the atom, X-rays and X-ray spectra, the Schrodinger equation, and wave equation. Includes special theory of relativity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): MA 201 - Mathematical Analysis III, MA 221 - Calculus II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 302 - Modern Physics II

An introduction to physics of the nucleus, models of the nucleus, natural radioactivity, detection, particle acceleration, neutron reactions, activation analysis, and strange particles.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PY 301 - Modern Physics I with grade greater than or equal to D-.]

Credits: 3

PY 305 - Physics Seminar

Physics topics of current interest are presented orally by students and invited guest speakers. Speech, delivery, use of visual aids,

and writing are all evaluated.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 222 - Calculus III, PY 213 - Physics III with grade greater than or equal to D-.]

Credits: 1

PY 310 - Mechanics

A study of Newtonian mechanics; particles in one, two, and three dimensions; and systems of particles leading to Lagrange+s and Hamilton+s equations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 315 - Einstein, Bohr, and the Modern Physics Revolution

An examination of the lives and achievements of the great physicists of the first half of the twentieth century, including Albert Einstein, Niels Bohr, Werner Heisenberg, Wolfgang Pauli, and others, as they developed the basis of special relativity, general relativity, quantum physics, and nuclear physics. Considers the personal and philosophical dilemmas they faced, through an analysis of historical source materials such as letters, papers, and interview transcripts, and delves into the cultural impact of their work.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 200 - Survey of Physics, PY 202 - Introductory Physics II, PY 205 - Elements of Physics with grade greater than or equal to D-.]

Credits: 3

PY 320 - Biomedical Instrumentation

Covers techniques and instruments used in biology, health sciences, and chemistry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 202 - Introductory Physics II with grade greater than or equal to D-.]

Credits: 3

PY 322 - Intro Biophysics

An introduction to the physics underlying the functioning of biological systems. The course covers various characteristics of living matter and explains them from the physical point of view. Various diagnostic instruments are introduced, and the role of new technologies is discussed.3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 202 - Introductory Physics II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed all of the following course(s): BS 104 - General Biology II with grade greater than or equal to D-.]

Credits: 2

PY 324 - Physics of Music

This course covers the nature of sound, hearing, harmony, and perception of sound. It explains the physics of various musical instruments, human voice, electronic sound systems, electronic music, and acoustical architecture and design of concert halls. Modern advances in the field of music will be discussed.

Credits: 2

PY 326 - Lasers in Health Sciences

Teaches the basic principles of operation of a laser, interaction of light with living matter, and safety criteria. The course emphasizes applications of lasers in biology, chemistry, surgery, and many other areas of medicine.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): BS 104 - General Biology II, CH 112 - Prin of Chemistry II, PY 202 - Introductory Physics II with grade greater than or equal to D-.]

Credits: 3

PY 328 - Light and Color

Study of the basic concepts of light and color and understanding of optical effects in nature and art.

Credits: 3

PY 330 - Descriptive Astronomy

Covers basic concepts of astronomy, its historical development, and theories of the origin of the universe. The search for life in the universe, the colonization of outer space, and the social and moral issues of the space program are also covered.

Credits: 3

PY 335 - Views of the Cosmos

An introduction to the study of the universe from scientific, religious, and philosophical standpoints. Surveys mankind's efforts to understand the nature of the cosmos, including its origins, evolution, and eventual demise. Viewpoints of many religious groups, cultures, and scientific thinkers will be discussed and compared. Contemporary debates in cosmology will be fully explored without mathematics.

Credits: 3

PY 340 - Biophysics I

This course focuses on the application of mathematics and physics to the understanding of current problems in cellular and molecular biology. The course covers fundamental and advanced topics involving the study of cells, random walk, diffusion in biological systems, friction in fluids, free energy, self-assembly, protein folding, membranes, nerve impulse, and nanotechnology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): BS 104 - General Biology II, BS 131 - Introductory Biology II with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): CH 102 - General Chemistry II, CH 112 - Prin of Chemistry II with grade greater than or equal to D-.]

Credits: 3

PY 355 - Mathematical Methods for the Physical Sciences

An introduction to mathematical methods used in physics and the physical sciences such as vector calculus, Fourier analysis, vector spaces and matrices, special functions, and partial differential equations. These topics are introduced in the context of specific problems in various areas of physics and physical science such as fluid dynamics, electricity and magnetism, quantum mechanics, thermodynamics, biophysics, and mechanics.

Credits: 3

PY 370 - Mathematical Methods for the Physical Sciences I

This course, the first of the two-course sequence, is an introduction to mathematical methods used in physics, chemistry, and physical and related sciences: vector calculus, functions of complex variable, Fourier series, Fourier transform, series solutions of ordinary differential equations, and introduction to group theory.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 222 - Calculus III, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 371 - Mathematical Methods for the Physical Sciences II

This course, the second of the two-course sequence, is an introduction to further mathematical methods used in physics, chemistry, and physical and related sciences: special functions and partial differential equations. These topics are introduced in the context of specific problems in various areas of physics and physical science such as fluid dynamics, electricity and magnetism, quantum mechanics, thermodynamics, biophysics, and mechanics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 320 - Differential Equations with grade greater than or equal to D-.] And Student has satisfied any of the following: [Student has completed any of the following course(s): MA 370/ PY 370 - Math Methods Physics Sci I, PY 370 - Math Methods Physics Sci I with grade greater than or equal to D-.]

Credits: 3

PY 380 - Electronics

Provides the theory of operation and laboratory experiences for both analog and digital circuitry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 406 - Advanced Lab

Students will perform modern physics experiments.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PY 301 - Modern Physics I with grade greater than or equal to D-.]

Credits: 1

PY 410 - Electricity and Magnetism

A study of the physics of electricity, magnetism, and electromagnetic fields and waves. Emphasis is given to the meaning and significance of the concepts that appear in the theory and the overall coherence and beauty of Maxwell equations.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): MA 222 - Calculus III, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 411 - Advanced Electromagnetism

A selection of advanced topics in electromagnetism such as electrostatics, boundary-value problems, fields, and wave propagation in material media. Other topics include propagation in waveguides and transmission lines, gauge transformations, relativistic theory of electromagnetic fields, and numerical techniques in electromagnetism.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): MA 320 - Differential Equations, PY 410 - Electricity and Magnetism with grade greater than or equal to D-.]

Credits: 3

PY 412 - Physics of Radiation Therapy

An introduction to the basics of radiation physics, radiation therapy, and dosimetry.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 205 - Elements of Physics, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 415 - Biophysics of the Brain

This course introduces biophysical models of the brain and the nervous system functioning. In particular the physics of the neocortex is presented through the analysis of EEG studies. Simulations with software packages are employed to illustrate with various examples the models and their results. Linear electrical analogs and some basics of neural network theory are part of the course content. Elements of Biophysics of consciousness are also presented and a set of case studies is analyzed and discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): PY 202 - Introductory Physics II, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 420 - Optics & Wave Phenomena

A study of geometrical and physical optics and a study of waves, interference, Fraunhofer and Fresnel diffraction, dispersion, and polarization of light. The course will also include some aspects of the quantum nature of light, including lasers, and other coherent properties of light.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 310 - Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 425 - Chaos and Nonlinear Dynamics

This course introduces the theoretical foundations of nonlinear dynamics and chaos. Phase space analysis, bifurcations, routes to chaos, renormalization and universality, fractals and strange attractors are presented for a variety of nonlinear systems including maps and flows. Several examples are used to illustrate the theory, from mechanical vibrations, superconducting circuits, chemical oscillations to biological rhythms and neuroscience. Simulations are used throughout the course either by numerical computations with Matlab, Mathematica, or specific software packages.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): MA 310 - Math Foundations of Neuro, MA 320 - Differential Equations with grade greater than or equal to D-.]

Credits: 1

PY 430 - Thermodynamics

This course will provide a detailed study of thermal phenomena, heat engines, thermodynamic laws, and statistical physics. It will discuss applications of thermodynamics and statistical methods and examine low-temperature phenomena such as superconductors.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 431 - Statistical Mechanics

An introduction to statistical mechanics and thermal physics of systems involving very many particles. Boltzmann and Gibbs distributions as well as Bose-Einstein and Fermi-Dirac statistics are presented. Various modern applications of the theory are also discussed.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 213 - Physics III, PY 301 - Modern Physics I, PY 310 - Mechanics, PY 450 - Quantum Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 435 - General Relativity

An introduction to the general theory of relativity. Topics include special relativity, tensor analysis, curved manifolds, the equivalence principle, Einstein's field equations, spherical static solutions, black holes, and cosmology.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PY 301 - Modern Physics I with grade greater than or equal to D-.]

Credits: 3

PY 440 - Introduction to Nanoscience

Introduction to broad topics of nanoscience and technology, including micro- and nanofabrication methods, small scale surface modification and characterization, physical and chemical properties of nanomaterials, and quantum phenomena, and their application in natural and engineering sciences. Up-to-date novel experimental and theoretical methods via research-based studies.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 450 - Quantum Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 445 - Introduction to Fluid Mechanics

Introduction to fluid mechanics, including kinematics and dynamics of fluid transport, and their applications in natural and engineering sciences, particularly in biophysics. Aspects of flow in microfluidic devices, including surfaces and techniques for fluid transport, will be discussed, using up-to-date methods.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): MA 320 - Differential Equations, PY 211 - Physics I with grade greater than or equal to D-.]

Credits: 3

PY 450 - Quantum Mechanics

This course will provide a detailed study of quantum phenomena, applied to single particles, multiparticle interactions, and ensembles. Discussions will include the experimental basis of quantum theory, Schroedinger wave equation, particles in various potentials, the hydrogen atom, spin, Bose-Einstein and Fermi-Dirac statistics, and other aspects of atomic physics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 460 - Topics in Contemporary Physics

A seminar course detailing discoveries in 20th- and 21st-century physics, including nuclear physics, quantum physics, atomic theory, and particle physics. The course covers topics such as radioactivity, fission, fusion, nuclear energy, fundamental particles, wave/particle duality, and modern cosmology. It also addresses the ethical, human, and environmental implications of contemporary physics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): PY 301 - Modern Physics I with grade greater than or equal to D-.]

Credits: 2

PY 463 - The Physics of Stars and Black Holes

An introduction to the physics and astrophysics of stellar evolution, including stellar birth, nucleosynthesis, main sequence stars, binary systems, white dwarfs, neutron stars, and black holes.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PY 301 - Modern Physics I, PY 310 - Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 465 - Introduction to Cosmology

An introduction to the physical properties and evolution of the universe, including its age, content, dynamics, and fate.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PY 301 - Modern Physics I, PY

310 - Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 470 - Solid State Physics

The subject matter of solid state physics supports a profitable interplay of experiment, application, and theory. This course is concerned with the properties that result from the distribution of electrons in metals, semiconductors, and insulators. This course also tells how the elementary excitations and imperfections of real solids can be understood in terms of simple models whose power and utility and now firmly established.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 450 - Quantum Mechanics with grade greater than or equal to D-.]

PY 480 - Introduction to Materials Science

General introduction to different types of materials: metals, ceramics, polymers, and composite materials. The relationship between structure and properties of materials are studied, along with the illustration of their fundamental differences and their applications.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): CH 112 - Prin of Chemistry II, PY 430 - Thermodynamics with grade greater than or equal to D-.]

Credits: 3

PY 490 - Special Topics in Physics

Study of one or two topics not included in other courses offered by the department. This course may be taken more than once for credit, provided the topics covered are sufficiently different or if this course represents a research project.

Credits: 3

PY 495 - Undergraduate Research in Physics

Students will engage in a supervised research project related to physics or biophysics.

Prerequisites & Notes

Student has received department permission for PY 495 - Undergrad Research in Phys

Credits: 2

PY 496 - Advanced Research in Physics

Students will engage in an advanced research project related to physics or biophysics under the close supervision of a faculty member.

Prerequisites & Notes

Student has received department permission for PY 496 - Advanced Research in Physic

Credits: 3

PY 498 - Directed Research in Physics

Students will engage in research of an experimental, computational, or theoretical nature in either physics or biophysics under the close supervision of a faculty member.

Credits: 3

PY 700 - Graduate Physics Seminar

Reports and seminars on topics of current physics interest presented by students. Depending on the instructor, topic may be one of student+s or instructor+s choice.

PY 701 - Medical Physics

Biomedical applications of physics are covered with emphasis on diagnostic and treatment implications. Problem-solving opportunities and detailed literature review in the areas of physics pertinent to orthopedic and/or neurologic physical therapy practice are included.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): PY 201 - Introductory Physics I, PY 202 - Introductory Physics II with grade greater than or equal to D-.] Or Student has satisfied all of the following: [Student has completed all of the following course(s): PY 211 - Physics I, PY 212 - Physics II with grade greater than or equal to D-.]

Credits: 3

PY 703 - Entrepreneurship and Physics in Industry

This course provides an overview of the tasks performed by physicists working in the private sector and industry. This includes an introduction of entrepreneurship basics. Students are also involved in projects which may include design, testing, cost feasibility and market analysis of simple products. Professional industrial physicists from the private, public, and government sectors are invited to give presentations and interact with the students.

Credits: 2

PY 710 - Advanced Mechanics

Advanced methods for analyzing classical physical systems, making use of Lagrangian, Hamiltonian, and Newtonian techniques. Includes single and multiple particle systems, rigid bodies, symmetry and conservation principles, normal modes of oscillation, continuous systems, and modifications needed for special relativity.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 310 - Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 722 - Intro to Biophysics

This course will provide a sound physical basis to biological function. The focus will be at the molecular and cellular levels and will take a detailed look at the energetics and thermodynamics of cellular processes including transport phenomena across cellular membranes. Protein and nucleic acid structure-function relationships will also be studied. Topics in this area include macromolecules in solution, protein-solvent interactions, and electrostatic and electrokinetic phenomena. 3 class hrs

Credits: 3

PY 725 - Advanced Nonlinear Dynamics

The course covers advanced topics in chaos and nonlinear dynamics including center manifolds, homoclinic and heteroclinic tangles and chaotic transport, topology of chaos-branched manifolds, invariant sets, and universality. Also, the symmetry of chaos, chaos in Hamiltonian and conservative systems, KAM theorem, stochastic layers and diffusion, and chaos in quantum systems. Theory will be applied to various systems in physics, chemistry, biology, and other fields. Numerical and computational

techniques will be presented and used in the applications.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): MA 425/ PY 425 - Chaos and Nonlinear Dynamics, PY 425 - Chaos and Nonlinear Dynamics with grade greater than or equal to D-.]

Credits: 3

PY 732 - Biophysics

This course will provide a sound physical basis to biological function. The focus will be at the molecular and cellular levels and will take a detailed look at the energetics and thermodynamics of cellular processes including transport phenomena across cellular membranes. Protein and nucleic acid structure-function relationships will also be studied. Topics in this area include macromolecules in solution, protein-solvent interactions, and electrostatic and electrokinetic phenomena.

Credits: 3

PY 750 - Quantum Mechanics

The course covers the essential theoretical formulation of quantum mechanics and its formal structure. It analyzes kinematics and dynamics of a set of quantum systems in various representations. The course also introduces the path integral formulation of quantum mechanics and quantum mechanics in phase space. Several examples and applications will be used to illustrate the concepts. These include addition of angular momenta, and charged particle in a magnetic field.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 450 - Quantum Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 771 - Math Meth for Phys Sci

Advanced mathematical methods to model systems in physics, physical science and engineering. Integral transforms. Series solutions of ordinary differential equations. Special functions. Solution of partial differential equations, with boundary and initial conditions and their applications. Complex variables, complex integration and their applications. Calculus of variations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): MA 370/ PY 370 - Math Methods Physics Sci I, PY 370 - Math Methods Physics Sci I with grade greater than or equal to D-.]

Credits: 3

PY 799 - Graduate Research in Physics

Candidates for the master of science in physics (thesis option) are required to complete a research project in their chosen track under the direction of a faculty advisor. The student will report the results of this research project in a thesis and will defend the thesis in an oral presentation. A minimum of 10 credits of this course is required for the MS in physics (thesis option); the 10 credits will spread across more than one semester.

Credits: 3-5

PY 810 - Advanced Electromagnetism

Advanced methods to study boundary-value in electrostatics. Electrostatics of macroscopic media. Magnetostatics, Faraday's Law and quasi-static fields. Maxwell Equations, macroscopic electromagnetism and conservation laws. Electromagnetic waves and wave propagation in different media. The course will cover some applications such as wave guides, resonant cavities, optical fibers, scattering and diffraction.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 410 - Electricity and Magnetism with grade greater than or equal to D-.]

Credits: 3

PY 815 - Polymer Physics

The course analyzes the polymer microstructures and their conformations, single and real chains. It introduces the thermodynamics of blends and solutions as well as networks and gelation. The course also analyzes the dynamics of some polymeric systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 431 - Statistical Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 817 - Quantum Information

Provides a broad survey of the fundamentals and physical implementation of the rapidly-evolving field of quantum information and computation. It discusses the concept of qubits, quantum entanglement, quantum coherence, and quantum gates and algorithms, with a focus on superconductor-based approaches.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 450 - Quantum Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 830 - Photonics

Provides a blended survey of the fundamentals and applications of photonics. The course covers the fundamentals of electromagnetic waves and their interaction with matter. The course also includes several applications such as lasers, fiber optics, select optical systems, and advanced materials for photonic and energy-harvesting applications.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 420 - Optics & Wave Phenomena with grade greater than or equal to D-.]

Credits: 3

PY 831 - Equilibrium and Non-Equilibrium Statistical Mechanics

Foundations of classical statistical mechanics with applications. Phase transitions, critical phenomena, and renormalization group theory. Quantum statistics such as Bose-Einstein and Fermi-Dirac distributions and their applications. Advanced topics in non-equilibrium statistical mechanics such as classical and quantum theory of linear response, Langevin and Fokker-Planck equations and their applications.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 431 - Statistical Mechanics with grade greater than or equal to D-.]

Credits: 3

PY 832 - Network Theory and Its Applications

Different types of networks are analyzed. These include random and scale-free networks. Their properties and evolution are studied. Examples of how these networks can model real processes and systems are introduced.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 370 - Math Methods Physics Sci I with grade greater than or equal to D-.]

Credits: 3

PY 833 - Pattern Formation

This course covers different techniques to explore mechanisms of macroscopic pattern formation in a variety of physical systems such as fluids, materials, chemical and biophysical systems. The course introduces both time and space-patterns. The concept of self-organization and formation of coherent structures is discussed in depth. The course also introduces basic techniques for digital pattern recognition.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 425 - Chaos and Nonlinear Dynamics with grade greater than or equal to D-.]

Credits: 3

PY 834 - Complexity Theory

This course introduces the various aspects and approaches within the development of Complexity Theory. These include the probabilistic, algorithmic, computational and axiomatic design approaches. Several examples of complex systems in physical sciences and engineering are introduced to illustrate the theories.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 425 - Chaos and Nonlinear Dynamics with grade greater than or equal to D-.]

Credits: 3

PY 840 - Experimental Techniques in Biophysics

Presentation of the available technologies for the research in biophysics, with emphasis on lab-on-a-chip and its interfaces with the atomic force microscopy (AFM) and mass spectrometry. It covers microfluidics techniques, including channel microfluidics and digital microfluidics. The concept of lab-on-a-chip technology is introduced, showing the possibilities for faster and accurate bio-analytical applications when compared to conventional methods.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 340 - Biophysics I with grade greater than or equal to D-.]

Credits: 3

PY 841 - Physical Approach to Life Sciences

The course applies physics and mathematics to obtain quantitative information that sheds light on biological processes, particularly at the cellular and molecular level. It includes microfluidics (with lab-on-chip technologies), random walks, diffusion with drift, statistical mechanics and rate equations, with applications to enzyme kinetics, molecular motors, biological electricity, and protein folding. Throughout the course, the student is guided in up-to-date discussion on selected papers and presentations on current platforms in the discipline.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 340 - Biophysics I with grade greater than or equal to D-.]

Credits: 3

PY 850 - Experimental Techniques in Materials Science

Introduces students to the principles and applications of state-of-the-art experimental techniques for the measurement and analysis of the structure and properties of materials. The course will involve a mixture of lectures, demonstrations and hands-on laboratory exercises. Topics are selected from advanced microscopy, electronic, optical, and thermodynamic methods of probing materials.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 480 - Intro to Material Science with grade greater than or equal to D-.]

Credits: 3

PY 851 - Quantum Materials

Introduces students to quantum effects in materials. Topics include superconductivity, magnetism, graphene and nanomaterials, topological insulators, charge and spin density waves, classical and quantum phase transitions, and interfaces.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): PY 480 - Intro to Material Science with grade greater than or equal to D-.]

Credits: 3

PY 890 - Graduate Special Topics in Physics

This course is designed to allow in-depth exploration of one of a variety of topics of current interest in physics. The topic will be designated by the instructor.

Credits: 3

RG 701 - Reg Sciences Experience 1 - Orientation

biotechnology or device industry. Concepts such as Quality-by-Design, responding to the FDA and other general concepts of regulatory will be addressed in this course.

Credits: 2

RG 710 - Reg Sciences Experience 2 - Drug Development

This residency will provide real-world experience in the drug development process, focusing on drug development science, regulation, and industry from the U.S. perspective. The student will participate in activities related to the development of drugs, devices or biotechnology agents within the United States.

Credits: 8

RG 715 - Reg Sciences Experience 3 - CMC

This course will provide the student the opportunity to work with sponsor company in manufacturing area to gain experiences with legislative and regulatory requirements in the procurement, control & production of supplies & medical products.

Credits: 8

RG 805 - Reg Sciences Experience 4 - Labelling / Promotion

During this rotation, students work with company in the labeling, marketing & promotions area. Student will apply appropriate communication strategies, create marketing material and respond to FDA and other regulatory agency inquiries.

Credits: 8

RG 810 - Reg Sciences Experience 5 - Clinical Trials

This course provides students the opportunity to work with sponsor company in the development and conduct of pre-clinical and clinical trials. The student will write study objectives and endpoints and/or coordinate and prepare submissions for clinical trials.

Credits: 8

RG 815 - Issues and Trends In Regulatory Science

This course provides an in-depth examination of the current issues facing the regulatory industry. Students gain an awareness of the such issues, as the international regulation, social media and regulatory requirements, quality by design, pharmacogenomics.

Credits: 2

RG 820 - Capstone

This capstone course allows students to apply integrated learnings from the DRSc program in a final project. The final project will include a presentation by the student to department faculty and sponsoring organization personnel

Credits: 2

RS 301 - Women and Religion

representations of the divine, the role of women in religious institutions, and rules regarding the human body, marriage and sexuality.

Credits: 3

RS 302 - Religious Song & Poetry

This class will explore poetry, hymns, and visual arts that praise various divine beings and religious figures. Our study will include acts of devotion, the lives of the artists who created them, and their religious and historical contexts.

Credits: 3

RS 303 - Modern Hinduism

This course explores the ideas, beliefs, and practices of lived Hinduism. We will compare and contrast diverse Hindu cultures that are found in rural and urban India, in the United States, and here on campus.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

RS 310 - World Religions

This course surveys some of the major religious traditions with an emphasis on comparing their perspectives on truth claims, ultimate reality, and human morality. It explores historical and contemporary perspectives on their basic beliefs and sacred texts. The course also examines the ritual practices and ethical dimensions of each religion.

Credits: 3

RS 320 - Religion and Medicine

An introduction to the historical development of medicine across a variety of religious traditions.

Credits: 3

RS 322 - Sacred Stuff

Sacred Stuff approaches the study of religious experience through the material world, objects, feelings, and sensations. What does religion feel like? How does it taste or smell? We will explore varieties of religion through our senses and study sacred objects crafted by artists inspired by the divine.

Credits: 3

RS 340 - Special Topics in Religious Studies

Topics addressed in this course vary.

Prerequisites & Notes

WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

RX 302 - Professional Orientation

This course module provides an introduction to the goals and expectations for student pharmacists entering the professional phase of the PharmD program. Health-related pre-requisites and anatomy/physiology knowledge will be assessed, and the personal and professional development expectations for success will be introduced, including emotional intelligence, team building, professional attire/attitudes/behaviors, relationship building, and professionalism.

Credits: 2

RX 305 - Fndn of Clinical Immunology

This module provides a foundation in human immune system components as applied to vaccine design, immunotherapies and biologics. Discussion will emphasize combating infectious disease, cancer, autoimmunity, and allergic responses.

Credits: 3

RX 316 - Practice Skills/Professional Behavior 1

This module introduces the skills necessary for patient engagement and interaction, emphasis is on the role of the pharmacist, Pharmacists+ Patient Care Process, communication (verbal and written), professionalism and ethics.

Credits: 4

RX 325 - Medication Use Systems I

This module provides an introduction to the principles and processes involved in medication acquisition/procurement, storage, prescribing/ordering, dispensing, including handling of controlled substances, utilization of medication safety information, documentation, health insurance payments systems and health informatics. The overall goal is for student pharmacist to demonstrate knowledge of these processes and to be able to process a non-complicated prescription for payment in both community and institutional pharmacy environments.

Credits: 3

RX 330 - Foundations of Biomedical Sciences

A foundation in the structure, properties, biological functions, bioenergetics, and metabolic fate of macromolecules essential to life (i.e. proteins, lipids, carbohydrates, and nucleic acids), the impact of molecular genetics on these processes; also, application of these concepts to human disease, drug therapy and rational drug design strategies.

Credits: 4

RX 340 - Foundations of Pharmaceutical Sciences 1

This module provides an introduction to medicinal chemistry, pharmaceuticals, compounding and pharmaceutical calculations. Medicinal chemistry focuses on the in vitro and in vivo chemical basis of drug action including their physico-chemical properties, structure activity relationships and receptor binding and metabolism. Pharmaceuticals focuses on the principles and dosage forms are included.

Credits: 3

RX 345 - Foundations of Pharmaceutical Sciences 2

This module continues with an understanding of the principles and applications of physico-chemical properties of drugs for safe and effective drug delivery. Pharmacodynamics and basic pharmacokinetics with calculations are emphasized in order to provide a thorough understanding of the mechanisms (absorption, distribution, metabolism and elimination) involved in therapeutic and adverse drug actions. Selection of appropriate dosage forms that minimize adverse effects/toxicity are covered.

Credits: 3

RX 350 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 1: Disease Prevention and Self-Care

This module is the first of the 14 iPSDT modules which integrate the application of the pharmacy sciences, including medicinal chemistry, pharmacology, and pharmaceuticals specific disease states and therapeutic decision-making. This module focuses on the principles that underline disease pathogenesis and self-care pharmacotherapy.

Credits: 3

RX 355 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 2: Cardiovascular 1

The Cardiovascular 1 module is first of two modules focused on the cardiovascular system. It focuses on the application of the pharmacy sciences, including medicinal chemistry, pharmacology and pharmaceuticals to cardiovascular diseases and therapeutic decision-making. The module encompasses the epidemiology, etiology, pathophysiology, prevention, pharmacologic and nonpharmacologic treatment and self-care of cardiovascular medical conditions. Included are complementary and alternative therapies.

Credits: 3

RX 365 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 3: Pulmonary

The Pulmonary module focuses on the application of the pharmacy sciences, including medicinal chemistry, pharmacology and pharmaceutics to pulmonary diseases and therapeutic decision-making. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and nonpharmacologic treatment, and self-care of pulmonary medical conditions. Included are complementary and alternative therapies.

Credits: 3

RX 380 - IPPE-1: Service Learning/Community Practice 1

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. The focus of this course is a preceptor directed experience in service learning and community pharmacy practice. Students will be assigned a service learning and community pharmacy site. Students will observe and be engaged in the following foundational components under preceptor supervision: medication use system, patient and healthcare practitioner communications, patient counseling, self-care triage, and patient care activities. Students will also be involved in professional pharmacy organizations, community service and advocacy.

Prerequisites & Notes

Student has received department permission for RX 380 - IPPE1: Serv Learn/Comm Prac1

Credits: 1

RX 390 - IPPE-2: Service Learning/Community Practice 2

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. This course is a continuation of RX380 and is a preceptor directed experience in service learning and community pharmacy practice. Students will be assigned a service learning and community pharmacy practice. Students will be assigned a service learning and community pharmacy site. Students will demonstrate competency in the following components under preceptor supervision: medication use system, patient and healthcare practitioner communications, patient counseling, self-care triage, and patient care activities. Students will also be involved in professional pharmacy organizations, community service and advocacy.

Prerequisites & Notes

Student has received department permission for RX 390 - IPPE2: Serv Learn/Comm Prac2

Credits: 1

RX 415 - Foundations of Health Care Policy/Law

This module provides an introduction to the principles of pharmacy law and ethics, healthcare policies, medication payer functions, economic theories and their application to pharmacoeconomics, drug selection, and health coverage laws.

Credits: 3

RX 420 - Practice Skills/Professional Behavior 2

This module enhances the skills necessary for patient engagement and interactions. Emphasis is on the role of the pharmacist, Pharmacist+s Patient Care Process, communication (verbal and written), and professionalism and ethics.

Prerequisites & Notes

Student has satisfied all of the following: [Students who specified one or more of these Programs of Study or Program Foci: Pharmacy, PharmD, Pharmacy (PharmD)] And (Student has satisfied all of the following: [Latest Class Standing in the selection list P1, U3] Or Student has satisfied all of the following: [Latest Class Standing in the selection list P2])

Credits: 3

RX 425 - Medication Use Systems 2

This modular course provides thorough coverage of medication acquisition/procurement, storage, prescribing/ordering, and dispensing processes in addition to applications of non-sterile and sterile compounding techniques, inventory control, adverse drug events, and hazardous waste handling and disposal processes. The overall goal is for student pharmacists to demonstrate appropriate utilization and documentation of medication procurement, distribution and dispensing in both community and institutional pharmacy environments.

Credits: 3

RX 430 - Health Information Retrieval and Evaluation

This module provides the foundational knowledge and skills related to identifying types of literature and health information sources and determining the appropriateness of the source and the content for purposes of providing information to healthcare providers and a lay audience. An understanding of the hierarchy of health information sources and literature will allow the selection of appropriate sources and the development of written and verbal health information sources.

Credits: 3

RX 435 - Literature Evaluation & Evidence-based Medicine

This module builds upon the foundations established in RX430, and focuses on primary literature and its application to populations as well as to specific patient situations or questions. The main emphasis is the selection and comprehensive critical evaluation of clinical trials and the appropriate use of available results to develop recommendations for population-based scenarios or patient-specific scenarios. In addition, the literature will be utilized to develop professional oral presentations with written deliverables.

Credits: 3

RX 440 - Foundations of Pharmaceutical Sciences 3

This module further elaborates the application of physico-chemical properties of drugs to ensure safe, effective and targeted drug delivery. The impact of cutting edge biotechnology, pharmacogenetic/pharmacogenomic parameters, (and manufacturing, specialized compounding) to personalized medication delivery and minimize adverse effects/toxicity will be covered.

Credits: 3

RX 452 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 4: Cardiovascular 2

The Cardiovascular 2 module is the second of two modules focused on the cardiovascular system. It focuses on the application of the pharmacy sciences, including medicinal chemistry, pharmacology and pharmaceuticals to cardiovascular diseases and therapeutic decision-making. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and nonpharmacologic treatment, and self-care of medical conditions over the life cycle. Included are complementary and alternative therapies.

Credits: 3

RX 454 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 5: Renal/Hepatic

The renal/hepatic module of the iPSDT series focuses on the application of pharmacy sciences, including medicinal chemistry, pharmacology, and pharmaceuticals, to disease states and therapeutic decision-making in relation to renal and hepatic function. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and nonpharmacologic treatment, and self care.

Credits: 3

RX 455 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 6: Endocrine/Reproductive

The endocrine and reproductive systems module of the iPSDT series focuses on the application of the pharmacy sciences, including medicinal chemistry, pharmacology, and pharmaceuticals to disease states and therapeutic decision-making. This series encompasses the prevention and management of uncomplicated to complex medical conditions over the life cycle. Included are self-care pharmacotherapy, as well as natural products, dietary supplements, and alternative and complementary therapies. As part of this course, students will complete a training certificate program, such as American Pharmacists Association's The Pharmacist and Patient-Centered Diabetes Care Certificate.

Credits: 3

RX 457 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 7: Infectious Disease 1

This is the first of three modules focusing on infectious diseases. The overarching objectives are to associate proper antibiotics (type and dosage) to bacterial infections and to identify main side effects and drug-drug interactions. This module will also allow the student to apply and integrate their knowledge by associating therapeutic dosages, side effects and resistance to antibiotics and mechanisms of actions at the pharmacological level.

Credits: 3

RX 480 - IPPE 3: Advanced Community/Ambulatory Care

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. The focus of this course is a preceptor directed experience in advanced community pharmacy practice and ambulatory care. Students will observe and be engaged in the following components under an assigned community/ambulatory preceptor: operations, patient and healthcare practitioner communications, patient counseling, self-care triage, and patient care activities including medication therapy management and immunizations.

Prerequisites & Notes

Student has received department permission for RX 480 - IPPE3: Adv Comm/Amb Care

Credits: 1

RX 490 - IPPE 4: Institutional Pharmacy

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. The focus of this course is directed student exposure to pharmacist practice roles in the institutional pharmacy practice setting. Students will observe and be engaged in the following components under the supervision of an assigned institutional pharmacist preceptor: the medication use system, operations, patient and/or healthcare practitioner communications.

Prerequisites & Notes

Student has received department permission for RX 490 - IPPE4: Institutional Pharm

Credits: 1

RX 510 - Applied Professional Behavior and Communications

This module focuses on complex communications with patients/caregivers and health care providers through both written and verbal skills using both formal and informal methods. Emphasis will be placed on professionalism, ethics, and leadership.

Credits: 2

RX 520 - Entrepreneurship

This course is designed for student pharmacists to gain business acumen and pursue potential entrepreneurial endeavors. Additionally, this course will motivate student pharmacists to explore entrepreneurial opportunities and innovations in their profession.

Credits: 1

RX 530 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 8: Infectious Disease 2

This is the second of three modules focusing on infectious diseases. The overarching objectives are to associate proper antimicrobial uses for various infections. Similar to module 1, this module will also focus on medication side effects and drug-drug interactions. Students will apply and integrate their knowledge by associating therapeutic dosages, side effects, pharmacokinetic and pharmacodynamic principles, and resistance to antimicrobial mechanisms of actions at the pharmacological level.

Credits: 3

RX 534 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 9: Central Nervous System 1

This the first of two modules focused on the central nervous system. It emphasizes the application of the pharmacy sciences, including medicinal chemistry, pharmacology and pharmaceuticals to central nervous system diseases and therapeutic decision-making. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and non-pharmacologic treatment, and self-care of medical conditions over the life cycle. Included are complementary and alternative therapies.

Credits: 3

RX 538 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 10: Central Nervous System 2

This module focuses on the epidemiology, pathophysiology, and clinical presentation of selected mood disorders, anxiety disorders, thought/psychotic disorders, neurodevelopment disorders, sleep-wake disorders, and substance-related/addictive disorders. The pharmacology and relevant pharmacokinetics, indications, dosage and administration, and adverse effects of the available drugs and drug classes used in the treatment of these disorders will also be addressed. Students will also design evidence-based treatment and monitoring plans based on current treatment guidelines and literature.

Credits: 3

RX 543 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 11: Gastrointestinal/Nutrition

The Gastrointestinal/Nutrition module of the iPSDT series focuses on the application of pharmacy sciences, including medicinal chemistry, pharmacology, and pharmaceuticals, to disease states and therapeutic decision-making in relation to gastrointestinal and nutritional disorders. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and non-pharmacologic treatment, and self care.

Credits: 3

RX 545 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 12: Immunology/Musculoskeletal/Skin

The immune/musculoskeletal/skin module of the iPSDT series focuses on the application of pharmacy sciences, including medicinal chemistry, pharmacology, and pharmaceuticals, to disease states and therapeutic decision-making in relation to diseases involving the immune system, musculoskeletal system and the skin. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and non-pharmacologic treatment, and self care.

Credits: 3

RX 553 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 13: Hematology/Oncology

This module focuses on the hematologic and oncologic processes with application of the pharmacy sciences, including medicinal chemistry, pharmacology and pharmaceuticals to specific diseases and therapeutic decision-making. The module encompasses the etiology, pathophysiology, prevention, pharmacologic and nonpharmacologic treatment, and self-care of medical conditions over the life cycle. Included are complementary, and alternative therapies as well as supportive care treatment options.

Credits: 3

RX 555 - Integrated Pharmacy Sciences, Disease and Therapeutics (iPSDT) 14: Infectious Disease 3

This is the third of three modules focusing on infectious diseases. The overarching objectives are to associate proper antimicrobial use for various infections. Similar to modules 1 and 2, this module will also focus on medication side effects and drug-drug interactions. Students will apply and integrate their knowledge by associating therapeutic dosages, side effects, pharmacokinetic and pharmacodynamic principles, and resistance to antimicrobials to mechanisms of actions at pharmacological level.

Credits: 3

RX 570 - Integrated Practice 1

This is the first of two modules designed to simulate real life patient scenarios with multiple disease states and patient care settings. This module will also focus on the various skills including, but not limited to, professionalism, communication, health information retrieval, physical assessment, calculation, application of pharmacy sciences, diseases and therapeutic knowledge, and intra-and inter-professional team dynamics. Additionally, various pharmacy practice management consideration, such as regulatory, public health, formulary management, and ethics will be integrated throughout the course activities. Students will serve as peer educators through a series of seminar presentations.

Credits: 3

RX 575 - Integrated Practice 2

This is the second of two modules designed to simulate real life patient scenarios with multiple disease states and patient care settings. This module will also focus on the various skills including, but not limited to, professionalism, communication, health information retrieval, physical assessment, calculation, application of pharmacy sciences, diseases and therapeutic knowledge, and intra-and interprofessional team dynamics. Additionally, various pharmacy practice management considerations, such as regulatory, public health, formulary management, and ethics will be integrated throughout the course activities. Students will serve as peer educators through a series of seminar presentations.

Credits: 3

RX 580 - IPPE 5: Advanced Institutional Pharmacy

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. The focus of this course is directed student exposure to patient care responsibilities of institutional pharmacists. Students will be assigned an institutional pharmacist preceptor and will observe and be engaged in the following components under their supervision: direct patient care, interprofessional collaboration, applying drug knowledge, the medication use system, patient and/or healthcare practitioner communications.

Credits: 1

RX 590 - IPPE6: Patient Care Elective

Introductory Pharmacy Practice Experiences (IPPEs) provides experiences that enhance and support didactic knowledge and skills. The focus of this course is directed student exposure to patient care responsibilities of institutional, community or ambulatory care pharmacists. Students will be assigned a pharmacist preceptor and will observe and be engaged in the following components under their supervision: direct patient care, applying drug knowledge, the medication use system, and patient and/or healthcare practitioner communities.

Credits: 1

RX 610 - Advanced Pharmacy Practice Experience: Community Pharmacy

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Community Pharmacy Rotation, student pharmacists are engaged in patient-focused provision of pharmacy services in a community pharmacy. Students will provide patient counseling, OTC triage, medication therapy management, etc. under pharmacist supervision as part of an integrated community pharmacy service model.

Credits: 5

RX 618 - Pharmacy Professional Development and Enrichment

This course is intended to enrich student development and achievement during their APPE year and prepare students to successfully transition from their professional education to practice.

Credits: 1

RX 620 - Advanced Pharmacy Practice Experience: Ambulatory Care Pharmacy

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Ambulatory Care Rotation, student pharmacists are engaged in provision of patient care and acute/chronic drug therapy management in an outpatient practice setting.

Credits: 5

RX 630 - Advanced Pharmacy Practice Experience: Institutional Pharmacy

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Institutional Rotation, student pharmacists gain experience in how medications are managed in the institutional setting and how institution-based pharmacists oversee the appropriate and safe use of medications including oversight of medication ordering, dispensing and administration, use of technology and information, and the development and use of formularies, drug policies, procedures and protocols.

RX 640 - Advanced Pharmacy Practice Experience: Acute Patient Care

Advanced Pharmacy Practice Experience integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Acute Patient Care Rotation, student pharmacists are engaged in provision of patient care and medication management as part of an interprofessional in-patient based medical team under the supervision of a pharmacist preceptor. Examples of patient focus may include general medicine, critical care, oncology, cardiology, or infectious diseases.

Credits: 5

RX 650 - Advanced Pharmacy Practice Experience: Indirect Patient Care Elective

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in-co-curricular activities. During the APPE Indirect Patient Care Elective Rotation, student pharmacists are able to gain additional knowledge, skills, and experience in businesses, organizations, and pharmacist practices that do not directly engage patients. Common rotations include pharmaceutical industry, managed care, medical communications, management rotations in community and hospital pharmacy, professional organizations, nuclear pharmacy, law offices, and investigations drug services.

Credits: 5

RX 660 - Advanced Pharmacy Practice Experience: Patient Care Elective

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance the knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Patient Care Elective Rotation, student pharmacists are able to gain additional knowledge, skills and experience in patient care/pharmacy practice settings such as compounding pharmacy, long term care pharmacy, anticoagulation services, poison control centers, home IV infusion, etc.

Credits: 5

RX 670 - Advanced Pharmacy Practice Experience: Academia Elective

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Academia Elective Rotation, student pharmacists are able to gain additional knowledge, skills and experience in academic pharmacy. Common experiences during this rotation may include: development of a teaching philosophy statement, creation of course learning activities and assessments, small/large group facilitation, exam proctoring, attending institutional meetings, and observation of various courses, among others.

Credits: 5

RX 680 - APPE Research Elective

Advanced Pharmacy Practice Experiences integrate, apply, reinforce, and advance knowledge, skills, attitudes, abilities, and behaviors developed in the Pre-APPE curriculum and in co-curricular activities. During the APPE Research Elective Rotation, student pharmacists are able to gain additional knowledge, skills and experience in research methodology. Experiences may include any or all of the following: exposure to research study design, protocol development, preparation of material for submission to institutional review board (IRB), data collection, data analysis, publication, among other research-related activities.

SO 101 - Introduction to Sociology

Analysis and description of the structure and dynamics of human society with emphasis on the presentation of a conceptual framework and development of a basis for understanding.

Credits: 3

SO 111 - Principles of Sociology

This is an advanced survey of the scientific and philosophical foundations of sociology. The course will facilitate understanding of social identities, dynamics, and the research used to explore social behavior. Students will be well prepared for professional school exam content areas on cultural, social, demographic, and economic influences on behavior and well-being.

Credits: 3

SO 205 - Social Problems

The study of the nature and scope of significant social problems in society, the analysis of the probable causes, and assessments of various solutions.

Credits: 3

SO 206 - Alcohol-Chemical Dependency

An analysis of the components of alcoholism, social controls, and treatment systems.

Credits: 3

SO 207 - Crime, Drugs and Policy

The course offers a framework to assess current problems with identification of illegal drug use and abuse. It examines distribution, policing, and alternatives to resolution of problems leading to drug use and abuse.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SO 304 - Crime and Society

An introduction to criminology: the study of law making, law breaking, and social responses to violations of criminal law.

Credits: 3

SO 306 - Marriage, Family, and Human Sexuality

Students will be provided with conceptual tools and insight with which to examine, from a sociological perspective, a variety of topics related to personal experiences in order that such knowledge might be useful in personal and professional life.

Credits: 3

SO 310 - Sociology of Work and Professions

An examination of the roles of adults that will yield social and financial consequences in their lives. The organization and function of work and the process of professionalization will be analyzed.

Credits: 3

SO 313 - Sociology of Religion

The examination of religion as a point of articulation between the cultural system and the social system: analysis of religion as function and process, meaning and symbol, and ideology and movement.

Credits: 3

SO 314 - Inside-Out: Jail and Society in Contemporary America

Held in a classroom inside a Philadelphia Prison System (PPS) jail with equal numbers of USciences students and persons incarcerated. The course introduces criminal justice topics through facilitating dialogue and interaction between the USciences and PPS students. This course provides both groups with a deeper and broader understanding of issues related to crime and justice.

Credits: 3

SO 315 - Complex Organizations and Theory

A broad introduction to organizational development and to organization theories that apply to bureaucracies, private enterprises, and voluntary associations.

Credits: 3

SO 321 - Health Care Admin

In this course, students will be introduced to the many issues involved in administering facilities in the modern healthcare environment. Topics covered may include managed healthcare delivery systems, Medicare and Medicaid, negotiating and contracting, and elder-law issues.

Credits: 3

SO 322 - Sociology of Health

Analysis of sociocultural factors in health and illness, including health practitioners, healthcare institutions, and healthcare systems.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SO 326 - Community Organizations

This course provides students with sociological tools and insights to examine and experience community organizations. The basis of community sociology and social network theories will be presented. Students will analyze the social meaning of (situations,+ (culture,+ (roles,+ (values,+ (power,+ (conflict,+ etc.

Credits: 3

SO 330 - World Cultures

Commonalities of ethnic relations throughout the world and the United States are examined.

Credits: 3

SO 332 - 20th African-Amer Thinkers

A multidisciplinary examination of the political and social thought of major African-American thinkers of the 20th-century. This course will also explore the major literary works and musical figures, such as Louis Armstrong, Duke Ellington, and John Coltrane, as well as the development of jazz. In addition, a great deal of attention will be given to the Harlem Renaissance as a model of the role of intellectuals and artists in the development of black identity and struggle. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SO 340 - Special Topics in Sociology

Topics of special interest considered from a sociological perspective. Includes timely topics.

Credits: 3

SO 344 - Drugs, Society, and Behavior

The organization of social and cultural influences on drug use. The practitioner, the patient and/or consumer, and governmental interactions are identified.

Credits: 3

SO 346 - Social Gerontology

Integration of demographic, philosophical, psychological, and social elements of the aging process into a systematic sociological framework.

Credits: 3

SO 347 - Death and Dying

The study of the phases of death and dying and the social reactions and implications.

Credits: 3

SO 348 - AIDS and Society

This course examines the AIDS pandemic and its impact on the United States and world society. A study of the history of AIDS and how societies responded to it will examine homophobia, poverty, race, class, and gender inequalities that shaped the U.S. response to AIDS and the effect of the response on the epidemic.

Credits: 3

SO 399 - Independent Study in Sociology

Available to students to work in an area of particular interest under the direction of a faculty member of the department. May be elected more than once for one, two, or three credits.

Prerequisites & Notes

Student has received department permission for SO 399 - Independent Study-Sociology

Credits: 3

SO 402 - Population

Population is also known as demography. This course examines the role and impact of population change on our lives. It examines how populations are studied using censuses and surveys. The class will explore three basic demographic processes: fertility, mortality, and migration. The course studies the structure and characteristics of given societies and the relevancy to individual members. The course is intended to approximate a seminar situation insofar as class size will permit.

Credits: 3

SO 422 - Race, Culture and Ethnicity

Study of the impact of race, culture, and ethnicity on societies and individuals in a shrinking intercultural world. Culture is sociologically defined to include religion and gender. Discussion will include cultures throughout the world, with appropriate examples to differentiate cultural differences.

Credits: 3

SO 431 - Human Resources Management

Basic survey of the concepts, structures, and processes that affect labor management and the allocation of employment. Problems and strategies are comparatively analyzed. 3 class hrs

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SO 498 - Directed Research in Sociology

Independent research opportunities in sociology are available to self-directed, motivated students to expand their knowledge in an area of particular interest under the direction of a faculty member of the department. The student must plan the independent study project with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography is required. In-depth knowledge of the area selected will be expected.

Credits: 3

SO 702 - Population

Population is also known as demography. This course examines the role and impact of population change on our lives. It examines how populations are studied using censuses and surveys. The class will explore three basic demographic processes: fertility, mortality, and migration. The course studies the structure and characteristics of given societies and the relevancy to individual members. The course is intended to approximate a seminar situation insofar as class size will permit.

Credits: 3

SP 101 - Elementary Spanish I

Basic knowledge of Spanish grammar, syntax, and vocabulary and the study of simple Spanish literary texts. For students with minimal or no language background in Spanish language.

Credits: 3

SP 102 - Elementary Spanish II

More advanced basic knowledge of Spanish grammar, syntax, and vocabulary and the study of simple Spanish literary texts.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SP 101 - Elementary Spanish I with grade greater than or equal to D-.]

Credits: 3

SP 201 - Intermediate Spanish I

Extensive review of Spanish grammar, syntax, and vocabulary, with emphasis on reading, speaking, listening, and writing as well as on Hispanic culture and literature. This class is intended for students who have had three (3) or more years of high-school Spanish or SP 102. Intermediate Spanish I is offered in the fall semester.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SP 102 - Elementary Spanish II with grade greater than or equal to D-.]

Credits: 3

SP 202 - Intermediate Spanish II

Spanish literature read in Spanish.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SP 201 - Intermediate Spanish I with grade greater than or equal to D-.]

Credits: 3

SP 301 - Spanish for Healthcare Professionals

A continuation course in the Spanish language with emphasis on the development of the language skills that healthcare professionals need to communicate with Hispanic patients in the course of their daily work.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SP 201 - Intermediate Spanish I with grade greater than or equal to D-.]

Credits: 3

SP 303 - Conversation & Composition

A continuation of the study of the Spanish language with emphasis on speaking, listening comprehension, composition for the intermediate-level student. Course taught in Spanish.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SP 201 - Intermediate Spanish I with grade greater than or equal to D-.]

Credits: 3

SS 203 - Leadership Development

A basic applied course in development. Topics include values and attitudes, counseling techniques, relationships, conflict, assertiveness, leadership styles, human sexuality, substance abuse, and suicidal behavior.

Credits: 3

SS 221 - Research Design & Statistical Analysis I

This course is part one of an introductory year-long study of social science research design and statistics for psychology majors that will prepare students for upper-level coursework in psychology and assumes that students have completed introductory courses. Course will provide an in-depth coverage of social science research methods including descriptive studies, correlational studies, experimental studies, and qualitative studies. It also will address statistical analyses including nonparametric statistics, calculation of correlation coefficients, testing the significance of correlation coefficients, testing for the difference between two correlation coefficients, t-tests for parameter estimates, t-test for the differences between intact or experimentally derived groups, one-factor ANOVAs, and planned and post-hoc comparisons. In addition to traditional statistical methods, the courses will cover methods for the qualitative analysis of social science data. Furthermore, these courses will incorporate training in the reading and writing of social science research reports in APA style. The course will consist of both lecture and laboratory experiences. Separate laboratory experiences will focus on conducting and analyzing social science experiments. Required of all psychology majors; open to social science minors and other qualified students with the permission of the instructor.

Prerequisites & Notes

Student has completed any of the following course(s): EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.

Credits: 4

SS 222 - Research Design & Statistical Analysis II

This course is part two of an introductory year-long study of social science research design and statistics for psychology majors that will prepare students for upper-level coursework in psychology. Course will provide an in-depth coverage of social science research methods including descriptive studies, correlational studies, experimental studies, and qualitative studies. It also will address statistical analyses including nonparametric statistics, calculation of correlation coefficients, testing the significance of correlation coefficients, testing for the difference between two correlation coefficients, t-tests for parameter estimates, t-test for the differences between intact or experimentally derived groups, one-factor ANOVAs, and planned and post-hoc comparisons. In addition to traditional statistical methods, the courses will cover methods for the qualitative analysis of social science data. Furthermore, these courses will incorporate training in the reading and writing of social science research reports in APA style. The course will consist of both lecture and laboratory experiences. Separate laboratory experiences will focus on conducting and analyzing social science experiments. Required of all psychology majors; open to social science minors and other qualified students with the permission of the instructor.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): SS 221 - Rsrch Design & Stat Analysis I with grade greater than or equal to D-.]

Credits: 4

SS 300 - Social Epidemiology

Analysis of the social determinants of health at the individual, community, and population levels.

Credits: 3

SS 305 - Intercultural Communication

A multidisciplinary explanation of domestic and international intercultural relationships and communications.

Credits: 3

SS 306 - Sex, Gender and Equality

A multidisciplinary examination of the cultural images and status of men and women in a contemporary cross-cultural framework.

Credits: 3

SS 321 - Intercultural Health Communication

A multidisciplinary overview of health communication theory and practice in diverse healthcare settings as well as international health communication systems and critical issues.

Credits: 3

SS 340 - Special Topics in Social Science

Special Topics in Social Sciences is a Behavioral and Social Sciences course that will offer students the opportunity to complete a course that takes advantage of a time-limited resource (e.g. faculty research, visiting scholar, collaborative relationship with another institution or organization, etc.) in any area of study offered by the department. Theory and methods will be drawn from

the disciplines offered in the department including anthropology, communication, economics, political science, psychology, and sociology. Assignments and class work will vary with course content and focus area.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): AN 103 - Intro to Anthropology, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SS 362 - Introduction to Teaching in Higher Education

Students will learn the essential aspects of course design and how to teach in higher education based upon current evidence-based educational literature. This course emphasizes developing teaching/learning and assessment activities in the students+ own disciplines.

Credits: 2

SS 399 - Independent Study in Social Science

Available to students to work in an area of particular interest under the direction of a faculty member of the department. May be elected more than once for one, two, or three credits.

Prerequisites & Notes

Student has received department permission for SS 399 - Independent Study in Social Science

Credits: 3

SS 400 - Qualitative Methods in Social Science

Students learn the fundamentals of ethnography, focus group interviewing, and other rapid assessment procedures. They will use these skills to design, conduct, and report on a group project that benefits a community organization, agency, or school.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CO 101 - Intro to Communication, PS 101 - Intro to Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SS 422 - Globalization and International Health

This course analyzes international health issues. It provides an in-depth understanding of international health from a multidisciplinary perspective.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CO 101 - Intro to Communication, EC 101 - Intro to Macroeconomics, PO 101 - Intro to Pol Sci and Amer Gov, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SS 466 - Public Health Response to Chemical, Biological, and Radiological Threats

This course analyzes bioterrorism in the framework of international health from a multidisciplinary perspective. It provides an in-

depth understanding of biological, chemical, and radiological terrorism in terms of its nature and impact on international health, the surveillance and communication system, and public health response.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed any of the following course(s): CO 101 - Intro to Communication, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SS 488 - Global Health Partnerships

This course analyzes global development and health partnerships from multicultural and multidisciplinary perspectives. Culture and gender underlie our discussions of global development and health problems. This course also provides an in-depth understanding of how all sectors+including the public sector, the private sector, non-governmental agencies, the civil society, and communities+can generate solutions in a collaborative framework. Each topic will feature the case studies of successful global partnerships in population health, gender equity, pharmaceutical access, refugee and migrant health, etc.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing any of the following course(s): AN 103 - Intro to Anthropology, EC 101 - Intro to Macroeconomics, PS 101 - Intro to Psychology, PS 111 - Principles of Psychology, SO 101 - Introduction to Sociology, SO 111 - Principles of Sociology with grade greater than or equal to D-.]

Credits: 3

SS 498 - Directed Research in Social Sciences

Independent research opportunities in social science are available to self-directed, motivated students to expand their knowledge in an area of particular interest under the direction of a faculty member of the department. The student must plan the study with the faculty member during the semester preceding the semester in which the study is to begin. Preparation of an acceptable research paper and annotated bibliography is required.

Credits: 3

SS 753 - Higher Education Teaching

Students will learn the essential aspects of course design and how to teach in higher education based upon current evidence-based educational literature. This course emphasizes developing teaching/learning and assessment activities in the students+ own disciplines.

Credits: 2

SS 764 - Qualitative Methods for Health Research

This course prepares students to use qualitative research, alone or in combination with quantitative methods, for health program planning, monitoring, or evaluation. Following a unified introduction to qualitative research, students may pursue specific topics and methods that best suit their needs. All students will evaluate representative literature; formulate research questions; practice observation, interviewing and content analysis techniques; and develop a protocol and research plan consistent with ethical guidelines. Students will also learn the fundamentals of computer aided qualitative data analysis.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): HE 750 - Behavior & Soc Foundations, HP 730 - Pub Hlth Res and Epidemiology, PB 751 - Introduction to Marketing with grade greater than or equal to D-.]

Credits: 3

ST 310 - Biostatistics I

This course is designed to provide a basic introduction to statistical methods and study design as they apply to biological research. An integrated method will be used to help the student become familiar with methods of describing and analyzing data, apply those methods, interpret results, and evaluate the appropriateness of those methods using data from unpublished and published biological research studies. Excel and the TI 83+ graphing calculator will be used for the course.

Credits: 3

ST 311 - Data Visualization

This course is designed to equip students with theoretical and practical tools needed to build effective and engaging data visualizations, and demonstrate competence in designing and developing visual stories with data. Students will learn visual representation methods and techniques that improve understanding of complex data and models, with emphasis placed on the identification of patterns, trends and differences from data sets across categories, space and time.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): DS 202 - Intro to Data Science II, ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 320 - Introduction to Probability

This course will introduce students to the fundamentals of probability theory (probability rules, discrete and continuous random variables, expectation, conditional probabilities, and distributions). Once the required background is established, more advanced topics (joint probability distributions, Poisson processes, Markov Chains, and Bayesian methods) will be addressed, with an emphasis on applications.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): MA 221 - Calculus II with grade greater than or equal to B-.]

Credits: 3

ST 321 - Advanced Topics in Probability

This course is the first in a two-semester sequence. It will offer a comprehensive introduction to the mathematical theory of probability starting with its first principles, with special emphasis on conditional probability and Bayes+ theorem. The many diverse applications of the subject will be emphasized through numerous real-life examples. The framework required for study in statistical decision will be constructed.

Credits: 3

ST 322 - Advanced Topics in Statistical Inference

This course is the second in a two-semester sequence. Sampling distributions, hypothesis testing, and estimation (both point and interval) will be presented at the abstract level, as well as criteria for comparing various procedures and determining optimality. Parametric and nonparametric models will be examined, along with the generalized linear model.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 321 - Advanced Topics in Probability with grade greater than or equal to B-.]

Credits: 3

ST 331 - Regression Analysis

This is a course for those who intend to minor in statistics. Students are introduced to analyses of bivariate and multivariate data, including plotting, model fitting (linear and nonlinear regression), measures of goodness-of-fit, confidence bands, prediction intervals, and stepwise regression. Least-squares procedures are derived theoretically through matrix algebra. Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) are introduced as linear models with dummy variables. One-way and two-way ANOVA are studied with Tukey's test and other tests for multiple comparisons.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 332 - Design and Analysis of Experiments

In this course we discuss proper design and analysis of experiments, including the role of randomization, selecting sample sizes, and allocating treatments to experimental units. Designs covered include completely randomized designs, designs with factorial treatment structure, random and mixed effects designs, complete and incomplete blocked designs, Latin squares, confounding, split plots, fractional factorials, and response surfaces. Examples and exercises are taken from a broad range of subject areas. Appropriate computer programs are used for analysis of real data sets.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 333 - Categorical Data Analysis

In recent years, the use of statistical methods for categorical data has increased dramatically in a variety of areas and applications, particularly for applications in the biomedical sciences. The course focuses on analyzing categorical response data. The main subject areas are analysis of contingency tables; chi-square and exact tests; measures of association; logistic regression; log-linear analysis using binomial, multinomial, and Poisson distributions; logit models for multidimensional tables; and models for ordinal categorical data. Appropriate computer programs are used for analysis of real data sets. Examples and exercises are taken from a broad range of subject areas.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 331 - Regression Analysis, ST 332 - Design & Analysis of Experiments with grade greater than or equal to B-.]

Credits: 3

ST 334 - Applied Multivariate Analysis

The course focuses on classic and new multivariate methods. In particular, the main subject areas are dimension reduction techniques (principal components analysis and correspondence analysis), classification, and clustering methods (multidimensional scaling, discriminant analysis, cluster analysis, and classification and regression trees), analysis of covariance structure, and latent variable models (factor analysis and canonical correlation analysis). Appropriate computer programs are used for analysis of real data sets. Examples and exercises are taken from a broad range of subject areas.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 331 - Regression Analysis, ST 332 - Design & Analysis of Experiments with grade greater than or equal to B-.]

Credits: 3

ST 335 - Statistics for Clinical Trials

The randomized control clinical trial has become the gold standard scientific method for the evaluation of pharmaceuticals, biologics, devices, procedures, and diagnostic tests. Statistics play an essential role throughout any clinical trial, from planning to conducting interim analysis to final analysis and reporting. Statistics are used to help identify the specific questions to be tested and the appropriate outcome to measure, to determine adequate sample size, to specify the randomization procedure, to establish a safety monitoring plan, and to detail the final analysis plan.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 336 - Survival Analysis

A comprehensive introduction to the principals and methods for the analysis of time-to-event data. The topics covered include types of censoring and truncation, common nonparametric (e.g., Kaplan-Meier estimator) and parametric (e.g., Cox model) approaches, model checking methods, sample size, and power estimation. While the theoretical basis for methodology will be discussed, the primary focus of the course will be on model selection, data analysis, and interpretation of results. Extensive use of SAS procedures for survival analysis will be incorporated into the course.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 331 - Regression Analysis with grade greater than or equal to B-.]

Credits: 3

ST 340 - SAS Programming and Data Analysis

SAS (Statistical Analysis System) is one of the most popular statistical software packages used in the pharmaceutical, biological, and medical sciences. Since it is widely used in business, government, and academia, students with knowledge of SAS programming would be more attractive to employers. This class is an introduction to the use of the SAS programming language for data manipulation, description, and basic statistical analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 345 - Advanced SAS Programming

Advanced SAS Programming is an undergraduate level intermediate course focused on the use of the SAS software for statistical analysis and data management. The overall objective of this course is to prepare students for the Advanced Programmer for SAS Certification test offered through the SAS Institute, Inc. The topics of the course mirror those required for the certification test: advanced programming techniques, macro programming, using SQL with SAS, and optimizing SAS programs.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 340 - SAS Programming Data Analysis with grade greater than or equal to B-.]

Credits: 3

ST 350 - Statistical Software Packages

This is a course for those who intend to minor in statistics. Three different software packages (Excel, SAS, and SPSS) will be discussed in detail, with regard to creating data sets, plotting, analyzing data, and interpreting the output. We will use various statistical techniques learned in the introductory biostatistics and advanced topics courses. Each software package will be taught

for four weeks, and SAS will be used in the last two weeks for advanced topics, including Monte Carlo simulation techniques, factor analysis, and survival analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 395 - Directed Research in Statistics

Students will engage in research under the supervision of a faculty member. Work done at an appropriate level may be presented at a meeting or may lead to publication.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 401 - Time Series and Forecasting

The course will provide students with basic understanding of time series data and various components that could be present in data gathered through time. Popular statistical methods and the corresponding theory to model time series data are discussed and practiced on real and simulated data. Model selection and parameter estimation is discussed in conjunction with checking model assumptions. An adequate model is then used to make forecasts.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed all of the following course(s): ST 331 - Regression Analysis with grade greater than or equal to B-.]

Credits: 3

ST 480 - Directed Study in Biostatistics

An opportunity for students, under the supervision of a faculty member in the department, to explore independently a specific area of biostatistics that is not typically covered in the statistics courses offered. Students may elect to take this course more than once for one, two, or three credits.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 490 - Special Topics in Applied Biostatistics

Designed to address subject areas within the biostatistical science field that are either interdisciplinary or of current interest and that are not covered in other courses. Students may receive credit for this course more than once, provided the subheadings indicate different material will be covered. This course may include student presentations and discussion of biostatistical articles.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 701 - Design and Analysis of Experiments

Covers fundamental principles of planning and designing experiments, completely randomized design, implicit assumptions and tests of validity, Levene+s test of homogeneity of variance and Wilk-Shapiro test of normality, estimation of component of variance and interpretation, multiple comparisons, expected mean squares, randomized block design, Tukey+s test of additivity, Latin square design, repeated Latin squares, generalized missing value procedure, cross-over designs, and analysis of covariance.

Credits: 3

ST 702 - Statistical Principles in Bioassay

Includes purpose, structure, and types of bioassays; statistical principles; quantitative dose response relationship; linear regression analysis; inverse prediction; confidence limits by Fieller+s approach; direct assay and relative potency; indirect assay; analysis of variance in bioassay; tests of validity; symmetrical and asymmetrical parallel line assay; experimental designs; slope ratio assay, covariance in bioassay; quantal response; probit analysis, EDoc, and relative potency; adjustment to natural mortality; combining estimates; and combined drug action, potentiation, inhibition, synergism, antagonism, and independent joint action.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 701 - Design-Anal of Expermnts with grade greater than or equal to B-.]

Credits: 3

ST 704 - Statistics for Research

This class covers statistical inference on two samples, design of experiments, repeated measures, analysis of covariance, multiple regression, categorical data analysis, and factor analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 310 - Biostatistics I with grade greater than or equal to B-.]

Credits: 3

ST 710 - Biostatistical Methods

This course covers basic statistical techniques that are important for analyzing data arising from the biological sciences, from the pharmacological sciences, from public health and health policyrelated research, and from business and marketing. The main subject areas are descriptive statistics, elements of probability, statistical inference using parametric and nonparametric methods, analysis of variance within the context of specific types of experimental designs, multiple linear regression analysis, and analysis of categorical data using contingency tables and logistic regression. Examples and projects will be developed taking into consideration the field of study of the students enrolled in the course.

Credits: 3

ST 711 - SAS Programming & Data Analysis

SAS (Statistical Analysis Software) is one of the most popular statistical software packages used in the pharmaceutical, biological, and medical sciences. Since it is widely used in business, government, and academia, students with knowledge of SAS programming would be more attractive to employers. This class is an introduction to the use of the SAS programming language for data manipulation, description, and basic statistical analysis.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): ST 704 - Statistics for Research, ST 710 - Biostatistical Methods with grade greater than or equal to B-.]

Credits: 3

ST 715 - Statistics for Clinical Trials

The randomized control clinical trial has become the gold standard scientific method for the evaluation of pharmaceuticals, biologics, devices, procedures, and diagnostic tests. Statistics plays an essential role throughout any clinical trial, from planning to conducting interim analysis to final analysis and reporting. Statistics is used to help identify the specific questions to be tested and the appropriate outcome to measure, to determine adequate sample size, to specify the randomization procedure, to establish a safety monitoring plan, and to detail the final analysis plan.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): ST 710 - Biostatistical Methods with grade greater than or equal to B-.]

Credits: 3

ST 720 - Regression Analysis

Covers basic statistics, straight line regression analysis, the correlation coefficient, analysis of variance, multiple regression analysis, testing hypothesis in multiple regression diagnostics, and selecting best regression equation.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): ST 704 - Statistics for Research, ST 710 - Biostatistical Methods with grade greater than or equal to B-.]

Credits: 3

ST 736 - Survival Analysis

A comprehensive introduction to the principals and methods for the analysis of time-to-event data. The topics covered include types of censoring and truncation, common nonparametric (e.g., Kaplan-Meier estimator) and parametric (e.g., Cox model) approaches, model checking methods, sample size, and power estimation. While the theoretical basis for methodology will be discussed, the primary focus of the course will be on model selection, data analysis, and interpretation of results. Extensive use of SAS procedures for survival analysis will be incorporated into the course.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 720 - Regression Analysis with grade greater than or equal to B-.]

Credits: 3

ST 745 - Advanced SAS Programming

Advanced SAS Programming is a graduate level intermediate course focused on the use of the SAS software for statistical analysis and data management. The overall objective of this course is to prepare students for the Advanced Programmer for SAS Certification test offered through the SAS Institute, Inc. The topics of the course mirror those required for the certification test: advanced programming techniques, macro programming, using SQL with SAS, and optimizing SAS programs.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): ST 711 - SAS Prog & Data Analysis with grade greater than or equal to B-.]

Credits: 3

ST 760 - Special Topics in Statistics

Designed to address subject areas within the statistical science field that are either interdisciplinary or of current interest and are not covered in other courses. The topics will be designated by the instructor. A variety of formats may be used, including lecture, presentations, papers, and discussion. Students may receive credit for this course more than once, provided that the subheadings

indicate that different material will be covered.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): MA 221 - Calculus II with grade greater than or equal to B-.]

Credits: 3

ST 780 - Independent Study in Statistics

An opportunity for students, under the supervision of a faculty member in the department, to independently explore a specific area of statistics that is not typically covered in statistics courses currently offered. Students may elect to take this course more than once for one, two, or three credits.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed any of the following course(s): ST 704 - Statistics for Research, ST 710 - Biostatistical Methods with grade greater than or equal to B-.]

Credits: 3

WR 100 - Writing for College

This course increases students+ ability to develop and express ideas effectively and to engage students in various academic and professional discourses. It gives special attention to sentence and paragraph construction, transitional sentences, logical organization, and appropriate tone and form. The course is intended for students who need additional preparation prior to undertaking WR 101. This course may not be used to fulfill any graduation requirements.

Credits: 3

WR 101 - Writing and Rhetoric I

This course focuses on increasing students+ ability to develop and express ideas effectively and to engage students in various academic and professional discourses. It gives special attention to critical reading and in-depth rhetorical analysis. Critical reading of texts helps students to understand the rhetorical process, to analyze audience and its cultural contexts, and to foresee the audience+s response. A substantial amount of writing is required.

Credits: 3

WR 102 - Writing and Rhetoric II

This course is designed to build on skills gained from WR 101 and to help students develop sophisticated, contextualized writing and research strategies. Students learn methods of secondary research and some methods of primary research. Students make arguments in formal and informal settings on interdisciplinary topics. Special attention is given to evidence discovery, claim support, argument response, and their applications to academic debate, public decision making, and written argument. A substantial amount of writing is required.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): WR 101 - Writing and Rhetoric I with grade greater than or equal to D-.]

Credits: 3

WR 301 - Science Fiction

This course surveys science fiction in print, film, television, comics, and popular culture as a rhetorical response to science as the (dominant discourse+ of the 20th and 21st centuries. Students will study and write about innovations in science along with the

science fiction texts that have responded to the ideas they presented.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 302 - Scientific Writing

This course introduces students to writing in the empirical and health sciences, with particular focus on clinical research and the scientific method. Students learn to write scientific reports, review essays, literature reviews, scientific articles for publication, and informal science articles. Additionally, students learn about the research and publication cycles of the scientific community as well as how to present papers and posters at conferences.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 303 - Professional Writing

This course introduces students to the forms of communication utilized in the global marketplace. In addition to memos, reports, and proposals, electronic texts+e-mails, websites, and multimedia presentations+are emphasized. Students learn proper business decorum and dress as a part of this class.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 1

WR 305 - Interdisciplinary Argumentative Writing

Students read and construct the types of argumentative documents associated with their various disciplines. Using logical propositions and formal and informal logic, students develop complex arguments. The Classical and Toulmin approaches to argumentation are emphasized. Students learn to formulate arguments of fact, definition, cause, proposition, and value. Special emphasis is placed on ethics and values-based arguments.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 307 - Visual Communication & Persuasion

Students analyze and create various types of visual documents used in advertising, business, politics, the sciences, and the arts to convey information and persuade audiences. Students will work with such documents as print advertisements, television commercials, brochures, websites, and multimedia presentations.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 308 - Writing for the Health Professions

This course provides an overview of writing principles and techniques geared at health professionals. Medicine and health care require specialized forms of communication in a variety of contexts, from clinics, private practices, and hospitals, to HMOs and other settings. Students will get intensive writing instruction and practice in a variety of genres and contexts, including among others, health education materials, public health campaigns, and visual electronic communication. Students will work both individually and collaboratively in in-class workshops. The course satisfies the written communication and information literacy general education skills.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed all of the following course(s): WR 101 - Writing and Rhetoric I, WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 310 - Writing Center Tutoring

This course is designed to provide students a range of pedagogical approaches to the tutoring of writing one-to-one. This course will examine why we offer individualized tutoring as well as a range of practical approaches to tutoring. Further, this course introduces students to Writing Center operation and pedagogy in theory and practice. Individual and group tutoring techniques, grammar, process theory, and tutoring ESL and special needs students are all emphasized. This class is strongly recommended for writing center tutors.

Credits: 3

WR 311 - Multimodal Literacies

Communication techniques have been widely expanded by digital tools. This course introduces students to writing and communication in our new multimodal society. Multimodal learning is about understanding the different ways of knowledge representation and meaning making. This class will examine the theories, processes, and strategies of multimodal integrated literacy. The course offers feedback during the learning and writing process and contains informal blog/journal writing, traditional writing assignments, and multimodal projects.

Credits: 3

WR 320 - History of Rhetoric

This course surveys theories of writing and rhetoric from the ancient world to the present. Topics covered include ancient, Medieval, Renaissance, and modern rhetoric. Particular attention is given to theories of argumentation and persuasion.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 325 - Rhetoric of Science

This course studies scientific discourse as a mode of argument in specific historical contexts. Students will study the principles of persuasive and informational rhetoric from ancient and modern sources, and will analyze scientific texts from the ancient world through the current day. Students will develop an understanding of the scientific discourses of important figures in the history of science.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 340 - Special Topics in Writing, Rhetoric, and Discourse Studies

This course allows students to engage in focused study of special topics not covered by current offerings. Such topics may include areas in writing, the history of rhetoric, or interdisciplinary studies in discourse theory or linguistics.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 1 to 3

WR 350 - Darwin, Rhetoric, and Culture

This course in writing and rhetoric examines the ways in which the theory of evolution, especially the arguments for it presented by Charles Darwin in *The Voyage of the Beagle*, *On the Origin of Species by Means of Natural Selection*, and *The Descent of Man*, fundamentally changed the nature of scientific and other disclosures. Particular attention will be paid to the nature/nurture debate prior to the nineteenth century, the rise and influence of social Darwinism, the (superman+ theory, and sociobiology. Forms of discourse studied will include scientific literature, popular science writing, film, and popular culture.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 399 - Independent Study in Writing & Rhetoric

This course allows students to engage in focused, independent studies of special topics not covered by current offerings. Such areas may include focused studies in writing, the history of rhetoric, popular culture, writing pedagogy, or interdisciplinary studies in discourse theory or linguistics. Students will engage in independent research projects under the guidance of a professor specializing in the particular area of study.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 401 - Writing the Nonfiction Essay

This course introduces students to the types of writing done for general population audiences for informative, educational, or entertainment purposes.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 402 - Public Relations Writing

Students will develop the professional writing skills expected of beginning public relations practitioners, including different approaches required for a variety of audiences and media. This course emphasizes the basics of good writing for the public and for client representation. Students learn to write press releases, create media kits, and write advertising copy and other public

relations-related documents.

Prerequisites & Notes

Student has satisfied any of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 1

WR 404 - Multimedia Writing

This course introduces students to writing for the electronic media. Using multimedia tools, students learn how to write and create visual and interactive texts for multimedia environments. Emphasis is on the rhetoric of professional communication utilizing online and multimodal texts with both traditional written and audio and visual design elements. There will be a considerable amount of writing in this course.

Prerequisites & Notes

Student has satisfied all of the following: [Student has completed or is in process of completing all of the following course(s): WR 102 - Writing and Rhetoric II with grade greater than or equal to D-.]

Credits: 3

WR 499 - Directed Study in Writing

For this course the student will engage in a specialized study in an area of writing, rhetoric, or discourse studies under the direction of a writing program faculty member. The study will result in a substantial work of scholarship, a professional writing portfolio, or other subject area approved by the directing professor. This course serves as the capstone course for the minor in professional writing.

Credits: 3

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