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Biological Sciences

The biological sciences program provides broad interdisciplinary graduate training in biology leading to the Master of Science degree. This interdisciplinary program utilizes the faculty, facilities, and courses of Microbiology, Physiology, Plant Biology, and Zoology. The program is designed for those students who desire a broad-based curriculum rather than an in-depth program of study in only one of the biological sciences.

Master of Science (M.S.) in Biological Sciences

Requirements for Admission

All applicants must submit an application to the biological sciences program. Applicants must meet the minimal requirements of the Graduate School before being considered for admission to Biological Sciences. A completed application includes the program application form, three letters of recommendation, and transcripts of all previous college credit.

This program requires a nonrefundable \$65 application fee that must be submitted with the application for Admissions to Graduate Study in Biological Sciences. Applicants must pay this fee by credit card.

In addition to Graduate School admission requirements, applicants must hold a bachelor's degree in a life science discipline. Specific options and concentrations may have additional prerequisites, as noted below.

Application forms are available online at gradschool.siu.edu/applygrad.

Thesis Option

Admission Requirements

Thirty-seven credit hours of undergraduate courses distributed among any four of the biological science areas (plant biology, microbiology, physiology and zoology): organic chemistry with laboratory; physics; statistics. Applicants deficient in these background areas may be admitted, but any deficiency must be successfully completed before the third semester of the registration program.

Advisement

No later than the end of the first semester of registration on the program, the student must arrange with a faculty member in one of the four biological science programs to serve as the research adviser. Following selection and approval of the adviser, an advisory committee is to be recommended to the director of the Biological Sciences Program for approval by the dean of the Graduate School. This committee shall consist of at least three members, each from a different biological science program, with the research advisor serving as chair. A program of course work must be approved by the advisory committee and filed with the director no later than the eighth week of the second semester of registration in the program. Any deviation from the course work program during the student's tenure must be approved by the advisory committee and filed with the director. A research proposal for the thesis must be approved by the advisory committee and filed with the director no later than the end of the second semester of registration.

Graduation Requirements

A total of 30 credit hours of 400- or 500-level courses are required, with the following provisions:

1. A minimum of 21 credit hours of formal graded courses in the biological sciences is required with no less than six credit hours coming from each of four of the biological science program.
2. At least 50% of the required total credit hours must be at the 500 level.
3. At least one semester of seminar in two of the four biological science programs must be attended for credit.
4. An overall 3.0 grade point average ($A = 4.0$) must be maintained with no course in which the grade is less than a C counting toward the degree requirements.
5. A thesis embodying original research is required and may be counted for not less than three nor more than six hours of credit.
6. A final oral examination is required consisting of a public presentation of the thesis research and a closed session of inquiry by the student's research and advisory committee.

Non-Thesis Option

Admission Requirements

Thirty-seven credit hours of undergraduate courses distributed among any four of the biological science areas (plant biology, microbiology, physiology, and zoology); organic chemistry with laboratory; physics; statistics. Applicants deficient in these background areas may be admitted, but any deficiency must be successfully completed before the third semester of registration in the program.

Advisement

No later than the end of the first semester of registration in the program, the student must arrange with a faculty member in one of the four biological science programs to serve as the research adviser. Following selection and approval of the adviser, an advisory committee is to be recommended to the director of the Biological Sciences Program for approval by the dean of the Graduate School. This committee shall consist of at least three members, each from a different biological science program, with the research advisor serving as chair. A program of course work must be approved by the advisory committee and filed with the director no later than the eighth week of the second semester of registration in the program. Any deviation from the course work program during the student's tenure must be approved by the advisory committee and filed with the director. A proposal for the research paper must be approved by the advisory committee and filed with the director no later than the end of the second semester of registration.

Graduation Requirements

A total of 40 credit hours of 400- or 500-level courses are required, with the following provisions:

1. A minimum of 26 credit hours of formal graded courses in the biological sciences required with no less than eight credit hours including one 400- or 500-level laboratory course in each of the biological sciences programs.
2. At least 50% of the required total credit hours must be at the 500 level.
3. At least one semester of seminar in each of three of the biological science programs must be attended for credit.
4. An overall 3.0 grade point average ($A = 4.0$) must be maintained with no course in which the grade is less than a C counting toward the degree requirements.
5. A research paper is required demonstrating the ability to collect and analyze data and to report interpreted results in a scientific manner. A library research problem is acceptable, but must include an original contribution of analysis and interpretation. No less than three nor more than six semester hours of "Research" may be counted for credit in meeting requirements. (Only those courses listed as "Individual Research", Introduction to Research", etc. may be taken for credit. "Thesis Research" may not be used for this requirement.)
6. A final oral examination is required, consisting of two parts:

- a public presentation of the research paper
- a closed session of inquiry by the student's Research and Advisory Committee.

MEDPREP Concentration (Non-Thesis)

Admission Requirements

Each student must apply and be accepted to the MEDPREP program in the SIU School of Medicine.

Advisement

Students are advised by MEDPREP faculty in the SIU School of Medicine. Advisement arrangements are made immediately after admission.

Graduation Requirements

A minimum of 47 credit hours of 400- or 500-level courses are required, with the following provisions:

1. A minimum of 20 credit hours of formal course work in the biological sciences and 12 credit hours of formal coursework in MEDPREP.
2. At least 50% of the required total credit hours must be at the 500-level.
3. A minimum of 12 credit hours of course work in MEDPREP (six of those credit hours to be completed during the summer prior to matriculation into the Biological Science program.)
4. An overall 3.0 grade point average ($A= 4.0$) must be maintained with no course in which the grade is lower than a C counting toward the degree requirements.

Biological Sciences Courses

BIOL409 - Developmental Biology Basic principles and processes of embryonic development including contemporary research on molecular, cellular and genetic mechanisms of differentiation and morphogenesis; selected plants and invertebrate and vertebrate animals will be considered. Prerequisite: BIOL 305 with a grade of C or better. Credit Hours: 3

BIOL450 - Biomedical Genetics The basic principles of human genetics, from detailed treatment of DNA structure and function to an overview of the human genome and cancer genetics will be covered with emphasis on implications to medical practice. Other major topics include genetic variation, patterns of inheritance, the human genome, genetic screening and risk assessment, and treatment of genetic disorders. Prerequisite: BIOL 305 with a grade of C or better. Credit Hours: 3

BIOL500 - Contemporary Biology for Teachers An introduction to fundamental biological concepts. Emphasis is placed on exploring plant and animal model systems using contemporary methodologies. Examples of biological processes will be covered from genomics to ecosystems. Prepares teachers to introduce biological principles and innovative approaches to understanding biological systems in the classroom. Prerequisite: SCI 210A & B or equivalent. Credit Hours: 3

BIOL601 - Continuing Enrollment For students who have not finished their degree programs and who are in the process of working on their dissertations, thesis, or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any course is not permissible. Graded S/U. Prerequisite: minimum hours as stated above. Credit Hours: 1

MEDP400A - MEDPREP Seminar-Orientation Seminar on social, professional, and scientific issues of interest to students planning a career in medicine or dentistry. Required of first-year MEDPREP

participants. Restricted to MEDPREP students. Must be taken in A,B,C sequence. Mandatory Pass/Fail. Credit Hours: 1

MEDP400B - MEDPREP Seminar-Medical/Dental Seminar I Seminar on social, professional, and scientific issues of interest to students planning a career in medicine or dentistry. Required of first-year MEDPREP participants. Restricted to MEDPREP students. Must be taken in A,B,C sequence. Mandatory Pass/Fail. Credit Hours: 1

MEDP401B - MEDPREP Skills-Prematriculation (P/F only) Focus on skills critical for academic success in preprofessional and professional training. Restricted to MEDPREP students. Credit Hours: 1-3

MEDP501C - Quantitative and Analytical Reasoning This course focuses on quantitative approaches and analytical reasoning needed for graduate and professional school problem solving, and for research data analysis encountered in graduate and professional education. Topics include mathematical problem solving integrating algebraic, geometric, logarithmic and trigonometric methods; applied calculations for medical practice and research. Emphasis is placed on ensuring students have appropriate quantitative reasoning competencies for professional school. Restricted to students enrolled in MEDPREP. Credit Hours: 1-3

MEDP501D - Problem Based Learning in Medicine Discussion-based course focusing on understanding of human physiology and biochemistry in the context of medical disease. Using a problem-based learning format, student will work in small groups to investigate simulated patient cases, identify and address learning issues associated with both doctoring and biological science, research physiological and biochemical mechanisms of disease, and present findings in oral and written forms. Credit Hours: 3

MEDP501E - Colloquium Seminar course focused on development of career and networking skills critical for success in the health professions. Required for all MEDPREP students enrolled in concurrent master degree programs. Restricted to MEDPREP students. Credit Hours: 1

MEDP503B - Medical Pharmacology Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program. Credit Hours: 1-3

MEDP503E - MEDPREP Medical Immunology Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program. Credit Hours: 1-3

MEDP503G - Biological Systems and Processes Course covers major biological systems and processes, with a focus on integration of disciplinary approaches and knowledge in preparation for professional study of medicine. Physiological systems covered include nervous, muscular, endocrine, cardiovascular, respiratory, digestion, renal, immune response, reproduction and embryology; as well as cellular metabolism, molecular biology, biochemistry of the cell, genetics, evolution, microbiology and virology. Research methodologies and data analysis are integral to the presentation of topics, which vary by semester. Restricted to students enrolled in MEDPREP. Credit Hours: 1-3

MEDP504A - Chemical Systems and Processes Course covers major chemical systems and processes, with a focus on integration of disciplinary approaches and knowledge in preparation for professional study of medicine. Chemistry topics covered include atomic structure and periodic theory of elements, stoichiometry, chemical bonding, solutions and mixtures, electrochemistry, thermochemistry. Research methodologies and data analysis are integral to the presentation of topics, which vary by semester. Restricted to students enrolled in MEDPREP. Credit Hours: 1-3

MEDP504C - Organic Chemistry Systems and Processes Course covers major organic chemistry systems and processes, with a focus on integration of disciplinary approaches and knowledge in preparation for professional study of medicine. Topics covered include structure, bonding and resonance, organic molecules, functional groups, organic reactions, and spectroscopy. Research methodologies and data analysis are integral to the presentation of topics, which vary by semester. Restricted to students enrolled in MEDPREP. Credit Hours: 1-3

MEDP504E - Biochemistry Content may be supplemental (to concurrent biological science courses), additional (permitting acceleration), or preparational for the MCAT/DAT. Restricted to MEDPREP students enrolled in Master's level program. Credit Hours: 1-3

Last updated: 01/27/2022

Southern Illinois University

Carbondale, IL 62901

Phone: (618) 453-2121

Catalog Year Statement:

Students starting their collegiate training during the period of time covered by this catalog (see bottom of this page) are subject to the curricular requirements as specified herein. The requirements herein will extend for a seven calendar-year period from the date of entry for baccalaureate programs and three years for associate programs. Should the University change the course requirements contained herein subsequently, students are assured that necessary adjustments will be made so that no additional time is required of them.