

Pre-Medical

Undergraduate Minor

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Goals and Objectives

This minor is only open to students who are NOT majoring in chemistry, biology, or medical lab science. Students in those majors should consult the pre-medical concentrations for those majors.

The goal of the pre-medical minor curriculum offered by the Natural Sciences Division is to prepare undergraduate students for professional program in medicine, pharmacy, dentistry, ophthalmology, veterinary medicine and other careers in the health-sciences. Students who want to pursue a career in a medicine must specially prepare themselves for admission to a graduate program in their area of interest. To pursue this goal they do not need to pursue a science oriented degree. However they must develop a strong background in science and math. The purpose of this minor is to provide the minimum background that a non-science major must have to complete a successful application to medical, pharmacy, veterinary, and dental school as well as professional programs in other health sciences.

Pre-Medical Minor

Advising

Students are expected to meet with a pre-professional health science advisor before beginning the minor. At that meeting, the student and advisor will prepare a course plan to ensure that all requirements will be met. Advising will also help students focus their career goals, identify admissions requirements to post-graduate programs that are not satisfied by the pre-med minor and navigating the process of applying to post-graduate health science programs.

Grading Policy

There is no minimum GPA requirement for this minor. However most post-graduate professional health science programs have stringent minimum GPA requirements that students must meet in order to earn admission.

To earn a Pre-Medical minor, students must complete **36** credit hours. Students are expected to meet with a preprofessional health sciences advisor before beginning the minor.

Required Courses

ASP 201	University Physics I	4
ASP 202	University Physics II	4
BIO 141	General Biology I	4
BIO 142	General Biology II	4
CHE 141	General Chemistry I	4
CHE 142	General Chemistry II	4
CHE 267	Organic Chemistry I	3
CHE 268	Organic Chemistry I Laboratory	1
CHE 269	Organic Chemistry II	3

CHE 271	Organic Chemistry II Lab	1
MAT 115	Calculus I	4
Total Hours		36

Students are permitted to count any of the required courses for the minor simultaneously for any other graduation requirement. For example a student may use BIO 141 and CHE 141 to satisfy their lower-division general education science requirement. Or MAT 115 could be used for a general education math requirement or toward a requirement in the student's major, in addition to counting toward the Pre-Medical minor.

Any course that meets the Illinois Articulation Initiative standards for the above courses may be transferred to count for this minor by a **Student Petition**. A minimum of 12 credit hours in this minor must be completed at UIS. Students should also be aware that some of the most selective post-graduate programs require their applicants to take these courses at accredited four-year colleges or universities.

The courses in this minor represent the intersection of the minimum requirements for admission to most medical schools. Individual professional schools may have additional requirements that are not met by this minor. Students are advised to take courses beyond the minor requirements to prepare for entrance exams such as the MCAT and DCAT. It is critical that students pursuing a Pre-Medical minor regularly meet with their advisor to help ensure that in addition to completing the minor, they are informed about additional courses that are recommended to prepare them for admission to the post-graduate professional health science program of their choice.

Courses

BIO 106. Environmental Biology. 3 Hours.

Examines ecological principles in relation to environmental problems. Emphasizes current environmental issues and possible solutions and courses of action. Course Information: Course is intended for non-science majors. This course fulfills a general education requirement at UIS in the area of Life Science without a Lab. (IAI Code: L1905).

BIO 107. Environmental Biology Lab. 1 Hour.

Optional lab for BIO 106. Course Information: Prerequisite: BIO 106 must be taken concurrently or have been completed with a passing grade. Course is intended for non-science majors. Course Information: This course, along with BIO 106, fulfills a general education requirement at UIS in the area of Life Science with a Lab.

BIO 111. Emiquon Stories. 4 Hours.

This course will bring first year undergraduates to UIS' Therkildsen Field station at Emiquon, to the nearby Dickson Mounds Museum, to the ecologically restored Thompson Lake at the Emiquon Preserve, and to the place where Spoon River meets the Illinois River. Students will meet experts in wetlands restoration, history, biology, environmental science, archeology, literature, and art. These experts will present different perspectives and different stories about the Emiquon region past, present, and future. Course Information: This course fulfills a general education requirement at UIS in the area of Freshman Seminar and a general education requirement at UIS in the area of Life Science with a Lab.

BIO 141. General Biology I. 4 Hours.

An introduction to the nature of life, including the cell doctrine, the basic physical phenomena of life; a consideration of bioenergetics and biosynthesis; cell reproduction; the gene concept and genetics; and the mechanism and evidence of organic evolution. Course Information: Prerequisites: Capital Scholar or instructor approval. This course is designed for science majors. Students must learn at least a C in this course. This course fulfills a general education requirement at UIS in the area of Life Science with a Lab.

BIO 142. General Biology II. 4 Hours.

Part of the introductory biology sequence for science majors. Students will learn about the unity and diversity of life, including concepts of evolution, growth and development, behavior, and the interactions of organisms with their abiotic and biotic environments. Course Information: Students must earn at least a C in this course.

BIO 201. Basics of Human Anatomy and Physiology I. 4 Hours.

This course is designed for Allied Health Science students interested in learning about anatomy and physiology. It is an introductory course which explores basic sciences related to health careers. It is part 1 of a 2 semester lecture and lab sequence. Course Information: This course fulfills a general education requirement at UIS in the area of Life Science with a Lab.

BIO 202. Basics of Human Anatomy and Physiology II. 4 Hours.

This course is designed for Allied Health Science students interested in learning about anatomy and physiology. It is an introductory course which explores basic sciences related to health careers. It is part 2 of a 2 semester lecture and lab sequence. Course Information: This course fulfills a general education requirement at UIS in the area of Life Science with a Lab.

BIO 231. Applied Microbiology. 3 Hours.

A lecture course that explores microorganisms important to healthcare. Topics include microbial characteristics, genetics, growth and metabolism, mechanisms of disease transmission, immunity, antimicrobial treatment and resistance, a survey of pathogenic microbes and prevention of microbial disease. Clinical applications will be emphasized. Course Information: This course is designed for nursing students and other allied health fields; it does not fulfill the microbiology requirement for Biology and CLS majors. This course fulfills a general education requirement at UIS in the area of Life Science without a Lab.

BIO 232. Applied Microbiology Lab. 1 Hour.

This is an optional laboratory course to accompany Applied Microbiology lecture (BIO 231). It covers basic laboratory techniques used to identify and study microbes. Application to healthcare is emphasized. Course Information: Prerequisites: concomitant enrollment in or prior successful completion of BIO 231. Intended for students pursuing nursing and other allied health fields. It does not fulfill the microbiology laboratory requirement for Biology/MLS majors.

BIO 234. Introduction to Ecology for Non-Majors. 4 Hours.

This course introduces non-science students to the ecology through on-line lectures and lab experiences at the UIS Therkildsen Field station at Emiquon. Core ecological principles include: Patterns of life, energy and ecosystems, populations, and human-ecological connections. Hands-on work in wetlands, rivers, lakes, forests, or prairies will be done. Course Information: Science majors should not enroll. This course fulfills a general education requirement at UIS in the area of Life Science with a Lab.

BIO 301. General Seminar. 3 Hours.

Development of writing skills and discussion of professional ethics. Mastery of library skills and ability to organize material demonstrated by production of a paper on a scientific topic of interest and a seminar based on that paper. Course Information: Same as CHE 301. Prerequisite: ENG 101 and ENG 102 or equivalents. COM 112 recommended. For the sophomore or junior year. Restricted to Chemistry and Biology majors.

BIO 302. Honors Seminar. 1 Hour.

Integrative seminar to share research methods and experiences and analyze procedures and protocols in research. Course Information: May be repeated up to 1 time(s).

BIO 306. Plants and Society without a Lab. 3 Hours.

This course focuses on the uses of flowering plants and their importance in human affairs. The lectures include general background about plant form, function, reproduction, and classification. Uses of plants as sources of fruits, grains, legumes, medicines, herbs and spices, drinks, textile fibers, lumber, poisonous and psychoactive plants, and forages are studied in more detail. Course Information: This course is for non-science majors and fulfills a general education requirement at UIS in the area of Life Science without a Lab.

BIO 307. Plants & Society Lab. 1 Hour.

Optional lab for BIO 306. The course includes experiments designed to reinforce the concepts and processes covered in the lectures. Course Information: Prerequisites: BIO 306 taken concurrently or completed with a passing grade. This one (1) credit hour course, along with BIO 306, is intended for non-science majors and fulfills a general education requirement at UIS in the area of Life Science with lab.

BIO 311. Cell Biology. 4 Hours.

Molecular basis of structure and function of cells, with an emphasis on the mechanisms of biological processes. Laboratory integrates study of cellular processes with introduction to current research techniques and instrumentation. Recommended spring of senior year. Course Information: Prerequisites: One year of introductory biology, one year of introductory chemistry, organic chemistry and permission of instructor.

BIO 333. ECCE: 10,000 Years at Emiquon. 3 Hours.

The Emiquon site on the Illinois River floodplain has been inhabited for over 10,000 years. This course will study five communities and how they related to the land: Native Americans, European settlers, hunters and fisherman, farmers, and scientists and conservations. Students will gain perspectives from historians, archeologists, biologists, and ecologies. Course Information: No prerequisites. This course cannot be used for BIO major elective. This course fulfills an Engaged Citizenship Common Experience requirement at UIS in the area of U.S. Communities.

BIO 334. Restoration and Conservation of Rivers in North and South America. 3 Hours.

This course explores conservation biology and restoration ecology in the context of two case studies. The U.S. study will be the middle reach of the Illinois River, which has undergone degradation, conservation and restoration. The area of focus in Brazil will be the Upper Rio Parana, the last stretch of river with no dams. Course Information: Same as ENS 334.

BIO 347. Medical Bacteriology. 4 Hours.

Concise overview of pathogenic bacteriology. Includes discussion of techniques for culturing and identifying bacteria and an introduction to epidemiology. Required of medical laboratory science students. Offered fall semester. Course Information: Same as MLS 347. Prerequisites: BIO 345 and BIO 346.

BIO 371. Principles Of Ecology. 4 Hours.

Structure and function of ecological systems including basic ecological principles and concepts. Applicable to individuals, populations, communities, and ecosystems. Laboratory involves outdoor and lab experiments. Course Information: One year of introductory biology. Recommended fall of senior year.

BIO 381. Genetics. 4 Hours.

Studies a range of topics including classical Mendelian analysis, chromosome structure and mapping, molecular genetics and recombinant DNA technology, culminating with an introduction to population genetics. Includes laboratory sessions to introduce students to problem-solving situations using the techniques of both classical and molecular genetics. Course Information: Prerequisite: One year of introductory biology, one year of introductory chemistry, microbiology, and organic chemistry. Recommended spring of senior year.

BIO 391. Evolution. 4 Hours.

Origin of life and history of development of living systems. Analysis of classical Darwinism, the Neo-Darwinian synthesis, and mechanisms of evolution, with emphasis on microevolutionary studies as an analytical tool. Course Information: Prerequisite: One year of introductory biology and successful completion of three biology courses required for this major.

BIO 399. Tutorial. 1-12 Hours.

Intended to supplement, not supplant, regular course offerings. Students interested in a tutorial must secure the consent of the faculty member concerned before registration and submit any required documentation to him or her. Course Information: May be repeated to a maximum of 12 hours.

BIO 400. ECCE: Undergraduate Research. 1-4 Hours.

Independent investigation of specific problem of interest to the student. Before enrolling, a student must select a faculty member from the biology department to direct and review the project. Research paper, formal seminar, or both may be required for credit. Offered each semester. Course Information: Restricted to BIO majors. May be repeated to a maximum of 4 hours. This course fulfills an Engaged Citizenship Common Experience requirement at UIS in the area of Engagement Experience.

BIO 401. Integrative Biology: Senior Seminar. 3 Hours.

This is the capstone course for Biology majors, students will apply the knowledge they have accumulated across their coursework towards study of a particular integrative topic. Students will focus on discussion and analysis of topics in biology, learn how to prepare a research report, give a formal research presentation, critique the work of their peers, and write a proposal outlining a potential investigation and deliver an oral presentation of their proposal.

BIO 402. Biometrics. 4 Hours.

Statistical analytical tools in biology and their application in developing strategies for experimental procedures and evaluation of results. Introduction to statistics software.

BIO 405. Modeling of Biological Systems. 4 Hours.

This course is designed to give senior undergraduate and graduate students the basic knowledge of modeling biological systems. The course will emphasize the basic concepts, principles, procedures, and techniques in modeling of biological systems. The STELLA software will be used to help students to learn how to model biological systems. Course Information: Prerequisites: a year of calculus (MAT 115 & MAT 116) or one semester of calculus (MAT 115) and one semester of applied statistics (MAT 121).

BIO 410. Topics in Biology. 1-4 Hours.

Study of a topic under investigation by contemporary biologists. Topic for a semester will be stated in the class schedule. Prerequisite: Dependent on topic. Course Information: May be repeated if topics vary.

BIO 411. Honors Senior Seminar. 4 Hours.

This is the capstone senior seminar course for Honors Biology majors. The aim of this course is for you to develop a final written thesis on your undergraduate research. You will also work on further developing your oral and presentation skills. You will be required to present your work publicly both orally and in poster format. Course Information: Prerequisites: BIO 400 and BIO 402 (can be taken concurrently).

BIO 425. Medicinal Chemistry. 3 Hours.

Pharmacotherapy is defined as the treatment of disease through the administration of drugs. Medicinal chemistry is an introductory course in pharmacology that introduces the underlying principles of the mechanisms of actions of drugs used to treat diseases (pharmacodynamics), the properties of drugs (pharmacokinetics), and how they vary from individual to individual (pharmacogenetics). Course Information: Same as CHE 425.

BIO 428. Human Disease. 4 Hours.

Human diseases arises by the complex interaction between inherited genetic mutations and environmental influences. In this course we will examine the basis for a wide range of diseases including inherited syndromes, cancer, influenza, and HIV. Course Information: Prerequisite: BIO 141, Cell Biology or Genetics.

BIO 429. Human Anatomy and Physiology I. 4 Hours.

A review of human anatomy and physiology part one. Topics include review of basic anatomy of tissues based on the histological structure. This is followed by a review of anatomy and physiology systems presented in the organization by organ system of Roget's lectures to the Royal Society. This starts with integumentary systems, followed by the skeletal system, then the muscular system, and, closing the semester, a presentation of the nervous system. Course Information: Prerequisite: One year of general biology and one year of general chemistry.

BIO 431. Human Anatomy and Physiology II. 4 Hours.

A review of human anatomy and physiology, part two. Topics include a review of the anatomy physiology of tissues in the following organ systems. The course starts with the Endocrine system, followed by the cardiovascular system including a review of the components of blood, the lymphatic and corresponding immune systems, the respiratory system, the urinary system, and, closing the semester, a presentation of the reproductive system. Course Information: Prerequisite: BIO 429.

BIO 432. Introduction to Neuroscience. 3 Hours.

While neurobiology traditionally focuses on the biology of the nervous system, neuroscience is an interdisciplinary field that incorporates principles from biology, chemistry, mathematics and medicine to provide a more comprehensive overview of the nervous system. In order to understand how the nervous system is organized and functions to generate behavior, we will examine the central and peripheral nervous system in anatomical, electrophysiological, cellular, and molecular terms. Course Information: Same as CHE 432.

BIO 433. Comparative Vertebrate Biology. 4 Hours.

Comparative study of the evolutionary origins, embryological development, and functional anatomy of the various classes of vertebrates. Interrelatedness of form and function is stressed in both lecture and laboratory. Recommended spring of junior year. Course Information: Prerequisites: BIO 141 and BIO 142.

BIO 435. Invertebrate Biology. 4 Hours.

Comprehensive study of major and minor invertebrate phyla. Emphasis on morphology and adaptations, evolutionary relationships among groups. Laboratory includes field collections and study of specimens. Course Information: Prerequisite: One year of introductory biology.

BIO 444. Aquatic Ecology. 4 Hours.

Fundamentals of freshwater ecology, including abiotic-biotic interactions, aquatic ecosystems structure and function, and relationships among organisms. Lecture and laboratory. Course Information: Same as ENS 444. Prerequisite: Ecology or permission of instructor.

BIO 445. Biology Of Water Pollution. 4 Hours.

Effects of organic wastes, industrial chemicals, and non-point pollutants on aquatic fauna and flora and humans; detection and measurement of water pollution. Laboratory involves detection and measurement of water pollution by toxicity tests and field sampling. Course Information: Same as ENS 445. Prerequisite: Ecology or permission of instructor.

BIO 446. Restoration Ecology. 4 Hours.

Restoration Ecology is a relatively new and growing field of study in ecology. This course will examine the process of repairing damage caused by humans to the diversity and dynamics of ecosystems. The approach to study will be to consider examples (case studies) of successful projects, and explore design aspects to restoration. Students with a background in biology and chemistry are encouraged to attend. Course Information: Prerequisite: Ecology or permission of instructor.

BIO 447. Global Change Ecology. 4 Hours.

This course is designed to provide senior undergraduate and graduate students critical knowledge about global change ecology. This course will examine how global change influences composition, structure, processes, and functions of ecosystems as well as what we can do to mitigate the negative impacts caused by global change on ecosystem services. Course Information: Prerequisite: BIO 371 or equivalent with instructor permission.

BIO 448. Introduction to Immunology. 3 Hours.

Immunologic principles, concepts, and techniques will be discussed, including components of the immune system, cellular and humoral immune response, and antigen-antibody reactions. Human diseases related to compromised immunity will be introduced. Course Information: Same as MLS 448. Prerequisites: BIO 141 or equivalent.

BIO 449. Introductory Immunology Lab. 1 Hour.

Basic immunology and serology procedures with emphasis on medical laboratory diagnostic procedures. Course Information: Same as MLS 449. Prerequisites: BIO 141 or equivalent, MLS 448 or concurrent.

BIO 451. General Botany. 4 Hours.

This lecture and lab course gives a comprehensive overview of plant biology, focusing on 3 broad sections of plant biology: morphology and anatomy, biochemistry and physiology, and evolution and diversity. Lab will apply concepts through experimentation and observation, using fresh and preserved specimens, and students will learn to identify plant cells and tissue, and recognize key features of major plant groups. Course Information: Prerequisites: BIO 141 and 142.

BIO 455. Medical Botany. 3 Hours.

Medical Botany looks at plants and botanical compounds used in traditional and contemporary medicine, examining their medicinal effects and biological mechanism. It is designed to teach the understanding and appreciation of the plant-based compounds that affect human health, not to encourage the practice of medicine or pharmacy. Course Information: Prerequisites: Students must have successfully completed one year of biology and one year of chemistry.

BIO 462. Conservation Biology. 4 Hours.

Covers biological principles related to biodiversity conservation and ecosystem management including the demography and genetics of extinction risk. Causes of biodiversity loss are explored and approaches to curb the losses. Course Information: Prerequisite: One year of Introductory Biology or Introductory Environmental Science. Ecology recommended.

BIO 471. Advanced Ecology and Evolution. 4 Hours.

Critical review of contemporary ecological concepts, mainly through analysis and discussion of primary references. Course Information: Prerequisite: Introductory Ecology and Evolution.

BIO 475. General Biochemistry. 3 Hours.

This is an introductory one semester course in biochemistry that provides a foundation for the health sciences by investigating the simple molecular components of the cell to the complex dynamics of metabolism, and information transfer. Course Information: Same as CHE 475.

BIO 476. General Biochemistry Laboratory. 2 Hours.

This is a laboratory and supplemental discussion to CHE 475: General Biochemistry. The course will develop a competency with basic biochemical techniques, e.g. protein and DNA preparations. The course will also provide a more in depth coverage to the topics in CHE 475. Course Information: Same as CHE 476.

BIO 481. Human Anatomy and Physiology Lab I. 1 Hour.

This is a Lab section that is to accompany the lecture course BIO 429. Course Information: These courses are meant to be taken concurrently.

BIO 482. Human Anatomy and Physiology Lab II. 1 Hour.

This is a Lab section that is to accompany the lecture course BIO 431. Course Information: These courses are meant to be taken concurrently.

BIO 485. Advanced Biochemistry. 4 Hours.

This is an advanced one semester course in biochemistry that provides an in depth coverage of topics that expand upon the foundations established in CHE 475: General Biochemistry as well as explore developing areas of research in biochemistry. Course Information: Same as CHE 485.

BIO 491. Advanced Cell Biology and Molecular Biology. 4 Hours.

Critical analysis of selected concepts in eukaryote cell and molecular biology, a subject of intense current scientific inquiry. Focuses on modern technology in the study of molecular mechanisms of eukaryote cell functions. Course Information: Prerequisite: BIO 311 or permission of instructor.

BIO 495. General Microbiology. 4 Hours.

Discussion of basic topics in microbial physiology, genetics, and ecology, along with an introduction to virology, immunology, and applied microbiology. Course Information: Prerequisites: One year of introductory biology, one year of introductory chemistry. Elective with lab for BIO majors. Replaces BIO 345/BIO 356.

BIO 496. Advanced Microbiology. 4 Hours.

Selected advanced topics that may vary in response to student need but include aspects of microbial physiology such as growth, metabolism, photosynthesis, and genetics. Independent laboratory project required. Course Information: Prerequisites: BIO 345 or permission of instructor.

BIO 499. Tutorial. 1-12 Hours.

Intended to supplement, not supplant, regular course offerings. Students interested in a tutorial must secure the consent of the faculty member concerned before registration and submit any required documentation to him or her. Course Information: May be repeated to a maximum of 12 hours.

BIO 510. Topics In Biology. 1-4 Hours.

Intensive study of a topic under investigation by contemporary biologists. Description of topic for a given semester will be stated in course schedule. Offered every semester. Prerequisite: Dependent on topic. Course Information: May be repeated if topics vary.

BIO 580. Independent Research. 1-6 Hours.

Student may enroll for 1 to 6 hours of graduate research with the permission of a biology faculty member. Course Information: May be repeated to a maximum of 6 hours.

BIO 599. Tutorial. 1-12 Hours.

Intended to supplement, not supplant, regular course offerings. Students interested in a tutorial must secure the consent of the faculty member concerned before registration and submit any required documentation to him or her. Course Information: May be repeated to a maximum of 12 hours.