

# Department of Biological Sciences

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## Description of Courses

### **BI 101, 102 The Life Sciences 3,3 hours**

This course is designed for nonscience majors. It is a basic study of biological principles involving various plants and animals. A major objective is the presentation of the concept of man in his biological background, as well as his environment and his responsibility to it.

### **BI 111-112 Human Anatomy and Physiology 3-3 hours**

This course is designed for those not majoring in the biological sciences such as nursing and allied health majors. It is a basic study of the structure and function of the human organism, including the cells, tissues, organs, and organ systems. Three hours of laboratory are required each week. Does not apply toward a major or minor in biology.

### **BI 131-132 General Biology 4-4 hours**

A study of the fundamentals of living organisms with emphasis on zoology and botany and their biochemistry, physiology, genetics, systematics, behavior, and ecology. Three hours of laboratory are required each week.

### **BI 201, 202 Principles of Environmental Science 3,3 hours**

A course designed to study the applications of ecological principles to human activities from a global perspective. Current class discussions deal with contemporary environmental issues, maintaining a sustainable environment, and developing positive environmental ethics. The laboratory period includes field trips, guest speakers, films, debates, and more in-depth discussions of specific current issues. May be applied to general education science requirement for nonscience majors and to meet certain state education requirements.

### **BI 204 Introduction to Research 1 hour**

This course is designed to provide the student with the opportunity to study various methods and techniques related to and/or necessary for the development of a research protocol. The student will prepare a research proposal, which will form the basis for his/her undergraduate research. Directed study. Prerequisites: BI 132, CH 142, and MA 211 or MA 171.

### **BI 221 Microbiology 4 hours**

The nature of bacteria and disease-producing organisms with their habits and methods of reproduction and the relationship of these organisms to disease in the human body are studied. Three hours of laboratory are required each week. Does not apply toward a major or minor in Biology. Prerequisite: BI 112

### **BI 230 Plant Biology 3 hours**

A study of phylogeny, structure, reproduction, and photosynthesis, beginning with simple unicellular and proceeding through various levels of complexity to the flowering plant. Three hours of laboratory are required each week. Prerequisite: BI 132.

### **BI 241 General Microbiology 4 hours**

A study of microorganisms as they affect our environment, their relationship to disease in man, plants, and animals, microbial metabolism and genetics, symbiotic associations, and the control of microorganisms where needed. Three hours of laboratory are required each week. Prerequisites: BI 132 and CH 142.

### **BI 280 Histology 3 hours**

The student will undertake the study of the microscopic anatomy of vertebrate tissues and organs, including references to their functions. Three hours of laboratory are required each week. Prerequisite: BI 132.

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## **BI 316 Biological Instrumentation 2 hours**

This course is intended to introduce students to a variety of laboratory instrument and experimental techniques used in some classical experiments that played key roles in the development of modern understanding of the field of biological science. One hour lecture and one hour laboratory demonstration per week. Prerequisites: BI 132, CH 142, and MA 211 or MA 171.

## **BI 321 Genetics 3 hours**

A study of principles of inheritance in all living organisms will be undertaken. Classical, molecular, and non-Mendelian genetics will be studied. Three hours of laboratory are required each week. Prerequisites: BI 132 and CH 312 or BI 241 and CH 311.

## **BI 323 Undergraduate Research 1 hour**

Directed independent research in an approved area. Topics must be chosen, discussed, and approved by the instructor at least one semester prior to the initiation of the study. Prerequisite: BI 204

## **BI 380 Comparative Vertebrate Anatomy 3 hours**

A study of the comparative anatomy of the chordates, with emphasis on the vertebrates. Detailed dissections of the shark, necturus, and cat are made in the laboratory. Three hours of laboratory are required each week. Prerequisite: BI 132.

## **BI 388 Developmental Biology (W) 3 hours**

This course is designed to explore developmental mechanisms of animals. Sea urchin, frog, and chick embryos are used as model animals. Emphasis is on human prenatal development. Topics covered include gametogenesis, fertilization, implantation, transcription factors and gene regulation of developmental induction, and other mechanisms of body systems development. Three hours of laboratory are required each week. Prerequisite: BI 132.

## **BI 401-402 Biology Seminar 1-1 hours**

Oral and written reports on both historical and current biological work as found in the biological literature. The student is expected to become familiar with some significant contributors (both past and present) in a selected field chosen by the student. During the second semester, the instructor will assign topical readings to the student, and students will be required to present an oral and a written report of the assigned readings. Prerequisites: BI 132 and senior standing or permission of the instructor.

## **BI 415 Biostatistics 2 hours**

This is an introductory course on probability theory and statistics. Special emphasis is given to biological applications for sampling, tests of central tendency and dispersion, and experimental design. Prerequisites: MA 211 or MA 171.

## **BI 422, 423 General Physiology 3, 3 hours**

This course is a study of the function, interaction, and regulation of the major organ systems of the human body, with emphasis on biochemical and biophysical processes. Three hours of laboratory are required each week. Prerequisites: BI 132, CH 312, and PH 104.

## **BI 425 General Ecology 3 hours**

A study of the interrelationships between organisms and their environment will be undertaken. Laboratories and field trips are designed to introduce the student to techniques used in basic ecological research. Three hours of laboratory are required each week. Prerequisites: BI 132.

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## **BI 430 Philosophy of Science (W) 2 hours**

A careful, critical study and discussion of both biblical and scientific evidence on origins. Particular emphasis will be given to rational, philosophical, and theological insights as a basis for arriving at a comprehensive understanding of the origins of all things. Prerequisites: BI 132 and senior standing or permission of the instructor.

## **BI 440 Parasitology 3 hours**

A study of the parasitic forms of protozoan, helminthes, and arthropods, their life cycles, controls, and economical, social, and health significance. Three hours of laboratory are required each week. Prerequisite: BI 241.

## **BI 451 Special Topics in Biology 2 hours**

The instructor, on approval of the department chair, at the time of registration will specify the special topics and prerequisites. Topics include, but are not limited to, contemporary issues in basic biology and biomedical fields such as preventive oncology, neurobiology, plant pathology, environmental pollution, gene therapy, and global ecology. Prerequisites: BI 132 and senior standing.

## **BI 455 Immunology 3 hours**

This course is a study of the function of the immune system and its response to antigens, allergens, and self-molecules. Both the humoral and cell-associated systems will be studied. Three hours of laboratory are required each week. Prerequisites: BI 241, BI 321, and CH 312.

## **BI 460 Cellular and Molecular Biology (W) 3 hours**

This course entails a study of cell ultrastructure and physiology as related to the metabolic and functional capabilities of cells. The structure and properties of macromolecules will be studied. Three hours of laboratory are required each week. Prerequisites: BI 321 and CH 312.

## **BI 471 Molecular Genetics 3 hours**

A study of genetics at the molecular level, with emphasis on the interaction of genes, the mechanisms of gene expression and their control, gene mutations and the modes of genetic material repair. Genome mapping and methods of studying genomes will be scrutinized. Three hours of laboratory are required each week. Prerequisites: BI 321 and CH 312.

## **BI 481-482 Human Gross Anatomy I, II 4-4 hours**

Regional human anatomy with emphasis on cadaver dissection. Primarily for pre-medical and pre-dental students. Human Gross Anatomy I covers the upper limb, thorax, and abdomen; Human Gross Anatomy II covers the pelvis and perineum, lower limb, head and neck. It is suggested that courses be taken in sequence. Exceptions will be made for dental students in their last semester. Prerequisites: senior status with GPA of 3.0 or better in the sciences, BI 388 and either BI331 or BI 380; or permission of instructor.

## **BI 484 Mycology 3 hours**

The study of fungi—their morphology, physiology, social and economic importance—is undertaken in this course. Three hours of laboratory are required each week. Prerequisite: BI 241. Offered alternate years.

## **BI 490-491 Research and Independent Study 1-1 hour**

The laboratory or field project must be chosen following consultation with a faculty member who will help the student in preparing the research protocol to be approved by the department's research committee. A minimum of six hours per week in laboratory or fieldwork is required. Approval of the research topic by both the instructor and the research committee must be completed prior to registration for this course. Laboratory or field performance, a written report, and an oral presentation of the findings to the entire faculty will determine course grade. Prerequisites: BI 132, cumulative GPA of at least 3.00 in science and nonscience subjects, consent of the instructor, and approval of the research topic by the department's research committee at least one semester before research is initiated.