HOWARD PAYNE UNIVERSITY

THE SCHOOL OF SCIENCE & MATHEMATICS

BIOLOGY

OVERVIEW

The purpose of the School of Science and Mathematics is to provide programs and coursework to students in the fields of science, engineering, technology, and mathematics. The school also contributes course offerings for HPU's liberal arts and sciences general education curriculum. Undergraduate degrees are offered in the areas of biology, biomedical engineering, biomedical science, chemistry (with concentrations in biochemistry and forensic science), computer information systems, engineering science, information systems management, mathematics and software engineering.

COURSES DESCRIPTIONS

BIO 1101–4609: Special Studies

Special courses not a part of the regular schedule but offered on an irregular schedule.

BIO 1159: Health Professions Seminar

This seminar course is designed to introduce the health professions to students pursuing a career in related fields such as medicine, dentistry, physical therapy, optometry, etc. Students will learn about various programs in Texas including common prerequisites and experience requirements, hear from current health professionals, and explore the application process. The course is developed for freshmen and transfer students considering a career in the health professions. Online. Spring.

BIO 1409: Biological Science

A study of the development of the principle concepts of biology and how they have influenced civilized man; a study of fundamental structure and function of biological systems. Contemporary problems will be discussed. This course is designed for non-science majors. Three hours lecture and two-hour laboratory. Spring or as needed.

BIO 1410: Human Biology

This course is a survey of the human body and its functions. Topics will include the scientific method and how it relates to understanding cells, tissues, organs and human disease. This course is designed for non-science majors. BIO 1410 can be counted toward the general education laboratory science requirement. Three hours lecture and two hours laboratory. Fall, Summer or as needed.

BIO 1439: Environmental Science

A study of the development of the principle concepts of biology and how they have influenced civilized man; a study of fundamental structure and function of biological systems. Contemporary problems will be discussed. This course is designed for non-science majors. Three hours lecture and two-hour laboratory. Spring or as needed.

BIO 1459: General Biology I
An in-depth study of the principles and concepts of biology which apply to all organisms with a focus on cell biology, genetics, and ecology. This course is designed for science majors. Three hours lecture and one three-hour laboratory. Fall.

BIO 1469: General Biology II
This course is a continuation of the in-depth study of the principles and concepts which apply to all organisms with a focus on plants and animals. Field trips will be required. This course is designed for science majors. Three hours lecture and one three-hour laboratory. Spring.

BIO 2114, 3114, 4114: Biology Teaching Assistant Internship
A course designed to give Biology majors teaching experience in a classroom setting under the supervision of a participating instructor. Forty-five (45) hours of service is required and may include time in, preparation before, and clean up after class. Fall, Spring, Summer.

BIO 2120: Global Studies in Biology
This is an experiential learning course that helps students see the global applications and relevance of their major. Students will connect biological concepts to the real world through diverse cultural perspectives. The course may be repeated for credit as long as the travel location has changed. Spring.

BIO 2369: Plant Biology
A study of the physiology, life cycles and diversity within the Plant Kingdom. Topics will cover all areas of plant biology and range from the molecular basis of fruit and seed production to the plants' role in the ecosystem and society. Three hours lecture. Spring, even years.

BIO 2409: Fundamentals of Microbiology
Fundamental concepts of the biology of microorganisms will be taught. Emphasis will be principally on bacteria, fungi, and viruses causing human disease and impacting human health through their effects on the environment. Three hours of lecture and three hours of laboratory per week. Fall.

BIO 2449: Zoology
This course examines the diversity and ecological roles of the animal kingdom. Key topics include taxonomy, anatomy, physiology, development, and behavior of invertebrate and vertebrate animals. This course is designed for science majors. Three hours of lecture and one three-hour laboratory. Fall, odd years.

BIO 2489: Human Anatomy and Physiology I
This course emphasizes the structure and function of cells, tissues, organs, and organ systems, including the integumentary, skeletal, muscular, nervous, and endocrine systems. Three lecture hours and two lab hours per week. Fall, Summer.

BIO 2499: Human Anatomy and Physiology II
Continuation of BIO 2489, including the cardiovascular, lymphatic, respiratory, digestive, and reproductive systems. Three lecture hours and two lab hours per week. Spring, Summer.

BIO 3399: Pathophysiology
This course will provide a conceptual understanding of the pathophysiological progression of diseases in the human body. Spring, odd years.

BIO 3419: Microbiology
An introduction to the structure, function and economic relationship of bacteria, fungi, and viruses. Three hours lecture and three hours of laboratory per week. Spring.

BIO 3429: Cell Biology
A detailed study of the structure and function of cells and cell structures. Regulation and mechanisms will be stressed. Three hours of lecture and three hours of laboratory per week. Spring.

BIO 3438: Genetics
A study of the theories, principles and mechanics of inheritance, including the latest molecular knowledge of DNA and RNA. Three hours of lecture and three hours of laboratory per week. Fall.

BIO 3469: General Ecology

A study of the basic principles of ecology (organisms in relation to environment) and relating these principles to many of the Earth's ecological challenges, using modern and classical ecological studies. Three hours lecture and three hours laboratory per week. Spring, odd years.

BIO 4109: Research Proposal
This course guides students through the development of a formal research proposal, emphasizing literature review, hypothesis development, experiment design, and scientific writing. Students will learn how to evaluate primary scientific literature, identify research gaps, formulate research questions, and design feasible experiments. The course culminates in the preparation of a complete written research proposal suitable for use in subsequent research and thesis courses. Spring.

BIO 4119: Research
A course emphasizing independent investigation, experimental design, collecting and analyzing data and drawing logical conclusions based on the data. Students will propose and conduct a novel independent research project. Fall.

BIO 4211: Senior Thesis and Assessment
This is the culmination of the educational experience for biology majors. Students will demonstrate the ability to communicate about biology by writing a scientific paper, preparing a scientific poster, and giving a scientific presentation over an independent research project completed before entry into the course. By attending and participating in presentations, students will develop skills in listening and questioning. Students will also be assessed on their knowledge about biology and general laboratory skills and competencies. Spring.

BIO 4329: Developmental Biology
A study of how cells differentiate, examining how diverse multicellular organisms develop from one cell into a fully functioning being. also focusing on the process of producing advanced structures such as limbs, hands, and fingers. Three hours lecture per week. As needed

BIO 4349: Medical Entomology

This course focuses on the role of arthropods in human and animal health. Major topics include vector-host interactions, mechanisms of disease transmission, epidemiology of vector-borne diseases, and vector biology and control. This course is designed for science majors. Three hours lecture. Fall, odd years.