

# BIOLOGY (BIO)

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## **BIO 101 Concepts of Biology (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students will learn the basic principles and concepts of biological systems. Emphasis is placed on form and function, biological processes, diversity within and across taxonomic groups, and ecological interactions. Students will examine the fundamentals of biochemistry, cells, genetics, cellular energy, taxonomy, reproduction, evolution, ecology and sustainability. This course includes laboratory exercises designed to reinforce these concepts and their application to modern scientific research. BIO 101 serves as an introductory lab-based biology course for non-majors. Students requiring a full year of college biology should consider BIO 161 and BIO 162. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 102 Human Biology (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students will become familiar with the structures and functions of the human body, recent advances in human genetics, human health and disease, elements of a healthy lifestyle, human reproductive technology and human evolution. Students apply this information as they gain an understanding of human biology and how they can contribute to their own health. The laboratory portion focuses on human structure and function using models, dissections, demonstrations and medical equipment. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 104 Biology of Exercise (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students are introduced to the basic principles of exercise biology, including the physiological responses to acute and chronic exercise, the impact of heat, altitude and other environmental stressors on exercise performance and safety, and the metabolic basis for measurements of oxygen uptake during exercise. The role of each body system in strength and endurance exercise performance will be considered. The relationships between physical activity, body composition, and health will be examined. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 107 Introduction to Field Biology (3 Credits)**

45 lecture, 3 total contact hours

This course is an introduction to the field study of biological systems and biodiversity. Students will explore the techniques and complexities of studying Michigan organisms and ecosystems in an outdoor setting. Topics will include wetland and river habitats, native trees, shrubs and wild flowers, fungi, animal diversity, and ecology. Several off-campus trips will enhance the field experience in addition to exploring the natural areas on campus. As part of this course, students will keep a semester-long field journal on a specific natural area of study. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 109 Essentials of Human Anatomy and Physiology (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students are introduced to the essential elements of human anatomy and physiology. This course surveys the anatomy and physiology of all human body systems. The lab emphasizes those elements of human anatomy that are of special importance to medical fields including radiography and medical billing and coding. It is intended for students entering some programs in allied health. This course will not meet WCC's nursing or physical therapist assistant program admissions requirements. Level I Prerequisite: Academic Reading and Writing Levels of 6; high school biology or BIO 101 or BIO 102 or BIO 162, minimum grade "C"

## **BIO 110 Introduction to Exercise Science (3 Credits)**

45 lecture, 3 total contact hours

In this course, students will be introduced to the field of exercise science. The areas of exercise physiology, motor control, biomechanics, athletic training, and exercise psychology will be presented. Careers open to exercise science students will be explored. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 111 Anatomy and Physiology - Normal Structure and Function (5 Credits)**

60 lecture, 45 lab, 5 total contact hours

In this course students will be given an intensive, in-depth introduction to the structure and function of all the body systems. Course topics include the following systems: integumentary, skeletal, muscular, nervous, cardiovascular, immune, respiratory, urinary, digestive and reproductive. Emphasis is on basic physiological principles, interrelationships among systems, homeostatic mechanisms and introductory disease processes. The laboratory component provides a unique hands-on learning experience for exploration of human body systems with the use of prosected cadavers. In addition, students complete lab exercises to enhance their understanding of basic physiology. Level I Prerequisite: Academic Reading and Writing Levels of 6; high school chemistry or CEM 101 and high school biology or BIO 101 or BIO 102 or BIO 161 or BIO 162; minimum grade "C" all BIO, CEM, and high school requirements

## **BIO 115 Life Science for Elementary Teachers (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students will learn basic scientific principles and methods, fundamentals of biochemistry, cells, genetics, and explore the evolution and ecology of biodiversity. The course will also explore a range of teaching methods and pedagogical resources relevant to elementary science education. This lecture and lab course meets MDE Science Standards for the Preparation of Teachers (PK-6), and is an introductory life science/biology course for students who plan to become elementary (PK-6) teachers. Biology non-majors who are not seeking an elementary education degree should take BIO 101. Biology majors should take BIO 161 and BIO 162. Level I Prerequisite: Academic Reading and Writing Levels of 6

## **BIO 147 Hospital Microbiology (1 Credit)**

15 lecture, 1 total contact hours

In this course, students will be introduced to topics in microbiology involving human health and disease. Biological characteristics of bacteria and viruses are described and selected pathogens are discussed. The innate and adaptive defenses of the human body against microbial pathogens are described. The course also discusses appropriate use of antimicrobics and public health efforts to control pathogens, including vaccination and infection control. Level I Prerequisite: Academic Reading and Writing Levels of 6

**BIO 161 General Biology I Ecology and Evolution (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, biology majors are given a detailed study of the concepts and evidence in evolutionary biology, an inclusive look at modern systematics and taxonomic organizations of all living organisms, an in-depth examination of the biological features (anatomy, physiology, and behavior) of all major groups of living things, and the application of these concepts into ecological systems. Basic concepts of genetics will also be covered. This course is part of a two-course sequence which serves as a comprehensive, year-long sequence for biology majors which can be completed in any order. Level I Prerequisite: Academic Reading and Writing Levels of 6; Academic Math Level 3; high school biology or high school chemistry or high school environmental science or BIO 101 or CEM 101 or ENV 101; minimum grade "C" all BIO, CEM, ENV and high school requirements

**BIO 162 General Biology II Cells and Molecules (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course for biology majors, students are provided an introduction to the basic principles of biology and their practical applications. Topics include chemistry, cell biology and energetics, classical and molecular genetics and gene expression. Basic concepts of development, ecology, evolution and sustainability issues will be covered. Students will read and discuss scientific literature, write two formal lab reports and a short paper and complete relevant lab exercises, including an inquiry-based experiment. This course is part of a two course sequence that serves as a comprehensive, year-long sequence for biology majors and other interested students. Level I Prerequisite: Academic Reading and Writing Levels of 6; Academic Math Level 3; high school biology, or high school chemistry, or high school environmental science or BIO 101 or CEM 101 or ENV 101; minimum grade "C" all BIO, CEM, ENV and high school requirements

**BIO 174 BIO Co-op Education I (1-3 Credits)**

120 to 360 clinical/other, 1 to 3 total contact hours

Co-op courses provide students with worksite skills and experiences in an approved, compensated position related to their chosen field of study. Together with an instructor, an employer, and the Workplace Learning Center, the student determines work assignments and learning objectives to connect learning with career-related work experience. Co-op experiences are coordinated by the Workplace Learning Center in conjunction with WCC faculty and cooperating employers. Registration for cooperative education requires attendance at a co-op orientation and the instructor's prior approval. Level I Prerequisite: Academic Reading and Writing Levels of 6; consent required

**BIO 199 Anatomical Studies (1 Credit)**

45 clinical/other, 1 total contact hours

This course provides individualized student experience in cadaver prosection under the supervision of WCC Biology faculty. Included are experiences with enhanced review in anatomy and physiology. Level I Prerequisite: Academic Reading and Writing Levels of 6; consent required

**BIO 201 Physiology of Exercise (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students are introduced to the basic principles of exercise physiology, including the physiological responses to acute and chronic exercise, the impact of heat, altitude and other environmental stressors on exercise performance and safety, and the metabolic basis for measurements of oxygen uptake during exercise. The role of each body system in strength and endurance exercise performance will be considered as well as the effects of regular exercise on health and aging. Level I Prerequisite: Academic Reading and Writing Levels of 6; BIO 109, BIO 110, or BIO 111

**BIO 208 Genetics (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students will explore the basic principles of genetics and their application to viruses, bacteria, plants, fungi, and animals, including humans. Classical and molecular genetic mechanisms are covered. Laboratory experiments demonstrate genetic principles and include classical and molecular techniques. Students who have taken one year of high school chemistry with a lab and earn a grade of "C" or better may have the college-level chemistry prerequisites waived. Level I Prerequisite: Academic Reading and Writing Levels of 6; Academic Math Level 4; BIO 161 or BIO 162, minimum grade "C", or AP BIO score of 4 or 5, or consent required

**BIO 212 Pathophysiology: Alterations in Structure and Function (4 Credits)**

60 lecture, 4 total contact hours

In this course, students are provided with an in-depth introduction to the study of human disease as an alteration of normal anatomy and physiology. This course covers major topics in pathophysiology including etiology, pathogenesis, adaptation and common clinical aspects of disease. Level I Prerequisite: Academic Reading and Writing Levels of 6; BIO 111 minimum grade "B-" and BIO 147 or BIO 237, minimum grade "C-"; BIO 147 or BIO 237, may enroll concurrently

**BIO 215 Cell and Molecular Biology (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students explore the smallest unit of living things, the cell, at the molecular and genetic level. A comparative cellular examination of the three domains of life (Archaea, Bacteria and Eukarya) provides an understanding of similarities of cells, while further study investigates differentiation and variation which leads to the diversity of life. Molecular pathways are dissected in both prokaryotic and eukaryotic cells focusing on their regulation and control. DNA technology, including genetic analysis of genomes, genetic engineering, gene therapy and cloning are also investigated. Laboratory topics focus on cell types and differentiation, enzymatic specificity and control, cellular respiration and DNA/molecular techniques. Level I Prerequisite: Academic Reading and Writing Levels of 6; BIO 161 or BIO 162 and CEM 105 or CEM 111; minimum grade "C" all BIO and CEM requirements

**BIO 225 Tests and Measurements in Exercise Science (3 Credits)**

30 lecture, 45 lab, 3 total contact hours

In this course, students will integrate and apply the principles learned in the prerequisite courses. Students will learn to evaluate the strengths and weaknesses of scientific research in the field of exercise science, gain practical experience and expertise with widely used measuring instruments of physical performance and body composition and may choose to take the external certification examinations for personal trainer and health/fitness instructor. Level I Prerequisite: Academic Reading and Writing Levels of 6; BIO 110 and BIO 111 and BIO 201 and MTH 160; minimum grade "C" for all BIO and MTH requirements; BIO 111 and MTH 160 may enroll concurrently

**BIO 227 Biology of Animals (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students will conduct intensive study of the diversity, general biology, evolution, and environmental relationships of the major animal groups. Students study animals with an emphasis on comparative anatomy and physiology, taxonomy, evolution, behavior, and ecology. Lectures will incorporate interactive discussions and activities that address our current understanding of animal biology. Laboratory topics will focus on taxonomy and anatomy using models, live specimens, behavioral experiments, field work and dissection. This course will include a semester term paper based on formal observations at a zoological park. Level I Prerequisite: Academic Reading and Writing Levels of 6

**BIO 237 Microbiology (4 Credits)**

45 lecture, 45 lab, 4 total contact hours

In this course, students are introduced to the structure and genetics of microbes that have a significant impact on humans. The epidemiology and prevention of infectious disease as well as events involved in immunity and pathogenesis within the body are covered. Finally, the course includes a survey of infectious diseases of major body systems. The lab is an introduction to basic microbiological skills with an emphasis on aseptic technique and scientific reasoning. Level I Prerequisite: Academic Reading and Writing Levels of 6; BIO 101, BIO 102, BIO 109, BIO 111, BIO 161 or BIO 162, minimum grade "C"