

## **BIOLOGY**

### **(NATURAL SCIENCES DIVISION)**

**BIOL-102 SCIENCE FOR LIFE (4 cr.)** This online course will serve as an introductory course for non-science majors. This course will cover the main biological principles and how these relate to daily life. Topics include cell biology, reproduction and genetics, evolution and ecology. Pre-requisite: Math 025 with a grade of 'C' or better or satisfactory math placement. Lab Fee.

**BIOL-120 PLANTS AND PEOPLE (4 cr.)** Fundamentals of plant growth and development are addressed through the study of useful plants. Current and historical uses of plants by cultures around the world with an emphasis on plant form and function, plant diversity and origin of crops.

**BIOL-175 HUMAN BIOLOGY (4 cr.)** Form and function of life using the human organism as the specific example. Topics will include: life, evolution, the human organism in the environment, human ecology, human systems including organization, support and movement, processing and transport, integration and coordination, and reproduction and development. Three hours of lecture and one 3-hour laboratory per week. Pre-requisites: Math015. Lab fee.

**BIOL-180 CONCEPTS IN CELLULAR MECHANISMS (4 cr.)** An introductory course for science majors with emphases on chemical, physical, and biological characteristics of the living organism and its metabolism. Students will acquire a general understanding of the chemistry of life, basic cell structure and function, metabolism, and genetics. Three hours of lecture and one 3-hour laboratory period per week. Pre-requisites: A grade of 'C' or better in MATH 108 or MATH 137 or satisfactory math placement. Lab fee.

**BIOL-181 ECOLOGY, EVOLUTION & DIVERSITY OF LIFE (4 cr.)** An introductory course for science majors examining organismal biology in an evolutionary context, including biodiversity and ecology, structure and function, reproduction, physiology, and morphology of viruses, bacteria, protists, fungi, plants, and animals. Three hours of lecture and one 3-hour laboratory period per week. Pre-requisite: a grade of "C" or better in BIOL 180 or permission of instructor. Lab Fee.

**BIOL-190 DIRECTED STUDY IN BIOLOGY (1-12 cr.)**

**BIOL-192 SPECIAL TOPICS IN BIOLOGY (1-12 cr.)**

**BIOL-202 ZOOLOGY (4 cr.)** A phylogenetic study of the animal kingdom. Beginning with unicellular animals and ending with vertebrates. The course includes the anatomy, physiology, systematics, ecology and evolution of animals. Three hours of lecture and one 3-hour laboratory period per week. Pre-requisite: a grade of "C" or better in BIOL 180 and BIOL 181. Lab fee.

**BIOL-203 BOTANY (4 cr.)** Structure, function and diversity of plants with an emphasis on evolution by natural selection. Three hours of lecture and one 3-hour laboratory period per week. Pre-requisite: a grade of "C" or better in BIOL 180 and BIOL 181. Lab fee.

**BIOL-213 PLANT AND ANIMAL FORM AND FUNCTION (4 cr.)** This course examines the comparative anatomy and physiology of animals and plants in an evolutionary context. Pre-requisite: a "C" or better in biology 181. Lab fee.

**BIOL-250 MICROBIOLOGY FOR HEALTH SCIENCES (4 cr.)** A study of microorganisms causing infectious diseases and contamination of foods. Focus will be on general structure and function of microorganisms, growth, and control through sterilization and antimicrobials. Lab will emphasize growth, identification and aseptic technique. Course does not satisfy requirement for Biology major. Four hours of lecture and one 3-hour laboratory period per week. Pre-requisites: A grade of 'C' or better in MATH 025 or satisfactory math placement and CHEM 105 or equivalent.

**BIOL-252 ANATOMY AND PHYSIOLOGY I (4 cr.)** A one semester introductory course in Human Anatomy and Physiology with emphasis on anatomy. This course focuses on principles of histology and the following body systems: skeletal, muscular, integumentary, nervous, cardiovascular, respiratory, endocrine, immunity, digestion, urinary and reproductive. Four hours of lecture and one two-hour laboratory per week. Pre-requisite: Math 025. Lab Fee.

**BIOL-253 ANATOMY AND PHYSIOLOGY II (4 cr.)** An advanced course in Human Anatomy and Physiology with clinical emphasis in physiology. The course focuses on principles of cytology, biochemistry and the systems listed under the Biology 252. Four hours of lecture and one 2-hour laboratory per week. Pre-requisites: a grade of "C" or better in BIOL 252. Co-requisite: CHEM 105. Lab fee.

**BIOL-280 Pre-Medical Seminar (1 cr.)** A seminar-based course designed to introduce students to the various graduate medical programs, including: physician (MD and DO), dentistry, veterinary, podiatry, optometry, pharmacy, physical and occupational therapy, and physician assistant. Students will discuss current healthcare issues, explore health programs and institutions, and be provided formal assistance as they prepare for programs in medicine. Students will develop strategies for admission, writing personal statements, participating in mock interviews, determining plans for letters of recommendation, and discussing individual credentials for these programs. One hour lecture per week with additional time to be determined by individual needs. Pre-requisites: A "C" or better in ENGL 101 and MATH 025, or satisfactory placement.

**BIOL-290 DIRECTED STUDY IN BIOLOGY (1-4 cr.)**

**BIOL-291 WORKSHOP IN BIOLOGY (1-4 cr.)**

**BIOL-292 SPECIAL TOPICS IN BIOLOGY (1-4 cr.)**

**BIOL-295 PRACTICUM IN BIOLOGY (1-2 cr.)**

**BIOL-296 COOPERATIVE EDUCATION IN BIOLOGY (1-3 cr.)**

**BIOL-299 RESEARCH ASSISTANTSHIP (1-12 cr.)**

**BIOL-301 EVOLUTION (3 cr.)** This course serves as an introduction to evolutionary theory for students in biology, biological education and related fields. Areas that will be covered include: the origins and history of evolutionary ideas, mechanisms that produce genetic diversity, natural selection, methods of phylogenetic analysis, and the evolution of

the primates. Three hours of lecture per week. Pre-requisite: a grade of "C" or better in BIOL 180 and BIOL 181.

**BIOL-307 HUMAN GENETICS FOR HEALTH SCIENCE (2 cr.)** Explores the biological basis of human inheritance, including mechanisms of cell division, DNA replication & repair, and causes & types of common mutations with a focus on the relationship of these processes to human health. Two one hour lectures per week. Pre-requisite: BIOL 253 or BIOL 180 & CHEM 105

**BIOL-312 PATHOPHYSIOLOGY (3 cr.)** The physiological basis of disease. Three hours of lecture per week. Pre-requisite: a grade of C or better in the following: 8 cr of Anatomy & Physiology, 4 cr of Microbiology, 4 cr of CHEM 105 or equivalent, core math or instructor's approval.

**BIOL-314 PATHOPHYSIOLOGY RECITATION (1 cr.)** Designed to grow student learning and increase proficiency at critical thinking and problem solving. Concurrent enrollment in BIOL 312 is required. Graded P/F only.

**BIOL-320 EPIDEMIOLOGY: THE STUDY OF DISEASES IN POPULATIONS (3 cr.)** Basics of epidemiology. Students will learn about infectious diseases and chronic diseases in societies, interpretation of medical literature, and basic statistical methods used in public health. Pre-requisites: Math 108, ENGL 102 and junior standing.

**BIOL-331 ECOLOGY (4 cr.)** Ecological principles of plants and animals; structure and function of the ecosystem; ecological monitoring and management. Three hours of lecture and one 3-hour lab per week. Lab fee. Pre-requisite: a grade of "C" or better in BIOL 202 and BIOL 203. Co-requisite: core mathematics course. Lab fee.

**BIOL-341 GENETICS (4 cr.)** An introduction to genetic mechanisms in animals, plants and microorganisms. Areas covered include transmission genetics and molecular genetics. Three hours of lecture and one 3-hour lab per week. This course is writing integrated. Lab fee. Pre-requisites: A grade of 'C' or better in BIOL 180, BIOL 181 and CHEM 112 and completion of mathematics core.

**BIOL-355 GENERAL MICROBIOLOGY (4 cr.)** The structure, physiology, genetics, and metabolism of microorganisms with emphasis on their diversity and ecology. Microorganisms and their relationship to industry, environment, and disease. Lab will emphasize growth, identification, and laboratory design. Three hours of lecture and one 3 hour laboratory per week. Pre-requisites: A grade of 'C' or better in BIOL 180, BIOL 181 and CHEM 112.

**BIOL-360 DEVELOPMENT BIOLOGY (4 cr.)** A study of vertebrate development. Lectures focus on principles of development and laboratories focus on experimental as well as morphological studies. Two hours of lecture and two 3-hour laboratories per week. Pre-requisite: a grade of "C" or better in BIOL 202. Lab fee.

**BIOL-362 CELLULAR AND MOLECULAR BIOLOGY (4 cr.)** A comprehensive study of cell structure and function with emphasis on cell organelles and the cellular membrane. Included in this course is a detailed examination of the cellular metabolism, the cell cycle, regulation of cell growth and division, cell signaling, and gene expression. Three hours of lecture and one three-hour laboratory session per week. Pre-requisite: a grade of "C" or better in BIOL 180, BIOL 181 and CHEM 112.

**BIOL-390 DIRECTED STUDY IN BIOLOGY (1-4 cr.)**

**BIOL-392 SPECIAL TOPICS IN BIOLOGY (1-4 cr.)**

**BIOL-394 INTERNSHIP IN BIOLOGY (1-12 cr.)**

**BIOL-395 PRACTICUM IN BIOLOGY (1-2 cr.)**

**BIOL-399 RESEARCH ASSISTANTSHIP (1-12 cr.)**

**BIOL-401 MAMMALOLOGY (4 cr.)** The study of mammals, their evolution, natural history, identification of regional mammals, and field techniques for scientific study. The course includes anatomy, phylogenetics, systematics, ecology, practical field and laboratory techniques. Three hours of lecture and one 3-hour laboratory period per week. There will be at least one weekend field trip. Pre-requisite: a grade of "C" or better in BIOL 213. Lab fee.

**BIOL-402 ORNITHOLOGY (4 cr.)** The study of birds, their evolution, natural history, identification of regional birds by sight and sound, and field techniques for scientific study. The course includes anatomy, phylogenetics, systematics, ecology, practical field and laboratory techniques. Three hours of lecture and one 3-hour laboratory period per week. There will be at least one weekend field trip. Pre-requisite: a grade of "C" or better in BIOL 213. Lab fee.

**BIOL-403 ICHTHYOLOGY (4 cr.)** The study of fish, their evolution, natural history, identification of regional fish, and field techniques for scientific study. The course includes anatomy, phylogenetics, systematics, ecology, practical field and laboratory techniques, and management practices. At least three field trips will be held of which two will be all day trips. 3 hours of lecture with one 3-hour lab per week. Pre-requisite: a grade of "C" or better in BIOL 213. Lab fee.

**BIOL-404 ENTOMOLOGY (4 cr.)** The study of insects, their evolution, natural history, identification of dominant insects and field techniques for scientific study. Includes anatomy, physiology, phylogenetics, systematics, ecology, practical field and laboratory techniques. Three hours of lecture and one 3-hour laboratory period per week. Pre-requisite: a grade of "C" or better in BIOL 213. Lab fee.

**BIOL-420 HUMAN DISSECTION (2 cr.)** Students dissect and identify gross anatomy of human cadavers under the supervision of the instructor. Pre-requisite: a grade of "C" or better in BIOL 253.

**BIOL-443 IMMUNOLOGY (3 cr.)** Survey of Immunology and Immunological principles. Concepts include development of the immune system, innate versus acquired immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the major histocompatibility complex and antigen presentation, T cell receptors (genetics, structure, selection), T- and B-cell activation and effector functions, cytokines, adhesion molecules, phagocytic cell function, immune responses to infectious organisms and tumors, autoimmune diseases, and immunodeficiency. Three hours of lecture per week. Pre-requisites: A grade of "C" or better in BIOL 253 and BIOL 250 or BIOL 355.

**BIOL-450 FIELD BOTANY (4 cr.)** A systematic survey of the plant kingdom, from non-vascular to vascular plants, with an emphasis on identification of the regional flora. Two hours of lecture and one 4 hour laboratory period per week. Five all-day field trips are required. Pre-requisite: a grade of 'C' or better in BIOL 213. Lab fee.

**BIOL-480 Pre-Medical Seminar (2 cr.)** A seminar-based course designed to continue the work done in BIOL 280. This course will emphasize a preparation for applications to medical programs and resulting interviews. Students will continue to explore current events in health care and/or medical science. Discussion of individual credentials for medical programs, planning for letters of recommendation, and self-directed professional job shadowing will be included. One hour lecture per week with additional time to be determined by individual needs. Course does not meet senior elective requirement. Pre-requisite: Successful completion of BIOL 280.

**BIOL-490 DIRECTED STUDY IN BIOLOGY (1-4 cr.)**

**BIOL-491 WORKSHOP IN BIOLOGY (1-4 cr.)**

**BIOL-492 SPECIAL TOPICS IN BIOLOGY (1-4 cr.)**

**BIOL-494 INTERNSHIP IN BIOLOGY (1-12 cr.)**

**BIOL-495 PRACTICUM IN BIOLOGY (1-2 cr.)**

**BIOL-496 COOPERATIVE EDUCATION IN BIOLOGY (1-3 cr.)**

**BIOL-499 SENIOR PROJECT AND SEMINAR IN BIOLOGY (1-3 cr.)** Students will conduct and communicate the results of a research project in the Natural Sciences Division. Topics may include the historical, philosophical, cultural and environmental aspects, and the processes of natural science. Requirements of students include satisfactory oral presentation and defense of their research and submission of a written report approved by their advisor to the Natural Sciences Division. Pre-requisite: NS 398.