BIOLOGY (BIOL)

BIOL 103 General Biology: Earth-Keeping 4
Basic concepts of ecology will be presented in sufficient detail to allow an examination of our environmental problems within an ecological worldview. There will be an emphasis on developing stewardship lifestyles. The laboratory will include field studies of terrestrial and aquatic communities and will examine pollution abatement systems. For non-majors only.
Core Category: Natural Science
Corequisites: BIOL 103L

BIOL 103L Earth-Keeping Laboratory 0
Corequisites: BIOL 103

BIOL 104 Human Biology 4
A study of the origin and structure of cells, energy transformation, the structure and function of major organ systems, inheritance, reproduction and development. For non-majors only.
Core Category: Natural Science
Corequisites: BIOL 104L

BIOL 104L Human Biology Laboratory 0
Corequisites: BIOL 104

BIOL 105 Introductory Biology 4
An overview of the major areas of biology. Topics to be covered include cell biology; heredity; protists; plants; diversity of animals; human body systems; ecology; major ecosystems of the world; conservation biology; evolution/natural selection. For non-majors only.
Core Category: Natural Science
Corequisites: BIOL 105L

BIOL 105L Introductory Biology Laboratory 0
Corequisites: BIOL 105

BIOL 130 Special Topics 1-4

BIOL 151 General Biology I 4
Required course for the student interested in majoring or minoring in biology, biological studies, environmental science, or the pre-physical/occupational therapy tracks in exercise science. The course surveys basic concepts of biology with an emphasis on field-oriented disciplines, including ecology, zoology, botany and macroevolution.
Core Category: Natural Science
Corequisites: BIOL 151L

BIOL 151L General Biology: Laboratory 0
Corequisites: BIOL 151

BIOL 152 General Biology II 4
Required course for the student interested in pre-med, majoring, minoring in biology, biological studies, environmental science, biochemistry or the pre-physical/occupational therapy tracks in exercise science. The course surveys basic concepts of biology with an emphasis on lab-oriented disciplines, including cell biology, physiology, genetics and evolutionary mechanisms.
Core Category: Natural Science
Corequisites: BIOL 152L

BIOL 152L General Biology II Laboratory 0
Corequisites: BIOL 152

BIOL 206 Ornithology 4
The biology and natural history of birds. Field work with emphasis on recognition and behavioral observations of local species. May require Saturday field trips.
Core Category: Natural Science
Corequisites: BIOL 206L

BIOL 206L Ornithology Laboratory 0
Corequisites: BIOL 206

BIOL 212 Marine Biology 3
This course is an introduction to marine biology, surveying marine life, marine ecosystems, and human interactions with the sea. Prerequisites : none. Recommended for biology and environmental science majors and other majors with an interest in field biology or marine ecosystems.
Core Category: Natural Science

BIOL 216 Introduction to Microbiology 4
A study of the classifcation and biology of microbes and application of microbiological techniques. The course is intended for biology majors and allied health students.
Prerequisites: BIOL 152 or BIOL 233
Corequisites: BIOL 216L

BIOL 216L Introduction to Microbiology Laboratory 0
Corequisites: BIOL 216

BIOL 230 Special Topics 1-4

BIOL 230B Immunology and Infectious Disease 3
This course is an introduction to the immune system and how it protects from disease, with an emphasis on humans and some reference to other mammals. This is an elective for biology and biochemistry majors, and other majors with an interest in medicine, immunology, and infectious disease.

BIOL 233 Human Physiology & Anatomy I 4
The first course of a two-semester sequence which surveys the human as a functioning organism. The first semester will emphasize the musculoskeletal system, nervous system and senses. The laboratory will emphasize human structure and techniques for studying muscle and nerve function. The course is designed for students in Athletic Training, Exercise Science, Psychology, and Nursing, and as an elective course for Biology students considering graduate work in health professions. Offered in the fall and offered in spring on adequate demand.
Core Category: Natural Science
Corequisites: BIOL 233L

BIOL 233L Human Physiology & Anatomy I Lab 0
Corequisites: BIOL 233

BIOL 234 Human Physiology & Anatomy II 4
The second of a two-semester sequence. Emphasis will be on mechanisms of internal homeostasis, i.e., circulation, nutrition, excretion, etc. Course purpose and format are the same as 233.
Prerequisites: BIOL 233
Corequisites: BIOL 234L

BIOL 234L Human Physiology and Anatomy II Laboratory 0
Corequisites: BIOL 234

BIOL 235 Anatomy and Physiology: Head and Neck Anatomy 4
This course focuses on the study of the anatomical structures of the head and neck. The osteology of the skull, the structure of the nasal cavity and sinuses, the muscles, nerves, and vascular system of the head and neck are introduced.

BIOL 299 Research Experience 1-2
This is an on-ground course that introduces freshmen and sophomore students with a strong interest in biology to mentored laboratory research. Students will participate in a research project in which the faculty member is engaged, in order to develop basic lab skills and increase foundational knowledge in the mentor's area of expertise. Prior approval of the faculty mentor is required.

BIOL 309L Ecology Laboratory 0
Corequisites: BIOL 309W

BIOL 309W Ecology 4
The principles of ecology with some emphasis on their applications to humans. Field projects and laboratory work complement the theoretical considerations. This is a writing intensive course. Three hours lecture, three hours laboratory. Some Required Saturday field trips.
Prerequisites: BIOL 103 or BIOL 151
Corequisites: BIOL 309L

BIOL 310 Animal Physiology 4
An inquiry into the physiological basis of life at the molecular, cellular and systems levels. Physiology of multicellular organisms is stressed with an emphasis on human biology and homeostasis.
Prerequisites: BIOL 152, CHEM 111 or CHEM 121
Corequisites: BIOL 310L

BIOL 310L Animal Physiology Laboratory 0
Corequisites: BIOL 310

BIOL 311 Cell Biology 4
Emphasis will be on the morphology and physiology of the cell. Biological molecules, reactions and cellular energetics will be studied, as well as membranes and the cell surface, cell motility, and cellular synthesis. Lab work will include fluorescence microscopy, cell culture, and cytological and biochemical analyses.
Prerequisites: BIOL 152 or CHEM 122
Corequisites: BIOL 311L

BIOL 311L Cell Biology Lab 0
Corequisites: BIOL 311

BIOL 312 Genetics 4
A survey of genetics, including (1) Mendelian inheritance and variations in chromosomal segregation, (2) microbial genetics, (3) molecular genetics, with an emphasis on human disease, and (4) population and behavioral genetics.
Prerequisites: BIOL 311 and CHEM 122
Corequisites: BIOL 312L

BIOL 312L Genetics Laboratory 0
Corequisites: BIOL 312

BIOL 313 Developmental Biology 3
An introduction to classical and current understanding of embryogenesis and development, with an emphasis on the genetic control mechanisms. Recommended elective for biology majors and other majors with interest in medicine and genetics.
Prerequisites: BIOL 151 and BIOL 152 or Instructor Consent

BIOL 315 Medical Botany 3
A survey of "biologically active" plants and the techniques used to study them and develop new medicines. Topics include pharmacokinetics and drug application procedures, cultural concepts of healing, medicinal, allergenic and poisonous effects of plants, plant sources of new anticancer drugs, foods as medicine and some problems in natural products research. Three hours lecture.

BIOL 316 Techniques in Biotechnology 3
The course will introduce students to a wide range of techniques used in research laboratories. Basic skills will be emphasized with hands-on directed experiences in sterile technique, molecular biology, and laboratory management.

BIOL 320 Environmental Issues 4
This course builds upon principles established in ecology to examine specific environmental issues. Fulfills the Social Justice General Education requirement. Major issues related to environmental degradation will be covered, including problems of policy and management choices.
Core Category: Social Justice
Corequisites: BIOL 320L

BIOL 320L Environmental Issues Laboratory 0
Corequisites: BIOL 320

BIOL 330 Special Topics 1-4

BIOL 340 Medical Parasitology 4
An introduction to the general biology of major parasitic groups, parasitic protozoa, monogeneans, digeneans, cestodes, nematodes, acanthocephalans, and parasitic arthropods of humans and domesticated animals. Lectures will emphasize the morphology, physiology (form and function), life cycles, symptomatology, and pathogenesis of representative taxa from these major parasitic groups. The labs will provide students with an opportunity to identify and study commonly occurring parasites. Emphasis will be placed on the taxonomy, morphology, life cycles, and histopathology of parasites of humans and domestic animals. Overall, the course aims at providing a basic theoretical and practical foundation in parasitology so as to enable students to better appreciate the impact that parasites have on society.
Prerequisites: BIOL 151 and BIOL 152
Corequisites: BIOL 340L

BIOL 340L Parasitology Laboratory 0
Corequisites: BIOL 340

BIOL 344 Molecular Biology 3
This course is designed to provide the science major with a thorough introduction to the biology of nucleic acids. It will cover the theoretical aspects of the field. Topics covered will include molecular cloning, an introduction to genomics, and an in depth study of DNA replication, transcription in prokaryotes and eukaryotes, post-transcriptional events, and translation.
Prerequisites: BIOL 311, CHEM 122 and CHEM 124W
Corequisites: BIOL 345

BIOL 345 Molecular Biology Laboratory 1
This laboratory course provides hands-on experience with common experimental techniques used in molecular biology research such as restriction digestion, PCR, electrophoresis of DNA and protein, DNA purification, gene cloning, bacterial transformation, bacterial culture manipulation, PCR primer design, and the analysis of genomes and genes using the basic online bioinformatics tools. As with a research project, the experiments carried out in this course are organized around a common theme - cloning the gene for lactate dehydrogenase (ldhA), an enzyme involved in metabolism, from its native context in the genome of the Lactobacillus bulgaricus bacterial strain that is used to produce Activia yogurt.
Corequisites: BIOL 344

BIOL 350A Entomology 4
The phyla of the Invertebrates are examined with reference to diversity in taxonomy, morphology and adaptation, with a particular emphasis on insects and consideration of species important in agriculture and medicine. Offered as part of the flexible core on a rotating basis with BIO 350B and 350C. Three hours lecture, three hours laboratory. Saturday trips may be required. Recommended for biology majors and other majors with interest in field biology and evolutionary mechanisms.
Prerequisites: BIOL 151 or Instructor Consent
Corequisites: BIOL 350AL

BIOL 350AL Invertebrate Zoology:entomology Laboratory 0
Corequisites: BIOL 350A

BIOL 350B Vertebrate Zoology 4
The organization, structure and taxonomy of the major groups of the Chordates. Laboratory work focuses on comparison of anatomy of Vertebrates. Application of this discipline to particular research problems will also be made. Offered as part of the flexible core on a rotating basis with BIOL 350A and 350C. Three hours lecture, three hours laboratory. Saturday trips may be required. Recommended for biology majors and other majors with interest in field biology and evolutionary mechanisms.
Prerequisites: BIOL 151 or Instructor Consent
Corequisites: BIOL 350BL

BIOL 350BL Vertebrate Biology Laboratory 0
Corequisites: BIOL 350B

BIOL 350C Vascular Plants 3
A lecture and laboratory course concerning the classification of vascular plants, with emphasis on family characteristics and relationships. Identification and description of local flora, use of keys and manuals, and field recognition will be emphasized. Application to research problems related to agriculture, biodiversity or medicine will be made. Offered as part of the flexible core on a rotating basis with BIOL 350A and 350B. Saturday trips may be required. Recommended for biology majors and other majors with interest in field biology and evolutionary mechanisms.
Prerequisites: BIOL 151 or Instructor Consent

BIOL 395 Field Experience 1-3
Course is Pass/Fail

BIOL 400 Directed Study 1-4

BIOL 417 Evolution, Creation & Organization of Biology 3
An advanced course studying the theoretical base of the origin of biological forms. The course discusses the nature of scientific theory, evolution and creation as theories, biological system theory, the mechanisms of population change, fitness and speciation, and the integration of faith and scientific work.

BIOL 420 Environmental Regulations and Policy 3
The course will survey the history of environmental policy in the United States and give overviews of specific critical areas, such as wetlands, coastal zones, species protection, hazardous waste, and land management. Case studies will allow students to apply their knowledge of science, environmental ethics, and policy to examine modern environmental problems. Three hours lecture. Prerequisites: Minimum grades of C in BIOL 151, and BIOL 309W or consent of instructor. May apply to Political Science major or minor. Offered spring of odd-numbered years.
Prerequisites: BIOL 151 and BIOL 309W or Instructor Consent

BIOL 425 Senior Thesis Literature Review 2
This advanced course involves the selection and approval of a thesis topic, the preparation of a comprehensive literature review, the preparation of a research proposal, and a seminar presentation describing the proposed research project and its relationship to the existing literature. A formal written proposal is submitted at the end of the semester.

BIOL 426 Sr Thesis Directed Research I 2-4
This course involves performing an original experimental research study, analyzing the data, and preparing a written thesis. A seminar will be presented at the end of the semester describing the research findings and the relationship to the existing data in the field of study. Those students who wish to continue the research for another semester may do so in BIOL 427. A second paper and seminar will be required.

BIOL 427 Sr Thesis Directed Research II 2-4
This course involves performing an original experimental research study, analyzing the data, and preparing a written thesis. A seminar will be presented at the end of the semester describing the research findings and the relationship to the existing data in the field of study. Those students who wish to continue the research for another semester may do so in BIOL 427. A second paper and seminar will be required.

BIOL 495 Internship 2-12
Qualified students will be assisted in obtaining laboratory/research positions in industry or academia; positions in parks, zoos, aquariums; or other positions in the student's area of interest. Internships must be approved by the department. Students will complete 40 hours of internship for every credit hour. Journal of experience and term paper are required. Up to 5 credits can apply to biology elective requirement.

BIOL 498 Teaching Assistant 1-3

BIOL 499 Research Assistantship 1-3