BIOLOGY (BIOL)

BIOL 111 - HUMAN BIOLOGY
This course introduces students to basic human biology from molecules and cells to organ systems and even populations. Students will focus on the structure and function of the major human organ systems, including the musculoskeletal, nervous, immune, digestive, cardiovascular, respiratory, urinary, and endocrine systems. Students will also learn about nutrition, human diseases including diabetes and cancer, and genetics. This interdisciplinary course will consider the social implications of current human biological issues.
Credits: 1,3
Attributes: Lab Course, Natural Science
Course Notes: BIOL major no credit

BIOL 112 - ENVIRONMENTAL BIOLOGY
Ecology, evolution and the diversity of life with emphasis on practical environmental consequences of human activities. Laboratory focuses on open-ended student experimental projects. Field trips to sites of interest. Lecture, discussion, and laboratory. Not for major credit in biology.
Credits: 1,3
Attributes: Lab Course, Natural Science
Course Notes: BIOL major no credit

BIOL 113 - THE NATURE OF SCIENCE
An exploration of scientific inquiry and how it is used to study the natural world and solve problems. Contemporary issues such as climate change, biodiversity and public health are the basis of class activities and discussions. Students gain experience with scientific methodology and practice, find and evaluate information about science and medicine, analyze scientific data, and examine the role of science in a social context. Fulfills general education requirements for natural science. Non laboratory course.
Credits: 3
Attributes: Natural Science
Course Notes: or higher. No credit for science majors.

BIOL 118 - CAREERS IN HEALTH SCIENCES
Credits: 1

BIOL 123 - ANATOMY &PHYSIOLOGY I
Anatomy & Physiology I covers the integumentary, skeletal, muscular and nervous systems, including the link between the structure and function of various organ systems. The primary underlying principle discussed is homeostasis, and for each system various pathological conditions and their causes will also be discussed. Material taught in lecture will be reinforced in laboratory using student designed experiments, demonstrations, and a detailed study of models and preserved specimens.
Credits: 1,3
Attributes: Lab Course, Natural Science
Prerequisites: MATH 096 or MATH 010
Course Notes: Must take BIOL 123 lecture and lab concurrently

BIOL 124 - ANATOMY &PHYSIOLOGY II
Anatomy & Physiology II covers the endocrine, circulatory, lymphatic, respiratory, digestive, urinary and reproductive systems, including the link between the structure and function of the various organ systems. The primary underlying principle discussed is homeostasis, and for each system various pathological conditions and their causes will also be discussed. Material taught in lecture will be reinforced in laboratory using student designed experiments, demonstrations, and a detailed study of models and preserved specimens.
Credits: 1,3
Attributes: Lab Course
Prerequisites: (MATH 096 or MATH 010) and BIOL 123
Course Notes: Must take BIOL 124 lecture and lab concurrently.

BIOL 151 - INTRODUCTION TO BASIC SCIENTIFIC INQUIRY
This course introduces students to current concepts and basic techniques in modern biology. Students will also be introduced to the scientific literature, writing short science reports, critical thinking, and the opportunity to work with at least five biology faculty in laboratory or field environments.
Credits: 1-3
Attributes: Natural Science
Course Notes: Science Summer Bridge Program - must have advisor approval to register.

BIOL 201 - ORGANISMIC BIOLOGY
Biological principles relating to organism level of complexity. Tissues, organs, and organ systems in structure and function; development; physiology; and introductory genetics. Lecture, laboratory, and discussion.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: MATH 121

BIOL 202 - ECOLOGY, EVOLUTION, AND GENETICS
Biological principles relating to population levels of organization. Topics include introduction to ecology and the biosphere, mechanisms of evolution and introductory genetics. Lecture, laboratory, and discussion.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: MATH 121 and CHEM 201

BIOL 221 - KINESIOLOGY
Kinesiology is the study of human movement with a focus on the mechanisms of movement and how the human body responds to movement and exercise. This course will provide an overview of the three major components of kinesiology: Exercise Physiology, Biomechanics, and Motor Control and Development. Topics include an introduction to exercise-induced stress effects on the body and organ systems, musculoskeletal biomechanics, regulation and control of muscles by the nervous system and how these systems develop from birth to adulthood.
Credits: 3
Attributes: Natural Science
Prerequisites: (BIOL 123 and BIOL 124) or BIOL 201

BIOL 242 - ANIMAL BEHAVIOR
Evolutionary, developmental and environmental bases of animal behavior. Emphasis on birds and mammals. Communication, decision-making, motivation, learning, memory, social behavior, and mating systems. See Psych 242.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 201 or BIOL 202
Course Notes: Students with BIOL 111 or PSYC 103 may take the course with instructor's consent.

BIOL 301 - CELLULAR &MOLECULAR BIOLOGY
Biological principles relating to cellular and subcellular levels of organization. Topics include introductory biochemistry, cell biology and ultrastructure, and cell physiology. Laboratory includes cloning methods. Lecture, laboratory, and discussion.
Credits: 2-5
Attributes: Lab Course, Natural Science
Prerequisites: CHEM 210 or CHEM 211

BIOL 304 - HISTOLOGY & ULTRASTRUCTURE
Histology is the study of the microanatomy of cells, tissues, and organs as seen through a microscope. It examines the correlation between structure and function.This course will discuss preparation of tissues for microscopic examination, different types of microscopy, immunohistochemistry, and interpretation of tissue sections.
Credits: 2,3
Attributes: Lab Course
Prerequisites: (BIOL 123 and BIOL 124) or BIOL 201
Course Notes: or instr. consent.

BIOL 314 - QUANTITATIVE ECOLOGY AND CONSERVATION
Designing ecological experiments to answer critical questions about ecology, ecosystem processes and conservation. This course will be completely hands-on and skill-based with a focus around experimental designs, experimental manipulation, some statistical analyses, field and laboratory exercises, and writing. Discussions will review ecological processes. Laboratory.
Credits: 1-5
Attributes: Lab Course, Natural Science
Prerequisites: MATH 217 and BIOL 202

BIOL 315 - ECOLOGY
Interactions among organisms and between organisms and the environment. Population growth, competition, predator-prey relationships, mutualism, species diversity, dispersal, succession, nutrient cycles, and energy flow through ecosystems. Lecture, discussion, and field projects.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 202 and MATH 217 (may be taken concurrently)

BIOL 318 - BIOSTATISTICS
Design, analysis, and interpretation of biological data using statistics.
Credits: 3
Prerequisites: MATH 217 and (BIOL 202 or BIOL 301)
Course Notes: Or instructor consent.

BIOL 322 - BOTANY
Study of the major plant groups, their classification and taxonomy, the anatomy used to identify species. Ethno-botanical importance (e.g. medicinal uses), anatomy, morphology and ecology of plant species will be emphasized. Ecological and economic importance of weedy and invasive species in an ecosystem context will be discussed. Principles of classifying seed plants by families will be introduced in the field and in the herbarium at The Field Museum.
Credits: 4
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 201 or BIOL 202

BIOL 323 - TROPICAL MARINE BIOLOGY
Exploration of tropical habitats, both marine and terrestrial, in terms of basic biology and ecology and current threats due to development. Emphasis is on coral reefs, including snorkeling of the second largest barrier reef in the world off Ambergris Caye in Belize, with opportunities to observe diverse wildlife in the field. Terrestrial field trips include beaches, mangrove swamps, and tropical deciduous forests. Visits to Mayan ruins and the Belize Zoo on the mainland emphasize local cultural ties to the environment.
Credits: 2
Attributes: Lab Course, Natural Science, Travel Based Study
Prerequisites: BIOL 324 (may be taken concurrently)
Course Notes: One prior college science course required or consent of instructor.

BIOL 324 - MARINE BIOLOGY
Physical forces, biodiversity, organismal function, and ecological interactions that form marine environments. The principles of cell biology, organismic physiology, biomechanics, and ecology applied to marine biological problems.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 201 or BIOL 202 or BIOL 112
Course Notes: One prior college science course with a min grade of C required

BIOL 325 - VIROLOGY
This course is an overview of the fundamental principles of modern virology. The main focus will be on viral replication strategies and structure as it relates to the pathogenesis of and host immune response to infection. Special attention will be paid to current research being done on clinically relevant human viruses.
Credits: 3
Prerequisites: BIOL 301

BIOL 326 - EPIDEMIOLOGY
This course provides an introduction to the principles, methods, and applications of epidemiology in public health. Students will explore the distribution, determinants, and prevention of diseases and health conditions in populations. Emphasis will be placed on understanding the role of epidemiology in disease surveillance, study design, data interpretation, and the evaluation of public health interventions.
Credits: 3
Prerequisites: MATH 217

BIOL 330 - PHYSIOLOGY: MECH. & DISORDERS
Learning to approach human physiology from a medical perspective. This course covers the basic systems of the human body through a focus on case studies and medical applications, focusing on the functions and disorders of the digestive, reproductive, circulatory and nervous systems.
Credits: 3
Attributes: Natural Science
Prerequisites: (BIOL 111 or BIOL 112 or BIOL 201) and (CHEM 100 or CHEM 101 or CHEM 201)

BIOL 331 - ADVANCED PHYSIOLOGY LAB
This online lab course will reassess previously learned physiological processes in a clinical and practical approach. New skills will be learned in physical assessment, collection of physiological data and interpretation of that data outlined in a patient report. Students will utilize critical thinking skills to analyze primary literature to support lab topics. And lastly, in a final project, students will investigate a physiological process of their choice and report findings.
Credits: 3
Attributes: Lab Course
Prerequisites: (BIOL 123 and BIOL 124) or BIOL 430
Course Notes: Students are expected to have a "patient" available to them who consents to undergo common at-home medical tests and examinations.

BIOL 332 - ECOLOGY OF TALLGRASS PRAIRIE
Prairies have been described as the most endangered ecosystems in North America. This is a field-oriented introduction to prairies, including exploration of unique ecological processes found at the population, community, and ecosystem levels. Special attention will be given to prairie plants, insects, soils, endangered species, and prairie restoration.
Credits: 4
Attributes: Natural Science
Prerequisites: BIOL 112 or BIOL 202
Course Notes: Includes offsite field trips.

BIOL 336 - INTRODUCTION TO NEUROSCIENCE
Complex behaviors are possible because of the brain. Our goal is to understand this complex organ and how it functions to allow for human behavior. Fundamental neural systems (such as sleep and motivation), higher cortical functioning (such as language and attention), and brain plasticity will be covered.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 123 or BIOL 124 or BIOL 201

BIOL 337 - NUTRITION IN AMERICA
This course will look at our understanding of nutrition and its effect on the body through the lens of the dual epidemics of obesity and food insecurity in America. Students will learn about epigenetc, microbiome and physiological effects of diet through primary and secondary literature and group projects. Students will also learn about the challenges involved in combating food insecurity and improving the American diet through a service-learning component.
Credits: 3
Attributes: Natural Science
Prerequisites: (BIOL 301 (may be taken concurrently)) and (BIOL 123 (may be taken concurrently) or BIOL 201 (may be taken concurrently))

BIOL 339 - EVOLUTIONARY PHYSIOLOGY
Learning to approach animal physiology from an evolutionary perspective. This course covers mechanisms by which animals perform life-sustaining functions, the evolution and adaptive significance of physiological traits, the diversity of physiological mechanisms, and how physiology and the environment interact. Laboratory involves dissection and study of physiological traits in a variety of different animals as well as experiments on the adaptive significance of traits.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 201 or (BIOL 123 and BIOL 124)

BIOL 350 - CANCER BIOLOGY
This course provides students with knowledge of the fundamental principles of the molecular and cellular biology of cancer cells. Biology of Cancer is designed to illustrate basic aspects of cancer development, and to discuss how molecular genetic approaches can be used to reveal fundamental processes of carcinogenesis. Lectures and demonstrations explain the role of growth factors, oncogenes, tumor suppressor genes, angiogenesis, and signal transduction mechanisms in tumor formation. Discussion of aspects of cancer epidemiology, prevention, and principles of drug action in cancer management is part of the course.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 301
Course Notes: or equivalent.

BIOL 351 - GENERAL GENETICS
Classical and molecular genetics. Transmission genetics, chromosome genetics, interaction of genes with sex and environment, mapping, DNA structure and replication, transcription, translation, chromosome structure and genome organization, extrachromosomal inheritance, mutagenesis, gene expression. Genetics of plants, insects, vertebrates, fungi, bacteria, and viruses.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 201 and BIOL 202 and BIOL 301
Course Notes: Must register for BIOL 351 lecture and lab in same semester.

BIOL 356 - DEVELOPMENTAL BIOLOGY
Basic principles and processes of embryology and development; selected invertebrates, vertebrates, and plants.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 301

BIOL 358 - CELL BIOLOGY
Molecular interactions that provide the foundation for the structure and functions of the cell. Topics include protein structure and function, membrane transport, post-translational modifications of proteins and protein secretion, cell cycle regulation, cell signaling and mechanisms of development and differentiation. Laboratory techniques include SDS-PAGE, cell fractionation, bacterial protein expression and purification, and immunohistochemistry. Included in the biotechnology certificate program. Lecture, laboratory and discussion.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 301
Course Notes: or Instr.consent.

BIOL 360 - MICROBIOLOGY
Structure and function of prokaryotic cells, including metabolic and genetic diversity; emphasis on differences and similarities with eukaryotes. Roles microbes play in human body, soil, and water ecosystems. Special emphasis on human diseases and microbial processes for the maintenance of biosphere. Applications to medicine, biotechnology, food processing, agriculture, pollution control. Laboratory includes proficient and safe handling of microorganisms, identification of unknown bacteria, and biochemical and microscopic methods. Included in the biotechnology certificate program.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 301

BIOL 363 - GENOMICS & APPLIED BIOINFO
The advent of high throughput techniques in biology and chemistry requires a data mining approach to discover new knowledge form these large data sets. Data mining techniques allow an investigator to understand the collection of data and then to classify and/or make predictions form the data. It is a combination of statistical, informatic and other analytical techniques. This course is designed to be an introduction to data mining techniques for biologists. Examples will be drawn from genomic, proteomic and epidemiologic data sets.
Credits: 3
Prerequisites: BIOL 301

BIOL 367 - IMMUNOLOGY
Humoral and cellular immune responses, generation of immune diversity, autoimmune and immunodeficiency diseases. Immunologic assays relevant to clinical settings. Laboratory techniques include antibody-antigen interactions, ELISA, and the purification of lymphocyte populations. Included in the biotechnology certificate program. Lecture, laboratory, and discussion.
Credits: 2,3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 301

BIOL 369 - CONSERVATION BIOLOGY: AFRICA
Conservation Biology—Tropical Africa is a 10 day, field-based course that will largely be carried out in the Amani Nature Reserve, Tanzania, where Dr. Norbert Cordeiro (Roosevelt University) and Dr. Henry Ndangalasi (University of Dar es Salaam, Tanzania) have been working since 1998. Field work will include (i) conducting applied ecological studies relevant to conservation in the area, (ii) discussing and problem-solving issues of poverty and conservation affecting human access to resources, (iii) meeting with Tanzanian stakeholders to gain an appreciation of the complexities of the solutions required to conserve one of the world's most important forests. Students will also spend 2 days in a savannah habitat at one of Tanzania's premier national parks. This course will involve designing ecological experiments, experimental manipulation, statistical analyses, intensive field and laboratory exercises, and scientific report writing.
Credits: 3
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 202

BIOL 381 - BIOLOGY OF BIRDS: ORNITHOLOGY
This is a hands-on course in the study of birds, from basic biology, to evolution, taxonomy, anatomy, ecology and behavior. There will be labs at the Field Museum using real specimens, and the exploratory field work component will include bird identification skills and bird ecology and behavior. Using a combination of lectures and invited speakers, students will build a firm and solid foundation on bird behavior, ecology and evolution, which will include a plethora of field techniques and laboratory skills.
Credits: 4
Attributes: Lab Course, Natural Science
Prerequisites: BIOL 202

BIOL 383 - SPECIAL TOPICS IN BIOLOGY
Discussion and critical review of contemporary issues in biology and biomedical sciences based on student and instructor interests. Discussions are intended to foster thought and exploration of solutions to problems in health care, biological research, and approaches to combat health disparities.
Credits: 3
Attributes: Natural Science
Prerequisites: BIOL 301

BIOL 391 - MEDICAL INTERNSHIP
Off-campus experience at area medical facility. Rotation through at least five medical specialties at a hospital or an approved medical or biomedical research or clinical facility. At least 12 contact hours.
Credits: 1-6
Course Notes: Approval of pre-professional advisor.

BIOL 392 - RESEARCH IN BIOLOGY
Independent science laboratory research experience under the guidance of a faculty researcher; 1 to 4 semester hours total may be applied toward the BS degree. Students may register in consecutive semesters.
Credits: 1-4
Attributes: Natural Science
Course Notes: Consent of instructor. $100 per semester hour. Students must arrange for independent laboratory research experience with a science faculty member prior to registration.

BIOL 395 - INDEPENDENT STUDY
Independent library research culminating in a formal review paper on a topic approved by the instructor.
Credits: 1-4
Attributes: Natural Science
Course Notes: Consent of instructor. Students must arrange for a library independent study with an instructor prior to registration; may register for only 1 SH per semester up to two semesters.

BIOL 396 - BIOLOGY INTERNSHIP
Internship off-campus related to the biological sciences. A maximum of 3 SH can be taken.
Credits: 1-4
Attributes: Natural Science
Course Notes: Approval of science advisor.