Biology Course Descriptions

100. INTRODUCTION TO BIOLOGY. - 3:2:2
A one-semester course dealing with biological principles and designed primarily for the non-major. Topics include organization of living matter, metabolism, reproduction, genetics, evolution and ecology. Two lectures and one two-hour laboratory per week. This course is designed for non-biology majors and can satisfy the General Education Natural Science requirement and can not be used as an elective for Biology majors. Students may not take both Biology 100 and Biology 101 or 102 for the Natural Science requirement. Three (3) credits.

101-102. GENERAL BIOLOGY. - 4:3:3
An introduction to the study of life with emphasis on basic concepts: energy relationships, cell biology, physiology, genetics, development, ecology, and evolution. Also, some attention is given to taxonomy and morphology of organisms. Three lectures and one three-hour laboratory each week. Must be taken in sequence. Students may not take both Biology 100 and Biology 101 for the Natural Science requirement. Credit, four hours each semester.

103. HUMAN BIOLOGY. - 3:2:2
This course introduces fundamental biological and scientific principles to non-science majors by studying the structures, actions and processes of the human body. Attention will be paid to structure and function of organs and organ systems as well as diseases of the human body such as cancer, heart disease and infections. Credit, four hours. Three hours of lecture and one 2-hour lab per week. This course is designed for non-biology majors and can satisfy the General Education Natural Science requirement and can not be used as an elective for Biology majors. Three (3) credits.

105. BASIC ECOLOGY. - 3:2:2
The study of the fundamental relationships between the living and non-living worlds, with special emphasis on man's place in nature. This course is designed for non-biology majors and can satisfy the General Education Natural Science requirement and can not be used as an elective for Biology, Agriculture, or Natural Resources majors. Two lectures and one 2-hour lab per week. Three (3) credits.

107. HUMAN HEREDITY. - 3:2:2
An exploration of the principles of genetics as they apply to human beings. Includes patterns of inheritance, population genetics and the impact of genetic engineering on society. This course is designed for non-biology majors and can satisfy the General Education Natural Science requirement and can not be used as an elective for Biology majors. Three hours of lecture and one 2-hour lab per week. Three (3) credits.

110. ESSENTIAL TOPICS IN BIOLOGY. - 4:3:3
This course exposes students to elements of Biology that are critical for understanding the fundamental concepts that are required for K-8 educators. Instructional methods will emphasize critical thinking and development of reasoning skills in addition to mastery of content areas and understanding science as an active process. Investigative laboratory exercises will reinforce lecture topics; additionally, they will provide elements directly applicable in a K-8 educational setting. Three lectures and one three-hour laboratory each week. Credit, four hours.

111. HUMAN DISEASES. - 3:2:2
A survey of the types and causes of human diseases. The course will cover both acute and chronic disease states. Three hours of lecture and 2 hours of lab per week. This course is designed for non-biology majors and can satisfy the General Education Natural Science requirement and can not be used as an elective for Biology majors. Three (3) credits.

191-192 UNIVERSITY SEMINAR IN BIOLOGY. - 1:1:0

University Seminar is a two semester, general education course sequence designed to provide students with the essentials for a smooth transition to college life and academic success. Academic skills will be developed. These skills include critical reading, thinking, listening, writing, speaking, and using the library, the Internet and word processing. Values clarification, coping with peer pressures and the impact of a healthy lifestyle will be addressed. Opportunities will be provided for self-evaluation and growth in basic learning strategies as well as personal and career goals. Knowing the history of the University, feeling connected to the institution, and sharing a common educational experience with other freshmen are important goals of this course.

194 INTRODUCTION TO BIOLOGY PROFESSIONS. - 1:1:0
This course will introduce students to the wide variety of professions open to students with Biology or Forensic Biology degrees. Students will examine their strengths and talents and explore possible career paths. The course will utilize presentations, guest lecturers and reflective assignments to help students determine their optimal educational path. One classroom hour per week. One credit.

200. INVERTEBRATE ZOOLOGY. - 3:2:2
A course designed to introduce the student to the major invertebrate phyla with attention given to taxonomy, morphology, physiology, ecology, and evolution. Two lectures and one two-hour laboratory period per week. Prerequisite: Biology 101-102. Credit, three hours.

205. ECOLOGY. - 4:3:3
The study of organisms in relation to their environment. Three one-hour lectures plus one three-hour lab per week. The course includes weekend field trips. Prerequisites: Biology 101 102, or consent of instructor. Credit, four hours.

207-208. ANATOMY AND PHYSIOLOGY II & I. - 4:2:4
A course designed to provide students with basic knowledge of the structure and function of the human body. Four one-hour lectures and one two-hour laboratory periods per week. Prerequisite: demonstrated knowledge (grade of B or higher) in high school biology and chemistry. Must be taken in sequence. A grade of "C" or better in 207 is required to enroll in 208. Primarily designed for pre-Nursing majors, not an acceptable Biology elective. Credit, four hours each semester.

210. GENETICS. - 4:3:3
A study of the fundamental principles of inheritance and their application to plants, animals, and microorganisms. Three lectures and one three-hour laboratory period per week. Prerequisites: Biology 101-102. Credit, four hours.

215. CELL BIOLOGY. - 4:2:4
A study of basic and essential processes of cells with emphasis on the correlation of structure and function at the organelle and cellular levels. Two lectures and two two-hour laboratory periods per week. Pre-requisites: General Biology 101-102. Credit, 4 hours.

221. FUNDAMENTALS OF MICROBIOLOGY. - 4:2:4
A study of the taxonomy, physiology, morphology, and cultivation of microorganisms with special emphasis on the relation of bacteria to the health of humans, animals, and plants. Primarily designed for pre-Nursing majors, not an acceptable Biology elective. Must be eligible for acceptance into Nursing program (GPA = 2.8) and passed both 207 and 208 with grade of C or better. Two lectures and two two-hour laboratory periods per week. Credit, four hours.

225. SURVEY OF FORENSICS. - 3:3:0
This serves as a gateway course for the students who are interested in pursuing a major or minor in Forensic Biology. The course will employ hands on learning activities, group work and the traditional lecture format to convey the course material. This course will begin with an overview on the field of Forensic Science and specialty areas in the field, i.e. Forensic pathology, entomology, etc. The general principles of crime scene investigation, collection and handling of evidence and chain of custody will be discussed in detail as students need to understand the basic legalities of forensic investigation. This course will also explore the different field and career opportunities in forensic. Credit, four hours.

250. FORENSIC AND INVESTIGATIVE BIOLOGY LAB. - 3:2:4
This course is a hands-on lab that will introduce students to the biological and laboratory aspects of forensic and investigative science including blood typing, DNA extraction and fingerprinting, hair and fiber analysis, time of death determination, the use of the microscope, drug/alcohol and toxicology testing. Labs include DNA fingerprinting, hair and fiber analysis, blood and saliva

testing, human bone and muscle identification. Prerequisites: Biology 101,102,210. Credit, three hours.

261. CALCULUS FOR LIFE SCIENCES. - 4:4:0
Topics include biological and physical applications requiring the knowledge of functions, graphing functions, an introduction to limits, continuous functions, rate of change, derivatives, implicit differentiation, maximum and minimum points, and their applications, exponential and logarithmic functions and development and application of the definite integral, trigonometric and hyperbolic functions, and techniques of integration. Includes an Extended Life Science Connection and use of the computer package, Maple, to perform symbolic, numerical and graphical analysis. Prerequisite: Math 122. Credit, four hours.

299. SOPHOMORE SEMINAR - SCIENTIFIC LITERATURE. - 1:1:0
A required course for all Biology majors, this seminar course exposes students to scientific literature and emphasizes comprehension and oral presentation of the material in scientific papers. One hour class per week. Prerequisites: Biology 101, 102, 191, 192. Sophomore standing. Credit, one hour.

301. PROBLEMS IN BIOLOGY. - "Variable" credit.
An opportunity to pursue independent study and research. May be elected in any semester with consent of the instructor. Credit, one to three hours per semester. Can be used to substitute for Senior Capstone I (23-451) at 1 credit when taking a summer internship. Prerequisite: Junior Standing.

302. COMPARATIVE VERTEBRATE ANATOMY. - 4:2:4
A comparative study of the vertebrate classes with emphasis upon structure development, evolution of the organs, and organ systems. Two lectures and two two-hour laboratory periods per week. Credit, four hours.

305. DEVELOPMENTAL BIOLOGY. - 4:3:3
A study of embryonic development with special emphasis on the frog, chick, pig and human showing the dynamic relationship between genetics and tissue environment in forming a complete multi-cellular organism of differing tissues from a single cell. Credit, four hours.

307. PRINCIPLES OF PHYSIOLOGY. - 4:3:3
This class presents an in depth overview of the principles of human physiology with a focus on the mechanisms of physiological processes. This course is designed for students who are planning careers in biology or the health professions, and who are preparing for entry exams such as the MCAT or GRE. Three hours of lecture and three hours of laboratory per week. Credit, four hours.

310. MOLECULAR BIOLOGY. - 4:3:3
A basic study of the principles of molecular biology including recombinant DNA technology and other approaches and methodologies used in investigating prokaryotic and eukaryotic cellular structure, development, chromosome organization, gene expression, and gene regulation. One three-hour lecture, one three-hour laboratory per week. Credit, four hours.

311. NEUROSCIENCE. - 4:3:3
A basic study of the nervous system for students who are preparing for careers in biological, medical, or psychological sciences. Topics include: central nervous system (brain and spinal cord), peripheral and autonomic nervous systems, neurons, nerve pathway, transmission of information, and reflexes. Three lectures and one three hour laboratory period per week. Credit, four hours.

315. BEHAVIOR. - 4:3:2
An exploration of the diversity of behaviors exhibited by organisms including the physiological bases, the role of heredity and learning, and the ecological and evolutionary significance of behaviors. Three one-hour lectures and one two-hour laboratory per week. Credit, four hours.

317. PRINCIPLES OF VIROLOGY. - 3:2:4
A comprehensive course covering the involvement of plant and animal viruses in disease processes and includes: classification of viruses, differences between animal and plant viruses, virus cultivation, virus replication, virus entry, virus assembly, and virus vectors. Two one-hour lectures and one 2- hour lab per week. Credit, three hours.

321. BIOSTATISTICS. - 3:3:0

A study of the application of mathematics and statistics to the life sciences. Three one-hour lectures per week. Prerequisites: One year of college mathematics. Credit, three hours.

322. MICROBIOLOGY. - 4:3:3
A comprehensive course covering the involvement of microorganisms in disease processes. This includes coverage of the relationship between host and pathogen, opportunism, the basic functions of the immune system, molecular mechanisms of pathogenesis and a significant section on the biology of viruses. Three hours lab and three hours lecture per week. Credit, four hours.

352. HISTOLOGY. - 4:2:4
A detailed study of the microscopic anatomy of vertebrate tissues and organs including laboratory practice in the preparation of histological slides. Two lectures and two two-hour laboratory periods per week.

355. FORENSIC DNA INVESTIGATIONS. - 4:2:4
This course will examine the theories and current practices used in criminal investigations and legal proceedings to collect, analyze and interpret biological evidence using molecular biology with emphasis on forensic DNA analysis. Prerequisites: 23-101, 23-102, 23-210, 23-215 Credit 4 hours

370. HUMAN ANATOMY. - 3:3:3
Human Anatomy is designed to provide students in pre-professional and paraprofessional health fields with a background for further study toward their health profession. This course will lay a foundation of the structure of the human body as well as familiarity with the medical terminology relevant to function in the health industry. It is highly recommended to be accompanied with the “sister” course of Principles of Physiology to provide a comprehensive view of human body functions.

399. JUNIOR SEMINAR – SCIENTIFIC WRITING. - 1:1:0
A required course for all Biology majors, this seminar course exposes students to basic elements of scientific writing and gives them the opportunity to practice writing basic scientific papers and reports. Prerequisites: 23-299 and Junior standing. Credit, one hour.

405. CELL MORPHOGENESIS. - 4:3:3
A study of the latest developments in developmental biology with regard to cellular and molecular effects. Laboratories using sea urchin, frog, and chick embryos for experimental procedures will reinforce the discussion. Credit, four hours.

410. ADVANCED MOLECULAR GENETICS. - 4:3:3
An advanced course focusing on the biotechnical aspects of molecular biology. Topics include: recent advances in cloning, PCR, DNA sequencing, genetic engineering using recombinant plasmids, and the isolation and screening of genomic libraries. The laboratory portion will focus on DNA manipulation techniques. Prerequisite: Biology 310. Credit, four hours.

411. PHARMACOLOGY .- 4:3:4
A study of how drugs are used to achieve therapeutic benefits. The mechanism of action of various drug types at the molecular, cellular and interactive-system levels will be addressed. Topics will include the basis for rationale uses of medically relevant drugs in biological systems and detailing their effectiveness in various diseases and disorders. Focus will be on understanding the balance between pharmacodynamic, pharmacokinetic, and toxicological side effects that underlie effective treatments. Three-hour lectures and one three-hour laboratory period per week. Credit, four hours.

415. ADVANCED CELL BIOLOGY. - 4:2:4
An advanced study of basic and essential processes of eukaryotic cells with the emphasis on the correlation of structure and function at the organelle and cellular level as related to their biochemical properties and physiology. Topics covered will include cell cycle regulation, cell signaling pathways, and control of apoptosis. Prerequisites: Organic Chemistry or Biochemistry. Two hours of lecture and four hours of laboratory per week. Credit, four hours.

420. IMMUNOLOGY. - 4:2:4
An introduction to general immunology focusing on principles of immunobiology, serological techniques, and immunodeficiency diseases. Three-hour lecture and three hour laboratory each week. Credit, four hours.

421. MICROBIAL PHYSIOLOGY & ECOLOGY. - 4:3:3
A detailed study of microbial physiology, ecology, and involvement in biogeochemical cycles. Roles of bacteria fungi, algae and protozoa in various ecosystems will be studied. Bacterial genetics and the role of bacterial viruses will also be included. Three hours of lecture and three hours of lab per week. Credit, four hours.

422. BIOCHEMICAL MECHANISMS. - 4:3:3
This course is an integration of study of the molecular and cellular functions of a cell from the perspective of biochemistry. The course will focus on protein biochemistry, enzymatic activity and function, carbohydrate and lipid structure and function, and metabolism. Life is a chemical phenomenon but, for the most part, the chemistry of life is governed by the actions of proteins. Therefore, our focus will be on these proteins, what they do, and how they do it.

451-452. SENIOR RESEARCH. CAPSTONE I. - 3:0:6
An opportunity to undertake or complete a mentored research project in biology. A thesis or report is required. Open to students with a 3.25 cumulative average in biology and an overall cumulative average of 2.75. Prerequisite: Senior standing in biology. Credit, three hours per semester.

471. NUCLEIC ACIDS BIOTECHNOLOGY. - 4:2:6
This lab course will survey applications in recombinant DNA methodology. Some topics covered will include enzymology of DNA manipulation; construction and isolation of recombinants; plasmid and bacteriophage vectors; structural analysis of cloned DNA. Prerequisite: Molecular Biology. Credit, four hours.

472. PROTEIN BIOTECHNOLOGY. - 4:2:6
This lab course will be a continuation of Biotechnology Lab I. The course will focus on gene expression and protein isolation and function. Prerequisite: Molecular Biology. Credit, four hours.

498. REVIEW OF BIOLOGICAL PRINCIPLES. - 1:1:0
This course will allow students to review essential content and concepts prior to retaking the Biology Comprehensive Assessment. It is required for all Biology majors who do not satisfactorily complete this assessment in their junior year. One classroom hour per week. One credit.

499. SENIOR SEMINAR: BIOLOGICAL PRESENTATION. CAPSTONE II. - 1:1:0
The third in a required series of biological skills seminars. The course is designed to provide the senior student with instruction and practice in the oral, poster and written presentation of research data. Topics will include preparation of figures, slides, posters, and organization of the presentation. Students are required to provide their own data from independently conducted research either within the Biology Department (e.g. 23-301, 23-451) or external to DSU (e.g. internship). Prerequisites: 299, 399, senior standing. Credit, one hour.

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