

# BIOLOGY (CBIO)

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## **CBIO 101 Biological Science 3 Credits**

This course is offered for non-science majors. Topics covered include basic concepts of living organisms; their organization from atoms to organisms directed specifically toward the human being. Functioning and some disorders of various systems in the human body are taught. Three (3) lecture hours per week.

## **CBIO 111 General Biology I & Lab 4 Credits**

This course introduces the basic principles of biology, covering cells, cell organelles, and genetics. The cell surface; roles of plastids and mitochondria in cell energetics; and the role of the nucleus in cell division and regulation are given special emphasis. Specific topics included in the course are cell chemistry, concepts of molecular biology, mitosis and meiosis. Three (3) lecture hours and three (3) laboratory hours per week.

## **CBIO 111H Hon Gen Biology I & Lab 4 Credits**

CBIO 111: Introduction to the basic principles of biology, covering cells, organisms and genetics. CBIO 112: Fundamental principles, concepts, and facts of specific areas in biology. Three (3) lecture hours and three (3) laboratory hours per week.

## **CBIO 112 General Biology II & Lab 4 Credits**

This course is the second part to the general biology requirement for majors. Fundamental principles, concepts, and facts of specific areas in biology, such as development, behavior, population biology, and ecology are presented. Topics cover mammalian physiology and general anatomy (nervous, hormonal, muscular, circulatory, excretory systems), with emphasis on regulation at the level of the organism. Three (3) lecture hours and a three (3) hour laboratory per week. Prerequisite: CBIO 111.

## **CBIO 112H General Biology II Honors 4 Credits**

Fundamental principles, concepts, and facts of specific areas in biology, such as development, behavior, population biology, and ecology. Covers organismal physiology (nervous, hormonal, muscular, circulatory, excretory), with emphasis on regulation at the level of the organism. Three (3) lecture hours and a three hour laboratory per week. Prerequisite: CBIO 111.

## **CBIO 112L General Biology II Lab 0 Credits**

This course is the second part to the general biology requirement for majors. Fundamental principles, concepts, and facts of specific areas in biology, such as development, behavior, population biology, and ecology are presented. Topics cover mammalian physiology and general anatomy (nervous, hormonal, muscular, circulatory, excretory systems), with emphasis on regulation at the level of the organism. Three (3) lecture hours and a three (3) hour laboratory per week. Prerequisite: CBIO 111.

## **CBIO 230 Anatomy and Physiology 4 Credits**

This introductory course covers the basics of human anatomy and physiology including anatomical terminology, basic biochemistry, cells and tissues, and the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, urinary, and reproductive systems. Laboratory component includes anatomical studies using microscopy and dissection and the study of physiological concepts via virtual labs. Prerequisites: CBIO 111 and CBIO 112.

## **CBIO 230L Anatomy and Physiology Lab 0 Credits**

Lab - This introductory course covers the basics of human anatomy and physiology including anatomical terminology, basic biochemistry, cells and tissues, and the integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, urinary, and reproductive systems. Laboratory component includes anatomical studies using microscopy and dissection and the study of physiological concepts via virtual labs. Prerequisites: CBIO 111 and CBIO 112.

## **CBIO 231 Anatomy & Physiology II 4 Credits**

This course is the second of a two-semester sequence including the study of the endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, urinary, and reproductive systems. Introduces common human disease processes. Laboratory component includes anatomical studies using microscopy and dissection and the study of physiological concepts via virtual labs. Prerequisites: CBIO 111 and CBIO 112 and CBIO 230.

## **CBIO 231L Anatomy & Physiology II Lab 0 Credits**

Lab - This course is the second of a two-semester sequence including the study of the endocrine, cardiovascular, lymphatic/immune, respiratory, digestive, urinary, and reproductive systems. Introduces common human disease processes. Laboratory component includes anatomical studies using microscopy and dissection and the study of physiological concepts via virtual labs. Prerequisites: CBIO 111, CBIO 112 and CBIO 230.

## **CBIO 233 Microbiology 4 Credits**

This course focuses on the study of microorganisms with emphasis on bacteria and viruses. The physiology and metabolism of bacteria, bacterial growth, metabolic regulation, genetics of bacteria, genetic resistance to antibiotics, survey of the major groups of bacteria and viruses, and diseases associated with bacteria and viruses are studied. Three (3) lecture hours and a three (3) hour laboratory required per week. Prerequisite: CBIO 111 and CBIO 112 and CCHE 111.

## **CBIO 233L Microbiology Lab 0 Credits**

This course focuses on the study of microorganisms with emphasis on bacteria and viruses. The physiology and metabolism of bacteria, bacterial growth, metabolic regulation, genetics of bacteria, genetic resistance to antibiotics, survey of the major groups of bacteria and viruses, and diseases associated with bacteria and viruses are studied. Three (3) lecture hours and a three (3) hour laboratory required per week. Prerequisite: CBIO 111 and CBIO 112 and CCHE 111.

## **CBIO 255 Invertebrate Zoology 4 Credits**

The classification, morphology, physiology, phylogeny, and ecology of invertebrate animals are presented. Laboratory work includes practical anatomy and physiology of indigenous and exotic species. Three (3) lecture hours and a three-(3) hour laboratory required per week. Prerequisites: CBIO 111 and CBIO 112.

## **CBIO 255L Invertebrate Zoology Lab 0 Credits**

The classification, morphology, physiology, phylogeny, and ecology of invertebrate animals are presented. Laboratory work includes practical anatomy and physiology of indigenous and exotic species. Three (3) lecture hours and a three-(3) hour laboratory required per week. Prerequisites: CBIO 111 and CBIO 112.

**CBIO 261 Environmental Biology 4 Credits**

The study of living things and their impacts on each other and the environment is the focus of this course. An introduction to basic biological principles and how they relate to our environment are presented. Problems caused by human use of the natural world along with general principles of ecology, chemistry, microbiology, and public health are emphasized. Specific topics covered in the course include: life's diversity, biogeochemical cycles, biology of wastewater treatment, pests and disease vectors, environmental pollution, pesticides and human health, and environmental laws. Three (3) lecture hours and a three-hour laboratory required per week. Prerequisites: CBIO 111 and CBIO 112.

**CBIO 261L Environmental Biology Lab 0 Credits**

The study of living things and their impacts on each other and the environment is the focus of this course. An introduction to basic biological principles and how they relate to our environment are presented. Problems caused by human use of the natural world along with general principles of ecology, chemistry, microbiology, and public health are emphasized. Specific topics covered in the course include: life's diversity, biogeochemical cycles, biology of wastewater treatment, pests and disease vectors, environmental pollution, pesticides and human health, and environmental laws. Three (3) lecture hours and a three-hour laboratory required per week. Prerequisites: CBIO 111 and CBIO 112.

**CBIO 312 Genetics I 3 Credits**

General study of the fundamental principles of genetics, including chromosome structure, the chromosomal basis of inheritance, meiosis, Mendelian genetics, linkage, human genetics, cytogenetics, DNA replication, quantitative genetics, molecular genetics, gene function, gene regulation and bacterial genetics. Three (3) lecture hours and a two-hour recitation period required per week. Prerequisites: CBIO 111, and CBIO 112 and CCHE 111 and CCHE 112.

**CBIO 312R Genetics Recitation 0 Credits**

General study of the fundamental principles of genetics, including chromosome structure, the chromosomal basis of inheritance, meiosis, Mendelian genetics, linkage, human genetics, cytogenetics, DNA replication, quantitative genetics, molecular genetics, gene function, gene regulation and bacterial genetics. Three (3) lecture hours and a two-hour recitation period required per week. Prerequisites: CBIO 111, and CBIO 112 and CCHE 111 and CCHE 112.

**CBIO 331 Plant Biology & Lab 4 Credits**

Introductions to the major groups in the plant kingdom, emphasizing the vascular plants are the focus of this course. Students explore the structure, function diversity, ecology, and physiology of plants. The laboratory emphasizes microscopy, experimentation and may include field trips. Three (3) lecture hours and three (3) laboratory hours required per week. Prerequisites: CBIO 111 and CBIO 112.

**CBIO 331L Plant Morphology Lab 0 Credits**

Introductions to the major groups in the plant kingdom, emphasizing the vascular plants are the focus of this course. Students explore the structure, function diversity, ecology, and physiology of plants. The laboratory emphasizes microscopy, experimentation and may include field trips. Three (3) lecture hours and three (3) laboratory hours required per week. Prerequisites: CBIO 111 and CBIO 112.

**CBIO 350 Intro. Bioinformatics and Comp 4 Credits**

This course introduces students to the concepts and methodology of computational biology, bioinformatics and genomics, including the role of computation and data mining in addressing hypothesis-driven and hypothesis-generating questions within the life sciences. It will introduce the databases, web sites, software and operating systems currently used to analyze biological data. The course will include use of laboratory computers for accessing public data and performing computational analyses with the latest open-source computational biology software. Prerequisites: CBIOIII and CB10112, CCHEIII, CCHE112, and CBIO 312 (Preferred)

**CBIO 356 Compar. Vertebrate Anat.&Embry 4 Credits**

This course focuses on the comparative study of the structures, functions and the ontogenesis of the vertebrates. Structural origin and mechanisms of development are stressed. Three (3) lecture hours and three (3) laboratory hours per week. Prerequisites: CBIO 111 and 112 and CCHE 111 and 112.

**CBIO 356L Comp. Vertebrate Anatomy Lab 0 Credits**

This course focuses on the comparative study of the structures, functions and the ontogenesis of the vertebrates. Structural origin and mechanisms of development are stressed. Three (3) lecture hours and three (3) laboratory hours per week. Prerequisites: CBIO 111 and 112 and CCHE 111 and 112.

**CBIO 360 Conservation Biology & Sustain 3 Credits**

The course will discuss the fundamentals of the ecological and evolutionary principles that underlie biological diversity. It discusses the threats to biodiversity and effects of biodiversity loss and demonstrates how ecological and evolutionary principles may be used to overcome challenges of conservation. These challenges are associated with global conservation efforts, including development and improving quality of life, cultural differences in problem perception, and identify potential solution. This course prepares students to identify, explain the rationale behind, and evaluate efficacy of common conservation management methods, including inventory and monitoring techniques, Prerequisite: CBIO 111, CBIO 112, CCHE 111, 112 and 231

**CBIO 375 Cell and Molecular Biology 3 Credits**

Study of the origin and structure of cell organelles and comparative and integrated presentation of the fundamental physiochemical mechanisms associated with the living cell. Three (3) lecture hours per week. Prerequisites: CBIO 111 and CBIO 112 and CCHE 111 and CCHE 112.

**CBIO 390 Introductory Biochemistry 3 Credits**

Survey of basic principles of biochemistry and molecular biology, emphasizing broad understanding of chemical and biological events in living systems. The course emphasizes the major biochemistry topics including sugars, amino acids, peptides, nucleic acids, lipids, enzymes, cofactors, vitamins, hormones and the operation of metabolic pathways. Prerequisites: CBIO 111 and CBIO 112, CCHE 111, CCHE 112, CCHE 231 and CCHE 232.

**CBIO 420 Biology of Radioactive Mat. 4 Credits**

This course will review types of ionizing radiation and their differences, physical and chemical interactions of radiation with key biological molecules, effects on living matter beginning with molecular and cellular interactions and proceeding to tissue, organ, and organism levels, emphasizing the human system. Radiation's beneficial effects in cancer therapy and medicine as well as detrimental and carcinogenic effects will be discussed. Specific units will consider food irradiation, nuclear power plant accidents, radiation terrorism, everyday sources of exposure to humans, and other practical situations involving radiation. Prerequisites: CBIO 111, and CBIO 112 and CCHE 111 and CCHE 112 and CBIO 261.

**CBIO 465 Endocrinology 3 Credits**

This course focuses on the endocrine system, including anatomy of the brain, neuroendocrine control, gland and function, hormone structure and biosynthesis, mechanisms of hormone action, and relationship to reproduction, lactation, growth, and metabolism. Prerequisites: CBIO 111, and CBIO 112 and CBIO 491 or CBIO 390. This course emphasizes the study of photosynthesis, nitrogen metabolism, and hormones in vascular plants. Three (3) lecture hours and four (4) laboratory hours required per week. Prerequisites: CBIO 111 and CBIO 112 and CCHE 111 and CCHE 112. Recommended: CBIO 331.

**CBIO 476 Human Physiology 4 Credits**

Students study the functions of the various tissues, organs, and organ systems of humans, with emphasis on the mechanisms, the cause and effect of hormonal actions, neurotransmission, cardiovascular control and muscle contraction in this course. Three (3) lecture hours and one hour of recitation required per week. Prerequisites: CBIO 111 and CBIO 112 and CCHE 111 and CCHE 112.

**CBIO 476L Human Physiology Lab 0 Credits**

Students study the functions of the various tissues, organs, and organ systems of humans, with emphasis on the mechanisms, the cause and effect of hormonal actions, neurotransmission, cardiovascular control and muscle contraction in this course. Three (3) lecture hours and one hour of recitation required per week. Prerequisites: CBIO 111 and CBIO 112 and CCHE 111 and CCHE 112.

**CBIO 476R Human Physiology Recitation 0 Credits**

Recitation - Study of functions of the various tissues, organs, and organ systems of humans, with emphasis on the mechanisms, the cause and effect of hormonal actions, neurotransmission, cardiovascular control and muscle contraction. Three (3) lecture hours and one hour of recitation required per week. Prerequisites: CBIO 111 and 112; CCHE 111 and 112.

**CBIO 478 Cell Biology Laboratory 3 Credits**

Introduction to experimental design, laboratory procedures, and instrumentation. Cell culture, cell growth kinetics, enzyme purification and kinetics, bacterial genetics studies, virus isolation and replication, column chromatography, protein synthesis and isolation of cell organelles. Two (2) 2.5-hour laboratories required per week. Prerequisites: CBIO 111, CBIO 112, and CBIO 312 and CCHE 111, CCHE 112, CCHE 231, and CCHE 232. Co-Requisite: CBIO 375.

**CBIO 480 Research in Biology 1-9 Credits**

An Independent faculty-supervised laboratory investigation on topics of special interest. Students present periodic reports and are required to make an oral presentation and submit a written paper on their research project. This course may be repeated for varying credit hours up to 12 hours. Prerequisite: Permission of department chair and faculty research supervisor.

**CBIO 482 Seminar in Biology 1 Credit**

Students present scientific seminars on contemporary biological topics. Students are required to make an oral presentation on the selected topic and submit a written paper. One (1) lecture hour per week.

**CBIO 484 Eukaryotic Gene Control 3 Credits**

This course will cover the molecular mechanism by which genes are regulated in eukaryotes, including humans. Topics include the role of gene regulation during normal development and disease (e.g., cancer), the organization and packing of DNA into chromatin, chromatin modifications, epigenetics, non-coding RNAs, transposable elements, gene regulatory networks, genomic detection of gene expression and bioinformatics analysis of differential gene regulation.

**CBIO 491 Biochemistry & Recitation 3 Credits**

Topics in this course focus on the structure and function of proteins, nucleic acids, carbohydrates, and lipids. Three (3) lecture hours and one hour of recitation required per week. Prerequisites: CBIO 111 and 112 and CCHE 231, and 232.

**CBIO 492 Biochemistry 3 Credits**

Intermediary metabolism and the control mechanisms involved in DNA replication and introductory recombination are presented. Three (3) lecture hours and one (1) recitation hour per week. Prerequisites: CBIO 111, CBIO 112, and CBIO 491 and CCHE 231 and CCHE 232.

**CBIO 492R Biochemistry Recitation 0 Credits**

Intermediary metabolism and the control mechanisms involved in DNA replication and introductory recombination are presented. Three (3) lecture hours and one (1) recitation hour per week. Prerequisites: CBIO 111, CBIO 112, and CBIO 491 and CCHE 231 and CCHE 232.

**CBIO 499 Special Topics in Biology 1-4 Credits**

The course is designed to present selected contemporary topics in biology. The course may be repeated for credit when topic varies. Prerequisites: CBIO 111 and CBIO 112. Some topics may require permission of the instructor.

**CBIO 501 Biology Seminar 0 Credits**

This course meets once a week during the fall semester to provide a forum to hear research reports from faculty, invited speakers and degree candidates. The course is required of all graduate students.

**CBIO 502 Instructional Practicum 0 Credits**

This course meets once a week during the spring semester to provide a forum to hear research reports from faculty, invited speakers and degree candidates. The course is required of all graduate students.

**CBIO 504 Molecular Genetics 3 Credits**

This course focuses on prokaryotic, bacteriophage, other viruses, and gene structure, function and regulation. Molecular details of DNA isomerization, replication, RNA transcription and translation are presented. The course also covers genetic codes, r-RNAs and t-RNAs, molecular mechanisms, transposition, mutation, repair and recombination in DNA. (Three [3] lecture hours per week)

**CBIO 506 Cell Biology 3 Credits**

Cellular structure, biosynthesis and function of eukaryotic cells are presented in this course. (Three [3] lecture hours per week)

**CBIO 509 Methods & Techniques in Bio. 3 Credits**

This is a laboratory course that covers techniques such as absorption and fluorescence spectroscopy, ultracentrifugation, diffusion, sedimentation, electrophoresis, spectrometry, x-ray diffraction, nuclear chemistry and chromatography. (Three [3] lecture hours per week)

**CBIO 511 Biochemistry I 3 Credits**

Students study Biosynthesis and the biological significance of carbohydrates, lipids, proteins, enzymes, nucleic acids and other endogenous compounds in this course. (Three [3] lecture hours per week)

**CBIO 512 Biochemistry II 3 Credits**

Topics on the function and interaction of metabolic pathways in eukaryotic cells are presented with emphasis on biosynthesis and the biological significance of carbohydrates, lipids, proteins, enzymes, nucleic acids and other endogenous compounds. (Three [3] lecture hours per week)

**CBIO 551 Biostatistics 3 Credits**

Statistical theory and methods as applied to biological research are emphasized. (Three [3] lecture hours per week)

**CBIO 556 Bioinformatics 3 Credits**

**CBIO 599 Special Topics in Biology 1-4 Credits**

The course is designed to present selected contemporary topics in biology. The course may be repeated for credit when topics vary.

**CBIO 633 Advances in Molecular Biology 3 Credits**

Topics in this course focus on recent literature and discoveries in specific areas of molecular biology. Content is presented through lectures, group discussions, assignments and formal presentations. Prerequisites:

CBIO 504, 514. (Three [3] lecture hours per week)

**CBIO 635 Advances in Cellular Biology 3 Credits**

Topics presented in this course focus on recent literature and discoveries in a specific area of cellular biology. Prerequisite: CBIO 506. (Three [3] lecture hours per week)

**CBIO 671 Research in Molecular Biology 1-12 Credits**

**CBIO 681 Research in Cellular Biology 1-12 Credits**

**CBIO 801 Thesis Consultation 1 Credit**

**CBIO 871 RSCH in Molecular Biology 3-9 Credits**

**CBIO 881 RSCH in Cellular Biology 3-9 Credits**

**CBIO 884 Research In Biochemistry 3-9 Credits**

**CBIO 991 Dissertation Consultation 1 Credit**