

# BIOLOGICAL SCIENCES (BIOL\_SCI)

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## BIOL\_SCI 115-CN The Human Brain (1 Unit)

Overview of the development, structure and function of the human nervous system; terminology and principles of neuroanatomy, neurochemistry, physiology, and molecular biology. How the brain works and its role in human behavior and psychopathology. Issues raised by new medical technologies.

## BIOL\_SCI 167-CN Genetics and Evolution (1 Unit)

NPEP course.

## BIOL\_SCI 170-CN Concepts of Biology (1 Unit)

General biological sciences introduction. Topics include evolution, biomolecules, cell biology, genetics, population biology, and the relationship between structure and function in organisms. The course is geared toward students with an interest in the topic but without a background in biological sciences.

## BIOL\_SCI 170-DL Concepts of Biology (1 Unit)

General biological sciences introduction. Topics include evolution, biomolecules, cell biology, genetics, population biology, and the relationship between structure and function in organisms. The course is geared toward students with an interest in the topic but without a background in biological sciences.

## BIOL\_SCI 170-PP Concepts of Biology (1 Unit)

NPEP course.

## BIOL\_SCI 201-CN Molecular Biology (1 Unit)

Basics of molecular biology, including the structure of macromolecules, DNA replication, transcription, and translation and the mechanisms by which these processes are regulated. Current biotechnology methods used to study molecular biology. Credit not allowed for both BIOL\_SCI 201-CN and BIOL\_SCI 215-CN.

## BIOL\_SCI 202-CN Cell Biology (1 Unit)

How an evolutionary perspective informs our understanding of human anatomy, health and disease. Mechanisms the cell uses to compartmentalize and transport proteins, to move, to regulate growth and death, and to communicate with their environments.

**Prerequisite:** Students must have completed, with a C- or better, BIOL\_SCI 201-CN or 215-CN to register for this course. Should be taken concurrently with BIOL\_SCI 232-CN. Credit not allowed for both BIOL\_SCI 219-CN and BIOL\_SCI 202-CN.

## BIOL\_SCI 203-CN Genetics and Evolution (1 Unit)

Fundamentals of genetics and evolution. From the rules of heredity to the complex genetics of humans, the methods and logic of genetics as applied to inheritance, development, neurobiology, and populations. The process and tempo of evolution, from natural selection to speciation, emphasizing how genetics plays a critical role.

**Prerequisite:** Students must have completed, with a C- or better, BIOL\_SCI 202-CN or BIOL\_SCI 219-CN to register for this course.

## BIOL\_SCI 215-CN Genetics and Molecular Biology (1 Unit)

Principles of inheritance; gene function; mechanisms by which DNA is replicated, transcribed into RNAs, and translated into proteins; basics of the process of natural selection.

**Prerequisite:** one year of general chemistry with laboratory.

## BIOL\_SCI 217-CN Physiology (1 Unit)

Organization and functioning of the major organ systems in mammals.

**Prerequisite:** CHEM 131-CN.

## BIOL\_SCI 219-CN Cell Biology (1 Unit)

Mechanisms that cells use to compartmentalize and transport proteins, to move, to regulate growth and death, and to communicate with their environments.

**Prerequisite:** CHEM 132-CN.

## BIOL\_SCI 220-CN Genetic and Molecular Processes Laboratory (0.34 Unit)

Laboratory techniques and experiments in fundamental aspects of transmission genetics and molecular biology. Credit for this course is 0.34 units.

**Prerequisite:** CHEM 132-CN.

## BIOL\_SCI 221-CN Cellular Processes Laboratory (0.34 Unit)

Laboratory techniques and experiments in fundamental aspects of cell biology. Credit for this course is 0.34 units.

**Prerequisite:** grades of C- or higher in both BIOL\_SCI 220-CN and CHEM 132-CN.

## BIOL\_SCI 232-CN Molecular and Cellular Processes Laboratory (0.34 Unit)

Laboratory techniques and experience that investigates relevant scientific research and teaches scientific inquiry skills such as experimental design, writing research proposals, data collection, data analysis/interpretation, and the presentation of results. The experimental model revolves around atherosclerosis and macrophage phagocytosis of apoptotic cells. Various cell and molecular biology techniques. Should be taken concurrently with BIOL\_SCI 202-CN. Credit not allowed for both BIOL\_SCI 221-CN and BIOL\_SCI 232-CN.

## BIOL\_SCI 233-CN Genetics and Molecular Processes Laboratory (0.34 Unit)

Laboratory techniques and experience that investigates relevant scientific research and teaches scientific inquiry skills such as experimental design, writing research proposals, data collection, data analysis/interpretation, and the presentation of results. The experimental model revolves around aggregate prone proteins in nematodes and RNA interference (RNAi) affecting protein folding and the clearance of protein aggregates. Various cell and molecular biology techniques.

**Prerequisite:** Students must have completed BIOL\_SCI 232-CN. Credit not allowed for both BIOL\_SCI 220-CN and BIOL\_SCI 233-CN.

## BIOL\_SCI 234-CN Investigative Laboratory (0.34 Unit)

### BIOL\_SCI 302-CN Fundamentals of Neurobiology (1 Unit)

Structure and function of the mammalian central nervous system from the molecular to behavioral level. Emphasis on foundational concepts in neurobiology, including neuronal and glial structure and function, neurophysiology of membrane, resting and action potential, synaptic physiology, an introduction to sensory perception, neuronal plasticity in learning and memory.

**Prerequisite:** BIOL\_SCI 215-CN and BIOL\_SCI 219-CN. Recommended: BIOL\_SCI 308-CN.

### BIOL\_SCI 302-DL Fundamentals of Neurobiology (1 Unit)

Structure and function of the mammalian central nervous system from the molecular to behavioral level. Emphasis on foundational concepts in neurobiology, including neuronal and glial structure and function, neurophysiology of membrane, resting and action potential, synaptic physiology, an introduction to sensory perception, neuronal plasticity in learning and memory.

**Prerequisite:** BIOL\_SCI 215-CN and BIOL\_SCI 219-CN. Recommended: BIOL\_SCI 308-CN.

## BIOL\_SCI 308-CN Biochemistry (1 Unit)

Basic concepts in biochemistry, emphasizing the structure and function of biological macromolecules, fundamental cellular biochemical processes, and the chemical logic in metabolic transformations.

**Prerequisite:** BIOL\_SCI 217-CN and CHEM 210-A.

**BIOL\_SCI 310-CN Human Physiology (1 Unit)**

An exploration of the functions of the human body at the tissue, organ, and organ system level. Emphasis on homeostatic mechanisms and interdependence within organs and organ systems and the influence of modulatory systems. Topics will include, but are not limited to: nervous, cardiovascular, respiratory, and renal systems.

**BIOL\_SCI 312-CN The Evolutionary Biology of Human Anatomy, Health and Disease (1 Unit)**

Key features of human anatomy, health and disease from an evolutionary perspective. Review of some evolutionary processes, overview of human evolutionary history, consideration of the primary body systems and regions in the human organism. The historical context of selected human structures and their function/dysfunction across these systems.

**BIOL\_SCI 312-DL The Evolutionary Biology of Human Anatomy, Health, and Disease (1 Unit)**

Key features of human anatomy, health and disease from an evolutionary perspective.

**BIOL\_SCI 313-CN Human Anatomy (1 Unit)**

An introduction to human anatomy. Topics include system approach to anatomical organization; sections of the body; musculoskeletal and nervous systems; embryology development. Lectures are supplemented by selected dissections of human cadavers and dry exercises using bones, models, and computer animations.

**Prerequisite:** BIOL\_SCI 170-CN, or equivalent course.

**BIOL\_SCI 313-DL Human Anatomy (1 Unit)**

An introduction to human anatomy. Topics include system approach to anatomical organization; sections of the body; musculoskeletal and nervous systems; embryology development. Lectures are supplemented by selected dissections of human cadavers and dry exercises using bones, models, and computer animations.

**Prerequisite:** BIOL\_SCI 170-CN, or equivalent course.

**BIOL\_SCI 315-CN Advanced Cell Biology (1 Unit)**

Relationship of shape, structural dynamics, and function with the cellular state and gene expression; cell-to-cell communication.

**Prerequisite:** BIOL\_SCI 219-CN.

**BIOL\_SCI 316-CN Human Structure and Function (1 Unit)**

The function of the musculoskeletal system in modern humans. A comparative perspective emphasizing the adaptive contexts of the evolutionary transformations leading to our modern anatomy. Structural, functional, and evolutionary anatomy of humans, with primary focus on the musculoskeletal system of the postcranium. General biomechanical principles of anatomical systems are covered through the regional anatomy of the muscles, bones and joints. Lectures are supplemented by selected dissections of human cadavers, in-class lab sessions examining bones and models, and computer animations and exercises.

**Prerequisite:** BIOL\_SCI 313-CN, equivalent anatomy course, or permission of instructor.

**BIOL\_SCI 317-CN Regional Human Anatomy Lab (0.34 Unit)**

Lab course utilizing dissections and demonstrations of human cadavers. It is an advanced anatomy course examining the details of human body systems. Topics include: body wall and cavities, contents and features of the thorax and abdomen (cardiac, pulmonary, and gastrointestinal systems), pelvis (genito-urinary system), spinal cord and back, innervation and blood supply of the upper and lower limbs, cranial

cavities and contents, cranial nerves and blood supply of the head and neck. Credit for this course is 0.34 units.

**Prerequisite:** BIOL\_SCI 313-CN or equivalent.

**BIOL\_SCI 318-CN Advanced Human Physiology (1 Unit)**

Builds on concepts covered in BIOL\_SCI 217-CN or an equivalent physiology course focusing on the body as an integrated set of systems. A global view of the body, its systems, and the many processes that keep the systems working. Integrated approach to studying all major organ systems including neural, autonomic/somatic motor, endocrine, cardiovascular, respiratory, renal, digestive, and reproductive physiology. The clinical relevance of the organ system that will include abnormal function, disease states, and medications used to bring the system back to normal functioning.

**Prerequisite:** BIOL\_SCI 217-CN or equivalent.

**BIOL\_SCI 318-DL Advanced Human Physiology (1 Unit)**

Builds on concepts covered in BIOL\_SCI 217-CN or an equivalent physiology course focusing on the body as an integrated set of systems. A global view of the body, its systems, and the many processes that keep the systems working. Integrated approach to studying all major organ systems including neural, autonomic/somatic motor, endocrine, cardiovascular, respiratory, renal, digestive, and reproductive physiology. The clinical relevance of the organ system that will include abnormal function, disease states, and medications used to bring the system back to normal functioning.

**Prerequisite:** BIOL\_SCI 217-CN or equivalent.

**BIOL\_SCI 327-CN Biology of Aging (1 Unit)**

Biological aspects of aging, from molecular to evolutionary.

**Prerequisite:** BIOL\_SCI 219-CN and BIOL\_SCI 217-CN.

**BIOL\_SCI 328-A Microbiology Lab (0 Unit)**

Laboratory section for BIOL\_SCI 328-CN.

**BIOL\_SCI 328-CN Microbiology (1 Unit)**

How microbes interact with their environments, including with humans.

**Prerequisite:** BIOL\_SCI 217-CN.

**BIOL\_SCI 342-CN Evolutionary Processes (1 Unit)**

Evolutionary mechanisms (natural selection, genetic drift), evolutionary history (speciation, phylogenetics), and adaptations (sex, cooperation, aging, life history).

**Prerequisite:** BIOL\_SCI 215-CN and BIOL\_SCI 219-CN.

**BIOL\_SCI 355-CN Immunobiology (1 Unit)**

Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity.

**Prerequisite:** BIOL\_SCI 217-CN.

**BIOL\_SCI 355-DL Immunobiology (1 Unit)**

Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity.

**Prerequisite:** BIOL\_SCI 217-CN.

**BIOL\_SCI 390-DL Advanced Molecular Biology (1 Unit)**

Builds on topics introduced in introductory Molecular Biology. Topics discussed include techniques, transcriptional and translational regulation, epigenetics, replication, regulatory RNAs, DNA repair, and genetic engineering.

**Prerequisite:** BIOL\_SCI 215-CN or BIOL\_SCI 201-CN.