

# NEUROSCIENCE

## Co-Coordinators

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## Faculty

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The Neuroscience minor is intended to introduce students to the rapidly expanding field that seeks in-depth understanding of the brain and nervous system. This minor is suitable for students in any field who wish to understand the neurological underpinnings of complex phenomena such as behavior, cognition, and emotion. Coupled with the student's major, the neuroscience minor will provide a solid foundation for further study or for application in a career setting.

## Programs

- Neuroscience Minor (<http://catalog.linfield.edu/programs-az/arts-sciences/neuroscience/neuroscience-minor/>)

## Courses

### PSYC 101 SURVEY OF PSYCHOLOGY (4 credits)

The study of human behavior. Neurological mechanisms, individual differences, learning, dysfunctional behavior, and social processes. Lecture and discussion.

(INDIVID/SYSTEMS/SOCIETIES, NATURAL WORLD)

### BIOL 210 PRINCIPLES OF BIOLOGY (4 credits)

An introduction to the fundamental principles of biology including the origin and diversity of living things; the molecular, cellular, and genetic bases of life; the structure and function of organisms; their evolution and ecology. Lecture and laboratory. Required for Biology majors.

Total Course fees: \$60.00

Prerequisites: Concurrent enrollment in CHEM 210 recommended.

(NATURAL WORLD)

### BIOL 211 PRINCIPLES OF BIOLOGY (4 credits)

An introduction to the fundamental principles of biology including the origin and diversity of living things; the molecular, cellular, and genetic bases of life; the structure and function of organisms; their evolution and ecology. Lecture and laboratory. Required for Biology majors.

Total Course fees: \$60.00

Prerequisites: BIOL 210. CHEM 210 recommended concurrent or previous.

(NATURAL WORLD)

### BIOL 260 FUNDAMENTALS OF NEUROSCIENCE (ALSO LISTED AS HHPA 260 AND PSYC 260) (4 credits)

Introduction to cellular, organismal and behavioral neuroscience. Examining principles of neurons, synapses, and brain systems; including structural and functional mechanisms of neurons in sensory systems, perception, movement and neural development.

Prerequisites: PSYC 101, BIOL 210, and BIOL 211.

### BIOL 340 BIOINFORMATICS (4 credits)

Computer-based explorations of large biological datasets to test hypotheses in ecology, evolution, and genetics. This is a project-based course, in which students learn fundamental concepts and methods in bioinformatics, gain practical experience with bioinformatics tools, and develop basic skills in the collection and presentation of big data, as well as the rudiments of programming in a scripting language. Programming experience is not required.

Total Course fees: \$60.00

### BIOL 400 MOLECULAR CELL BIOLOGY (5 credits)

Study of the molecular mechanisms of fundamental biological processes such as transcription, translation, and DNA replication; molecular cell biology of eukaryotic organisms. Concepts introduced at the beginning of the course applied to the molecular biology of complex multicellular processes such as development, immune response, and cancer.

Total Course fees: \$60.00

Prerequisites: BIOL 211, CHEM 211 and junior standing.

(MAJOR WRITING INTENSIVE)

### BIOL 410 ANIMAL BEHAVIOR (4 credits)

Concepts in animal behavior at multiple levels of biological organization. Perspectives range from genetic and neurophysiological underpinnings of behavior to the resulting behavioral interactions of animals with their environment and other organisms. Topics include behavioral genetics, hormones and behavior, mating behavior, parent-offspring interactions, habitat selection, navigation, foraging, self defense, communication, learning, sociality, and behavior and conservation. Laboratory includes experimental hypothesis testing in the field and lab; data collection, analysis, and presentation; and a grant proposal.

Total Course fees: \$60.00

Prerequisites: BIOL 211 and junior standing. 4 credits.

### BIOL 420 ANIMAL DEVELOPMENT (4 credits)

Study of the early development of vertebrates and selected invertebrates, with emphasis on genetic, biochemical, and physiological processes influencing formation and growth of organ systems. Lecture and laboratory.

Total Course fees: \$60.00

Prerequisites: BIOL 211, CHEM 211 (BIOL 270 strongly recommended).

### BIOL 441 BIOCHEMISTRY AND MOLECULAR BIOLOGY (4 credits)

Study of the biochemical and molecular processes within a cell. Consideration of the role of lipids, amino acids, carbohydrates, and nucleic acids in the fundamental cellular processes of replication, transcription, translation, signaling, and transport.

Total Course fees: \$60.00

Prerequisites: BIOL 210, BIOL 211, CHEM 210, and CHEM 211, plus junior standing.

### PSYC 282 INTRODUCTION TO BIOPSYCHOLOGY (4 credits)

Introduction to the physiological, biochemical, and neuroanatomical foundations of behavior and mental processes. Attention to central nervous system function and psychoactive drug effects, sensory/perceptual processes, sleep and dreaming, learning phenomena, memory mechanisms, human communication disorders, and abnormal behavior.

Prerequisites: PSYC 101.

(NATURAL WORLD)

**PSYC 325 DRUGS AND BEHAVIOR (4 credits)**

General principles of drug effects with attention to neural mechanisms of drug action, addiction, tolerance, and drug classification. Drug use in the treatment of mental health, and drug effects on learning, cognitive, and social processes. Laboratory exposure to experimental research techniques in behavioral pharmacology and descriptive research techniques in psychopharmacology.

*Total Course fees: \$20.00*

*Prerequisites:* PSYC 252 and any one of the following: PSYC 101, PSYC 281, PSYC 282, PSYC 283, PSYC 284, PSYC 286, PSYC 287 or consent of instructor.

**PSYC 382 SEMINAR IN BIOPSYCHOLOGY (4 credits)**

Physiological, biochemical, and neuroanatomical foundations of behavior and mental processes. Primary resources in basic and applied research. Laboratory experience with histological techniques for imaging the nervous system. Research into structure-function relationships in the CNS. Use of classical and operant conditioning techniques to study biological bases of learning.

*Total Course fees: \$20.00*

*Prerequisites:* PSYC 252 and PSYC 282, or consent of instructor.

*(MAJOR WRITING INTENSIVE)*

**PSYC 389 COGNITIVE NEUROSCIENCE (4 credits)**

Introduction to the neural bases of cognitive functioning. Examination of both lower-order functions such as perception and encoding, and higher-order functions such as memory and language, at both a cellular and systems level of analysis.

*Prerequisites:* Any one of the following: PSYC 101, 282, 283, or BIOL 212, 213.

*(NATURAL WORLD)*