

# ADVANCED STUDIES IN BIOLOGY FOR HEALTH PROFESSIONS

SPS Certificate website: <https://sps.northwestern.edu/premedicine-prohealth/advanced-biology-health-professions/>

Advanced Studies in Biology for Health Professions draws students from a wide range of backgrounds who are interested in careers in medicine, physical therapy, physician assistant studies or other health careers. Students complete four to eight advanced undergraduate courses in biology to help them prepare for professional programs.

## Certificate Offered

- Advanced Studies in Biology for Health Professions, Certificate (<https://catalogs.northwestern.edu/sps/certificates/post-baccalaureate/advanced-studies-biology-health-professions/advanced-studies-biology-health-professions-certificate/>)

## Advanced Studies in Biology for Health Professions Courses

### 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 201-CN or BIOL\_SCI 215-CN, and BIOL\_SCI 202-CN or 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 201-CN or BIOL\_SCI 215-CN and CHEM 215-A.

### 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 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 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 202-CN or 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-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 310-CN or equivalent.

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

Biological aspects of aging, from molecular to evolutionary.

**Prerequisite:** BIOL\_SCI 201-CN or BIOL\_SCI 215-CN, and BIOL\_SCI 202-CN or BIOL\_SCI 219-CN.

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

How microbes interact with their environments, including with humans.

**Prerequisite:** BIOL\_SCI 201-CN or BIOL\_SCI 215-CN, and BIOL\_SCI 202-CN or BIOL\_SCI 219-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 201-CN or BIOL\_SCI 215-CN, and BIOL\_SCI 202-CN or BIOL\_SCI 219-CN.

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

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

**Prerequisite:** BIOL\_SCI 201-CN, BIOL\_SCI 202-CN, and BIOL\_SCI 308-CN or equivalent.

### 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.