

PRENURSING

SPS Certificate website: <https://sps.northwestern.edu/premedicine-prohealth/prenursing/>

The prenursing certificate program admits students with an undergraduate degree who are seeking the courses required for admission to accelerated bachelor of science in nursing (BSN) programs and entry-level master's degree nursing programs. Students are advised to contact the schools in which they are interested before applying to ensure that the SPS program fulfills their requirements. This program is designed for career changers who do not have an extensive background in science.

Certificate Offered

- Prenursing, Certificate (<https://catalogs.northwestern.edu/sps/certificates/post-baccalaureate/prenursing/prenursing-certificate/>)

Prenursing Courses

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 222-CN Investigative Lab (0.34 Unit)

A culminating life-science lab experience. Credit for this course is 0.34 units.

Prerequisite: CHEM 132-CN and BIOL_SCI 221-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 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 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 325-CN Animal Physiology (1 Unit)

Physiological principles and mechanisms responsible for the ability of animals to regulate variables in the steady state.

Prerequisite: BIOL_SCI 217-CN.

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 or BIOL_SCI 201.

CHEM 110-CN Quantitative Problem Solving in Chemistry (1 Unit)

Solution strategies for traditional word problems and their application to basic chemistry quantitative problems: dimensional analysis, chemical equations, stoichiometry, limiting reagents.

CHEM 131-CN General Chemistry 1 (1 Unit)

Quantum mechanics, electronic structure, periodic properties of the elements, chemical bonding, thermodynamics, intermolecular forces, properties of solids and liquids, special topics in modern chemistry. Must be taken concurrently with CHEM 141-CN.

Prerequisite: grade of C- or higher in CHEM 110-CN.

CHEM 132-CN General Chemistry 2 (1 Unit)

Solutions and colligative properties, chemical equilibrium, aqueous solution equilibria, chemical kinetics, metals in chemistry and biology, oxidation-reduction reactions and electrochemistry, special topics in modern chemistry. Must be taken concurrently with CHEM 142-CN.

Prerequisite: grade of C- or higher in CHEM 131-CN and CHEM 141-CN.

CHEM 141-CN General Chemistry 1 Lab (0.34 Unit)

Chemical analysis of real samples using basic laboratory techniques including titration, colorimetric analysis, density measurements, and atomic spectroscopy. Planning, data collection, interpretation, and reporting on experiments. Credit for this course is 0.34 units. Must be taken concurrently with CHEM 131-CN.

Prerequisite: grade of C- or higher in CHEM 110-CN.

CHEM 142-CN General Chemistry Lab 2 (0.34 Unit)

Chemistry laboratory techniques applied to materials science and nanotechnology, acid-base chemistry, and chemical kinetics. Planning, data collection, interpretation, and reporting on experiments. The course must be taken concurrently with CHEM 132-CN. Credit for this course is 0.34 units.

Prerequisite: grade of C- or higher in CHEM 131-CN.

CHEM 201-CN Chemistry of Nature and Culture (1 Unit)

NPEP course.

CHEM 210-A Organic Chemistry (1 Unit)

Basic concepts of structure, stereochemistry, and reactivity of organic compounds. The chemistry of hydrocarbons and alcohols.

Prerequisite: completion of General Chemistry Sequence with grade of C- or better, or equivalent transfer credit with qualifying score on the Chemistry Placement Exam.

CHEM 210-B Organic Chemistry (1 Unit)

The chemistry of aromatic, carbonyl, and nitrogen compounds; characterization of organic substances by chemical and spectral methods; reaction mechanisms. Must be taken concurrently with CHEM 230-B.

Prerequisite: grade of C- or higher in CHEM 210-A.

CHEM 210-C Organic Chemistry III (1 Unit)

The chemistry of poly-functional compounds of biological and medicinal interest. Modern organic synthesis, bioorganic chemistry, and recent developments in organic chemistry. Must be taken concurrently with CHEM 230-C.

Prerequisite: grade of C- or higher in CHEM 210-B.

CHEM 215-A Organic Chemistry I (1 Unit)

Foundational concepts in organic chemistry will be introduced. Topics include structure and properties of common functional groups, acidity/

basicity, conformational analysis, stereochemistry, and reactivity of organic compounds. The chemistry of hydrocarbons, alkyl halides, and alcohols, ethers, and carbonyl compounds included.

Prerequisite: CHEM 132-CN and CHEM 142-CN (C- or better in all listed courses) or permission of department by placement exam. Must be taken concurrently with CHEM 235-A.

CHEM 215-B Organic Chemistry II (1 Unit)

Fundamental concepts in organic chemistry will be covered. Topics include important functional groups: nomenclature, structure, properties, and multi-step synthesis. Reaction mechanisms for organic transformations presented, and synthesis strategies covered. The chemistry of pi systems and aromatic ring system, amines, and carboxylic acids and their derivatives, and enol/enolate species included.

Prerequisite: CHEM 215-A and CHEM 235-A (C- or better). Must be taken concurrently with CHEM 235-B.

CHEM 215-C Advanced Organic Chemistry (1 Unit)

Advanced concepts in modern organic chemistry introduced. Focus on recent developments in synthetic organic chemistry, including concerted/pericyclic reactions, catalysis, green/environmental chemistry, automated synthesis, and combinatorial/screening methods. Additional topics include an introduction to materials and polymer chemistry.

Prerequisite: CHEM 215-B and CHEM 235-B (C- or better). Must be taken concurrently with CHEM 235-C.

CHEM 230-B Organic Chemistry II Laboratory (0.34 Unit)

Instruction in experimental techniques of modern organic chemistry emphasizing chemical separations, spectroscopic characterization, and reactions of alkanes, alkenes, alkyl halides, alcohols, carbonyls, esters, and aromatic compounds. Must be taken concurrently with CHEM 210-B.

Prerequisite: grade of C- or higher in CHEM 210-A.

CHEM 230-C Organic Chemistry III Laboratory (0.34 Unit)

Experimental techniques of modern organic chemistry emphasizing chemical separations, spectroscopic characterization, and reactions such as amide synthesis, Grignard reaction, aldol condensation, Robinson annulation, and DielsAlder reaction. Must be taken concurrently CHEM 210-C.

Prerequisite: grade of C- or higher in CHEM 210-B.

CHEM 235-A Organic Chemistry Lab I (0.34 Unit)

Standard laboratory techniques in organic chemistry will be covered.

Techniques will focus on the isolation and purification of organic compounds as well as the use of spectroscopic methods to determine identity and purity.

Prerequisite: CHEM 132-CN and CHEM 142-CN (C- or better in all listed courses) or permission of department by placement exam. Must be taken concurrently with CHEM 215-A.

CHEM 235-B Organic Chemistry Lab II (0.34 Unit)

Complete laboratory experiments focusing on standard synthetic organic chemistry conducted each week. Students complete prelab worksheet including stoichiometric calculations, prediction of reaction outcome, and identification of safety protocols.

Prerequisite: CHEM 215-A and CHEM 235-A (C- or better). Must be taken concurrently with CHEM 215-B.

CHEM 235-C Advanced Organic Chemistry Lab (0.34 Unit)

Advanced concepts in modern organic chemistry introduced. Focus on recent developments in synthetic organic chemistry, including: concerted/pericyclic reactions, catalysis, green/environmental chemistry, automated synthesis, and combinatorial/screening methods. Additional topics include an introduction to materials and polymer chemistry.

Prerequisite: CHEM 215-B and CHEM 235-B (C- or better). Must be taken concurrently with CHEM 215-C.

CHEM 242-CN Thermodynamics (1 Unit)

NPEP course.