

PRE-PHYSICAL THERAPY

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

The pre-physical therapy concentration admits post-baccalaureate students into courses required for application to physical therapy graduate (DPT) programs. Students can complete the program in 21 months. While this program meets minimal requirements for application to most physical therapy schools in Illinois, students are strongly advised to confirm the admission requirements of the schools in which they are interested before enrolling to ensure that the SPS program fulfills their needs. This program is designed for career changers who do not have an extensive background in science. Students who need only some of these courses may apply to the Advanced Studies in Biology for Health Professions (<https://catalogs.northwestern.edu/sps/certificates/post-baccalaureate/advanced-studies-biology-health-professions/>) certificate program or create a specialized certificate (<https://catalogs.northwestern.edu/sps/certificates/post-baccalaureate/specialized-studies/>).

Certificate Offered

- Pre-Physical Therapy, Certificate (<https://catalogs.northwestern.edu/sps/certificates/post-baccalaureate/prephysical-therapy/prephysical-therapy-certificate/>)

Prephysical Therapy Courses

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 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)

A culminating life-science laboratory experience. Students design and generate reagents that can be used in larger experiments. Topics vary from year to year and typically involve sub-cloning of a specific gene fused to a reporter for detection.

Prerequisite: Students must have completed BIOL_SCI 233-CN. Credit not allowed for both BIOL_SCI 222-CN and BIOL_SCI 234-CN.

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 313-DL Human Anatomy (1 Unit)

This is an online course on human anatomy, focusing on morphology and function. It follows both a regional and systems approach. All course content, activities, and assessments will be online learning activities and assessments. The course will also have a broad emphasis on clinical application that is applicable to all health care professions. The course covers gross anatomy of the human body; therefore, images of human cadavers will be presented in your textbook, as well as in other course resources. Readings are assigned from the Marieb, Wilhelm and Mallatt text.

Prerequisite: BIOL_SCI 170-DL, or equivalent course.

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 prosections 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 prosections 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.

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 Fundamentals of Chemistry I (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 Fundamentals of Chemistry II (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 Fundamentals of Chemistry Laboratory I (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 Fundamentals of Chemistry Laboratory II (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.

PHYSICS 130-A College Physics I (1 Unit)

First quarter of a three-quarter algebra-based physics course with lecture and laboratory. Physics is the most basic of the sciences, dealing with the behavior and structure of matter. Lectures and labs illustrate physical principles: mechanics, motion, momentum and energy, and fluids. Continues in winter and spring quarters as PHYSICS 130-B, PHYSICS 130-C. Must be taken concurrently with PHYSICS 131-A lab.

Prerequisite: college algebra or higher college math course.

PHYSICS 130-B College Physics II (1 Unit)

Continuation of PHYSICS 130-A algebra-based physics with lecture and laboratory; the sequence concludes with PHYSICS 130-C in the spring quarter. Harnessing the forces of electrical power; how they have altered the way we live and perceive ourselves in the universe. Lecture demonstrations illustrate physical principles: electricity and magnetism, DC and AC circuits. Must be taken concurrently with PHYSICS 131-B lab.

Prerequisite: PHYSICS 130-A or equivalent course.

PHYSICS 130-C College Physics III (1 Unit)

Continuation of PHYSICS 130-A, PHYSICS 130-B. Wave motion, optics, and introduction to the basic concepts of modern physics including quantum mechanics, relativity, and atomic physics. Focus on conceptual understanding of basic physical principles and their real-world applications. Demonstration experiments will be used to illustrate physical phenomena and concepts. Must be taken concurrently with PHYSICS 131-C lab.

Prerequisite: PHYSICS 130-A, PHYSICS 130-B or equivalent course.

PHYSICS 131-A Physics Laboratory I (0.34 Unit)

Laboratory course associated with PHYSICS 130-A; must be taken concurrently. Credit for this course is .34 units.

PHYSICS 131-B Physics Laboratory II (0.34 Unit)

Laboratory course associated with PHYSICS 130-B; must be taken concurrently. Credit for this course is .34 units.

PHYSICS 131-C Physics Laboratory III (0.34 Unit)

Laboratory course associated with PHYSICS 130-C; must be taken concurrently. Credit for this course is .34 units.

KINS 237-CN Foundations of Human Movement (1 Unit)

An introductory course examining the biomechanical and physiological factors contributing to the control of human movement. This course concentrates on the biomechanical principles of the musculoskeletal system and how these principles impact global human movements as well as joint-specific movement. It will also encompass the foundational physiology of muscle tissue and how it facilitates movement about a joint. Learning experiences will include self-paced online modules, in-person lectures, laboratories, and task analysis activities to foster the ability to comprehend the foundational principles that drive human movement.

PHIL 269-DL Bioethics (1 Unit)

Ethical analysis of a variety of issues such as the human genome project, genetic therapy, cloning and stem cell transplantation, human and animal research, reproductive technologies, and the allocation of resources.

PRO_HLTH 390-DL Interprofessional Health Practice (1 Unit)

Interprofessional education is important for preparing health professions students to provide patient care in a collaborative team environment, as an interprofessional approach leads to improved patient outcomes. Interprofessional Health Practice promotes the development of skills and attitudes needed to work effectively in a healthcare community. Through case studies, role play, interactive activities, reflection, and research, students will increase their knowledge in the four core competencies of interprofessional work as outlined by the Interprofessional Education Collaborative (IPEC).

PSYCH 213-DL Social Psychology (1 Unit)

The purpose of this course is to introduce students to important theory, research, and methodologies in social psychology. Social psychologists examine how people interpret the social world and investigate the influence of the social environment on individuals' thoughts and behaviors. We will examine classic topics in social psychology: social cognition, social influence, conformity, group processes, helping, and prejudice. There will be a strong emphasis on methodology and the ways in which study design affects both the research questions one can answer and the conclusions one might draw. Because social psychologists sometimes investigate "everyday" behavior, students often believe that they can rely on intuition or common sense to learn about social psychology. Unfortunately, one core finding in social psychology is that common sense can be misleading at best and seriously biased at worst. Thus, this course will focus on how the scientific method helps to

provide empirical answers to questions about humans and their social world.