

## NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

### COURSE SYLLABUS

**Course Title:** Principles of the Human Body

**Course #:** BIO\* 110

**Course Description:** 3 semester hours (Hybrid course). This course is a non-majors course designed to introduce students to basic principles required to support human life. The cellular nature of life and organization and function of organs and organ systems is emphasized. In addition to the textbook, students use a variety of resources from traditional print to electronic media to acquire and evaluate relevant scientific content. Selected body systems and disease states are discussed. This course cannot be used as the prerequisite for BIO\* 211, BIO\* 235, or VET\* 201.

**Pre-requisite:** Eligibility for, or completion of, ENG\* 101. Computer skills, including email, word processing, and web navigation **are critical** for this course.

**Goals:** The goal of this course is to introduce students to biological principles as they apply to the human body, to introduce students to the structure and function of selected systems of the human body, to develop the ability to gather and read scientific content from a variety of sources and evaluate it as an information source, to understand the biological basis of selected disease states.

**Outcomes:** Upon the completion of this course, students should be able to:

- a. Evaluate scientific information sources and specific health claims.
- b. Apply principles of scientific method to specific examples.
- c. Describe the basic chemical basis of life, including atoms, molecules, bonding, pH, and properties of water.
- d. Explain the relationship between monomers and polymers and describe the structure and function of carbohydrates, proteins, lipids, and nucleic acids.
- e. Describe the basic structure and function of eukaryotic cells, including the various organelles, cytosol, and cell membranes.
- f. Recognize and identify the structure and function of a variety of tissue types, including epithelial, muscle, nervous, and connective.
- g. Recognize the various methods of transportation of substances across the cell membrane and predict the results exposure of cells to different tonicities.
- h. Discuss the importance and mechanism of homeostasis and relate this process to thermal control in humans.
- i. Compare and contrast the processes of mitosis and meiosis.
- j. Demonstrate the basic principles of genetics as they apply to humans, including inheritance, (co)dominance/recessive, multiple alleles, multifactorial traits, polygenic, nondisjunction, sex-linked traits, and common genetic disorders.
- k. Explain the process of DNA replication and identify the importance of DNA technology, including the Human Genome Project.
- l. Describe the basic process of carcinogenesis in various parts of the human body, including symptoms, treatment, and avoidance.
- m. Identify structure and functional components of a variety of body systems including but not limited to:
  - **Integumentary:** the basic structure and function of skin; the role of skin in homeostasis.

- **Musculoskeletal:** the basic structure and function of bones, including the various types; the role of bones and muscles in homeostasis; the bones of the axial and appendicular skeletons; the structure and function of different types of joints, with specific emphasis on the synovial joint of the knee; the structure and function of the three types of muscle tissue; the sarcomere unit of a muscle; terminology of muscle action.
  - **Nervous:** the structure of a neuron and neuroglia cells; the role of the nervous system in homeostasis; the afferent and effector functions of the nervous system including important neurotransmitters and the reflex arc; the action potential; the difference between the central and peripheral nervous systems, the difference between the sympathetic/parasympathetic and autonomic/somatic nerve actions; the basic structure of the brain, including meninges, hindbrain, forebrain, midbrain, with special emphasis on the cerebrum.
  - **Sensory:** the different types of sensory receptors; basic somatic sensations; the structure and function of the special sense organs, with emphasis on the ear/hearing/balance and the eye/sight.
  - **Cardiovascular:** the structure and function of the cardiovascular system, including vessels, with a special emphasis on the heart; the role of the cardiovascular system in homeostasis; the composition and function of blood, including the various cell types and their origins; blood types; the basic mechanism of clotting.
  - **Immune:** the basic body defenses against pathogens; the types of pathogens to which humans are most susceptible; the process of adaptive immunity; the results of a failed immune system; patterns of infectious disease and methods of prevention.
  - **Respiratory:** the basic structure and function of the respiratory system; the role of the respiratory system in homeostasis; the primary process of gas exchange; controls of breathing and respiration.
  - **Digestive:** the basic structure and function of the digestive system; the role of the digestive system in homeostasis; the principle of nutrition and its relation to body weight; relating consumption of nutrients and daily exercise to weight control.
  - **Endocrine:** the origin and role of hormones in the body; the role of the endocrine system in homeostasis; the glands and organs of the endocrine system and their importance; the feedback mechanisms for hormone control.
  - **Urinary:** the structure and function of the urinary system; the role of the urinary system in homeostasis; the process of diffusion and osmosis in regulating the urinary system; the basic formation of urine, including the steps of filtration, reabsorption, and secretion.
  - **Reproductive systems:** the basic structure and function of the male and female reproductive systems; the hormones involved in regulating the male and female reproductive systems; the process of spermatogenesis and oogenesis; the ovarian cycle; the process of sexual intercourse and fertilization; methods of enhancing or limiting fertility; specific sexually transmitted diseases, including symptoms and methods of avoidance.
- n. Identify basic integration of the body systems above with one another.
- o. Discuss the biological basis of selected disease states, symptoms, and current methods of treatment for each of the body systems above.