BIOL 2113 - Anatomy and Physiology I (version 201003L)

Course Title	Course Development	Learning Support
Anatomy and Physiology I	Standard	No

Course Description

Introduces the anatomy and physiology of the human body. Emphasis is placed on the development of a systemic perspective of anatomical structures, physiological processes, and chemical principles related to physiology. Topics include body organization, cell structure and functions, tissue classifications, integumentary system, skeletal system, muscular system, and nervous and sensory systems.

Pre-requisites

Regular Admission

Regstr. Co-requisites

Regstr. Co-requisites: All Required

ENGL 1101 - Composition and Rhetoric (201003L)

True Co-requisites

True Co-requisites: All Required

BIOL 2113L - Anatomy and Physiology Lab I (201003L)

Course Length

	Lecture Contact Time	Regular Lab Type	Reg. Lab Contact Time	Other Lab Type	Oth. Lab Contact Time	Total Contact Hrs
Contact Hours Per Week	**3 hrs**	**N/A**	**0 hrs**	**N/A**	**0 hrs**	**3 hrs**
Contact Min/Hrs Per Semester	**2250 min**		**0 min**		**0 min**	**45 hrs**

	Lecture Credit Hours	Lab Credit Hours	Total Credit hours	WLU
Semester Credit Hours	**3**	**0**	**3**	**101.25**

Competencies & Outcomes

Order Description

1 **Body Organization and Chemical Basis of Life**

Order	Description	Learning Domain	Level of Learning
1	Define the terms anatomy and physiology.	Cognitive	Knowledge
2	Describe the basic biological functions necessary for survival.	Cognitive	Knowledge
3	Define anatomical position.	Cognitive	Knowledge
4	Identify descriptive body terms, planes-abdominopelvic regions and quadrants, directional terms as they relate to anatomical position, body membranes and cavities.	Cognitive	Knowledge
5	Discuss complementarity between structure and function.	Cognitive	Comprehension
6	Describe the various organizational levels of the human body.	Cognitive	Knowledge
7	Define homeostasis and metabolism.	Cognitive	Knowledge

8	Define positive and negative feedback cycles and provide examples of each.	Cognitive	Knowledge
9	Describe basic atomic structure.	Cognitive	Knowledge
10	Define the terms molecule, element, compound, mixture, solution, solvent and solute and give examples of each.	Cognitive	Knowledge
11	Describe and give examples of covalent (non-polar and polar), ionic and hydrogen bonding.	Cognitive	Knowledge
12	Describe water as an inorganic compound and universal solvent.	Cognitive	Knowledge
13	List the major elements present in the body.	Cognitive	Knowledge
14	Discuss and give examples of the most important carbohydrates, proteins, lipids and nucleic acids found in the body and relate these substances to specific body structures or functions.	Cognitive	Comprehension
15	Describe intermediary metabolism.	Cognitive	Knowledge
16	Describe pH scale, acids and bases.	Cognitive	Knowledge

2 **Cell Structure and Functions**

Order	Description	Learning Domain	Level of Learning
1	Describe the structure of a typical cell.	Cognitive	Knowledge
2	List the organelles and discuss the functions of each.	Cognitive	Knowledge
3	Describe the types of movement of materials across cell membranes and relate these to functions of the cells within the body.	Cognitive	Knowledge
4	Discuss the molecular structure of DNA in relation to hereditary characteristics.	Cognitive	Comprehension
5	Discuss mitosis and meiosis.	Cognitive	Comprehension

3 **Tissue Structure and Function**

Order	Description	Learning Domain	Level of Learning
1	Define the term tissue and histology.	Cognitive	Knowledge
2	Identify the four major types of tissue in the body and their basic functions.	Cognitive	Knowledge
3	Describe the structure, function, and location of epithelial tissues in the body.	Cognitive	Knowledge
4	Describe the structure, function, and location of connective tissues in the body and contrast these to epithelial tissues.	Cognitive	Knowledge
5	Compare and Contrast the three forms of muscle tissue: skeletal, smooth and cardiac.	Cognitive	Evaluation
6	Describe the structure, function, and location of nervous tissue in the body.	Cognitive	Knowledge
7	Classify the membranes of the body and provide examples of each.	Cognitive	Analysis
8	Describe the basic steps in tissue repair.	Cognitive	Knowledge

4 **The Integumentary System**

Order	Description	Learning	Level of

		Domain	Learning
1	Discuss the functions of the skin as an organ system and its role in the homeostasis of body temperature.	Cognitive	Comprehension
2	Describe the layers, structural components, and functions of the epidermis dermis and hypodermis.	Cognitive	Knowledge
3	Describe the basic structure and function of epidermal derivatives such as hair, nails, sweat, and associated glands.	Cognitive	Knowledge
4	Discuss the classification of burns by degree and surface areas involved.	Cognitive	Comprehension
5	Discuss the three principal types of skin cancer and differentiate among them.	Cognitive	Comprehension

5 **The Skeletal System**

Order	Description	Learning Domain	Level of Learning
1	Discuss the components and functions of the skeletal system.	Cognitive	Comprehension
2	Compare and Contrast the anatomy of long and flat bones.	Cognitive	Evaluation
3	Describe the histological features of compact and spongy bone tissue.	Cognitive	Knowledge
4	Compare and Contrast intramembranous ossification and endochondral ossification.	Cognitive	Evaluation
5	Define interstitial and appositional bone growth.	Cognitive	Knowledge
6	Describe the process of bone remodeling and fracture repair.	Cognitive	Knowledge
7	Classify the principal types of bones on the basis of shape and location.	Cognitive	Analysis
8	Describe the various markings on the surface of bones.	Cognitive	Knowledge
9	Identify the bones and principal markings of the bones of the axial skeleton.	Cognitive	Knowledge
10	Identify the bones and principal markings of the bones of the appendicular skeleton.	Cognitive	Knowledge
11	Define an articulation and identify the factors that determine the types and degree of movement at a joint.	Cognitive	Knowledge
12	Classify joints based on their structure and function using proper terminology.	Cognitive	Analysis
13	Describe the movements allowed by the different types of synovial joints.	Cognitive	Knowledge
14	Describe selected articulations of the body with respect to the bones that enter into their formation, structural classification, and anatomical components.	Cognitive	Knowledge
15	Discuss selected bone diseases and common fractures.	Cognitive	Comprehension

6 **The Muscular System**

Order	Description	Learning Domain	Level of Learning
1	List the characteristics and functions of muscle tissue.	Cognitive	Knowledge
2	Discuss the organization of muscle tissues and their components.	Cognitive	Comprehension
3	Discuss the anatomy of the muscle (cell) fiber and the microscopic anatomy of the muscle cell including the sarcomere as the basic unit of muscle contraction.	Cognitive	Comprehension

4	Discuss the sliding filament theory of muscle contraction.	Cognitive	Comprehension
5	Discuss the structure and function of the neuromuscular junction.	Cognitive	Comprehension
6	Describe the movement of the action potential in skeletal muscle.	Cognitive	Knowledge
7	Describe the ATP needs and the energy sources used by skeletal muscle.	Cognitive	Knowledge
8	Explain concepts in muscle physiology such as twitch, motor unit, tetanus, as well as types of muscle fibers and muscle contractions.	Cognitive	Comprehension
9	Define origin and insertion.	Cognitive	Knowledge
10	Describe the relationship between bones and skeletal muscles in producing body movements.	Cognitive	Knowledge
11	Discuss body movements as the activities of muscle groups by explaining the roles of the prime movers, synergists, antagonist and fixators.	Cognitive	Comprehension
12	Define the criteria employed in naming skeletal muscles.	Cognitive	Knowledge
13	Identify the principal skeletal muscles in selected regions of the body and their functions.	Cognitive	Knowledge
14	Discuss selected muscle disorders.	Cognitive	Comprehension

7 **The Nervous and Sensory Systems**

Order	Description	Learning Domain	Level of Learning
1	Explain the basic functions of the nervous system in maintaining homeostasis	Cognitive	Comprehension
2	Describe the components of the central and peripheral divisions.	Cognitive	Knowledge
3	Characterize the supporting cells of neural tissues in the CNS and PNS.	Cognitive	Analysis
4	Compare and Contrast the structure and function of unipolar, bipolar, and multipolar neurons.	Cognitive	Evaluation
5	Define a synapse and describe the events that occur at the synapse.	Cognitive	Knowledge
6	Describe action potentials in terms of generation and transmission within the neuron.	Cognitive	Knowledge
7	Discuss concepts in neurophysiology such as excitatory post-synaptic potentials, inhibitory post-synaptic potentials, summation, all-or-none phenomena, and neuron regeneration.	Cognitive	Comprehension
8	Discuss common neurotransmitters.	Cognitive	Comprehension
9	Describe the layers of meninges and anatomy of the spinal cord.	Cognitive	Knowledge
10	Describe cross sectional anatomy of the spinal cord including the location of sensory and motor neurons.	Cognitive	Knowledge
11	Identify major sensory and motor tracts in the spinal cord.	Cognitive	Knowledge
12	Describe the basic components of a reflex arc and discuss the patellar, Golgi tendon, stretch, and withdrawal reflexes.	Cognitive	Knowledge
13	Identify the principal components of the spinal cord as well as spinal nerves, their derived plexi and functions.	Cognitive	Knowledge
14	Discuss the immediate and long-term effects of spinal cord injuries.	Cognitive	Comprehension
15	Identify the principal regions of the brain.	Cognitive	Knowledge

16	Explain the function of the cerebrospinal fluid, its composition, and the pathway of CSF flow.	Cognitive	Comprehension
17	Describe the blood supply to the brain and the blood-brain barrier.	Cognitive	Knowledge
18	Identify the major structural and functional areas of the cerebral cortex and cerebrum including the basal nuclei.	Cognitive	Knowledge
19	Identify the components of the diencephalon and explain their roles in homeostasis	Cognitive	Knowledge
20	Identify the three major components of the brain stem, their substructures and their functions.	Cognitive	Knowledge
21	Discuss the structure and function of the cerebellum.	Cognitive	Comprehension
22	Discuss common disorders of the central nervous system.	Cognitive	Comprehension
23	Identify the twelve pairs of cranial nerves by name, number, function and classify as each sensory, motor or mixed.	Cognitive	Knowledge
24	Identify the major nerves of the brachial plexus.	Cognitive	Knowledge
25	Identify the major nerves of the lumbosacral plexus.	Cognitive	Knowledge
26	Describe exteroceptors, interoceptors, and proprioceptors.	Cognitive	Knowledge
27	Compare the structure and functional differences between all subdivisions of the nervous system.	Cognitive	Synthesis
28	Compare and Contrast the structure and function of the parasympathetic and sympathetic nervous systems and their specific effects on target organs.	Cognitive	Evaluation
29	Discuss acetylcholine (cholinergic) and norepinephrine (adrenergic) as the major neurotransmitters in the ANS.	Cognitive	Comprehension
30	Discuss olfactory sensations and receptors.	Cognitive	Comprehension
31	Discuss gustatory sensations and receptors.	Cognitive	Comprehension
32	Describe the external and internal anatomy of the eye.	Cognitive	Knowledge
33	Discuss the visual pathway and common errors of refraction.	Cognitive	Comprehension
34	List the major structures and functions of the external ear, middle ear and internal ear.	Cognitive	Knowledge
35	Discuss selected disorders of the special senses.	Cognitive	Comprehension