

Course Description**PCB4097 | Human Physiology | 3.00 credits**

The student studies the physiology of organism's major organ systems with emphasis on humans. Student will learn the principles of physics, cell biology, and anatomy in order to explain how the different organs systems work individually and in the context of the whole organism. Prerequisites: PHY2054, 2054L, BCH3023, 3023L, and PCB 4023.

Course Competencies:

Competency 1: The student will demonstrate an understanding of the physiology of excitable cells by:

1. Discussing the general characteristics of the different types of ion channels
2. Explaining the ion and molecular mechanisms involved in the resting membrane potential of excitable cells
3. Comparing graded potentials with action potentials
4. Explaining the mechanisms for generating axonal action potentials and comparing continuous and saltatory conduction of action potentials
5. Explaining the mechanisms of synaptic transmission in the neuromuscular junction and neural synapses
6. Comparing temporal and spatial summation in neurons
7. Comparing the structural and functional bases of muscle contraction and relaxation in skeletal and smooth muscle fibers
8. Describing the mechanics of skeletal muscle contraction

Competency 2: The student will demonstrate an understanding of the physiology of nervous control by:

1. Defining homeostasis and its mechanisms and explaining its importance to survival
2. Identifying the different components of the nervous system and discussing the basis of its classification
3. Describing the morphological and functional bases of the following spinal reflexes: stretch, Golgi tendon, flexor, and cross extensor reflexes
4. Comparing the structure and function of somatic and autonomic reflexes

Competency 3: The student will demonstrate an understanding of the physiology of endocrine control by:

1. Comparing the structure and function of the sympathetic and parasympathetic nervous system comparing the nervous and endocrine control
2. Identifying all endocrine glands/tissues, the chemistry of the hormones they produce, and the mechanisms of hormone action
3. Describing the hypothalamic pituitary relationships and their physiological effects
4. Describing the structure and function of the adrenal gland and the physiological effects of the hormones produced

Competency 4: The student will demonstrate complete understanding of the functioning of the Heart, Blood, Blood Vessels, and Respiratory System in maintaining superior living organisms' homeostasis by:

1. Identifying the structural composition of the Heart, Blood, Blood Vessels, Conducting Respiratory tract, and Lungs
2. Describing the mechanism of blood perfusion to organs and systems in a living superior organism
3. Describing the mechanisms of gas exchange at the respiratory and non-respiratory systems
4. Describing the functioning of transporters of biological substances to cells and tissues
5. Illustrating the Pathophysiology of relevant important diseases: Hypertension, Coronary Artery Disease, Chronic Obstructive Pulmonary Disease, and Lung Cancer

Competency 5: The student will demonstrate full understanding of the functioning of the Urinary and Gastrointestinal Systems in maintaining a superior living organism's homeostasis by:

1. Identifying the structural composition of gastrointestinal organs and kidneys
2. Describing the mechanism of absorption of nutrients in living superior organisms
3. Describing the mechanisms of detoxification and excretion in superior organisms

4. Describing the mechanisms of regional transport and clearance of substances in the kidney
5. Illustrating the pathophysiology of relevant important diseases: Malnutrition, Obesity, Gastritis, Gastric Cancer, and Renal Failure

Learning Outcomes:

1. Communicate effectively using listening, speaking, reading, and writing skills
2. Use quantitative analytical skills to evaluate and process numerical data
3. Solve problems using critical and creative thinking and scientific reasoning
4. Describe how natural systems function and recognize the impact of humans on the environment