BME 105 - Introduction to Human Physiology I

2 Credits, 2 Contact hours
Instructor: Dr. Bruno Mantilla

Textbook(s)/Materials Required:
Fundamentals of Human Physiology, 4th Edition Lauralee Sherwood - West Virginia University

Description:
One of the core elements of this discipline is being able to understand the biological world and
the engineering world at the same time. In addition biomedical engineers need to prepare their
minds for analyzing, quantifying, thinking, and solving problems at the interface of engineering,
medicine and biology. This course sets the basic concepts for future interfacing between
engineering and physiology. BME 105 offers an overview and the fundamental concepts of
homeostasis, and how the interactions between cells, tissues and different human body systems
achieve it. This is the first of two parts in which the student is introduced to the complex field of
neurophysiology. By the end of the semester the student should understand and know the
essentials of the nervous system.

Prerequisites: NONE

Objectives:
1. **Cell differentiation, cell specialization & Homeostasis**: Cell differentiation &
specialization. Cell to cell interaction, tissues, organs and systems. Homeostasis, feedback
system as a fundamental mechanism in physiology.
2. Neuron & Glial Cell Structure: Identify the fundamental components and structure of each
of the Nervous system cells.
3. Neuron & Glial Cell Physiology:
4. Nervous System Structure and Function: Understand the brain and spinal cord as complex
organs composed of numerous regions and nuclei. The students should understand the
intricate and complex associations between the different areas of the brain, as well as the
hierarchical structure and functioning of the Peripheral, and Central Nervous System.
5. Nervous System Physiology: Understand the general organization of the central and
peripheral nervous system(NS), into autonomic and somatic branches, as well as the afferent
and efferent connections of each portion. Special emphasis is given to vision, hearing and
vestibular systems as specialized functions of the NS.

Topics: Cell Structure; Cell Physiology; Nervous System Structure; Nervous System Physiology
**Professional Component:** Medical / Biological Topics

| Outcome # 1. Students will understand the fundamental structure of the cell and its components. |
|---|---|---|---|
| Strategies & Actions | Program Outcomes | Prog. Object | Assessment Methods |
| The cell structure and functioning are covered in class lectures, class discussions, and assigned presentations. | L | 1 | Tests |

| Outcome # 2. Students will understand the basic anatomy, histology and physiology of the central and peripheral nervous system |
|---|---|---|---|
| Strategies & Actions | Program Outcomes | Prog. Object | Assessment Methods |
| Macro and micro structure of the brain and spinal cord are explained at the class. | L | 1 | Tests |