



The Hashemite University  
Faculty of Science  
Course Syllabus

**Department of Biology and Biotechnology**

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**Course Title:** Functional Anatomy

**Pre-requisite:** Bio 102

**Designation:** Required

**Instructor's E-mail:** [Esamqn@hu.edu.jo](mailto:Esamqn@hu.edu.jo)

**Office Hours :** S -10-11, M and W 10.30-11,

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**Course Number:** 110104 265

**Credit Hours:** 3

**Instructor:** Dr. Esam Qnais

**Course Description (Catalog):**

**Theory :**

This course will be designed to cover the basic principles of functional anatomy (physiology). Like a textbook it would be impossible to cover all topics of physiology in a single course. Therefore we will focus on the most important and generalized principles such as circulation, movement, respiration, and nerve conduction. Unfortunately there won't be time enough to cover some of the more specific, and interesting, aspects of physiology (e.g. specific sensory systems, specific systems of motility, etc.) but there are several other courses offered that can build upon what you learn in this course. It is hoped that when a student successfully completes this

they will have a working understanding of how human body function, and how the specific mechanisms of physiology relate to structure and the environment.

**Lab:**

The course includes up to (12) laboratory experiments. Each unit is designed to illustrate one of more specific aspects of physiology. Although most labs will be associated with a specific topic covered in the lecture and will serve to enhance the students learning of that topic others will be more independent and may serve as the students' only exposure to the theory.

**Text Book:**

**Vander's human physiology:** The mechanisms of body function by Eric P. Widmaier, Hershel Raff, Kevin T. Strang 13<sup>th</sup> edition. 2015

- **Experiments in physiology** by Gerald D Tharp-
- Weekly lab exercises will be posted on the course website

**Major Topics Covered:**

| Topics                     | No.of Weeks/<br>Contact Hours |
|----------------------------|-------------------------------|
| Introduction to the Course | 1/2                           |
| Skeletal system            | 2/2                           |

|                                     |              |
|-------------------------------------|--------------|
| Muscular system                     | 3/2          |
| Muscular system                     | 4/2          |
| Nervous system                      | 5/2          |
| Nervous system                      | 6/2          |
| Endocrine system                    | 7/2          |
| Endocrine system<br><b>MID EXAM</b> | 8/2          |
| Circulatory system                  | 9/2          |
| Circulatory system                  | 10/2         |
| Respiratory system                  | 11/2         |
| Respiratory system                  | 12/2         |
| Digestive system                    | 13/2         |
| Reproductive system                 | 14/2         |
| Lymphatic system                    | 14/2<br>15/2 |
| <b>Final exam</b>                   | 16           |

**Schedule of lab meetings:**

| <b>Lab</b>                | <b>No.of Weeks<br/>Contact Hours</b> |
|---------------------------|--------------------------------------|
| <b>Introduction</b>       | 1/3                                  |
| Microscopic calibration   | 2/3                                  |
| Cell transport mechanisms | 3/3                                  |
| Blood physiology          | 4/3                                  |
| Blood physiology          | 5/3                                  |

|  |      |
|--|------|
|  |      |
| Physiology of muscle contraction                                     | 6/3  |
| Cardiac Physiology   | 7/3  |
| <b>Mid-term exam</b>   | 8/1  |
| Measurement of Blood Pressure and Electrocardiogram and Heart Sounds | 9/3  |
| Pulmonary Ventilation  | 10/3 |
| Renal functions  | 11/3 |
| Hormones and metabolic rate  | 12/3 |
| Hormone and reproductive system                                      | 13/3 |
| Digestive system experiment  | 14/3 |
| <b>Final exam</b>  | 15/1 |

**Upon successful completion of lecture portion of this course, the students will be able to :describe, identify, and/or explain**

|             | <b>Course Learning Outcomes (CLO)</b>   | <b>(SO*)</b>      |
|-------------|---|-------------------|
| <b>CLO1</b> | The various physiological organ-systems and their importance to the integrative functions of the human body.  | (a), (b),(d), (k) |
| <b>CLO2</b> | Body fluid compartments and the ionic composition of body fluids.   | (a), (b),(d), (k) |
| <b>CLO3</b> | Movement of water and solutes between the fluid compartments  | (a), (b),(d), (k) |
| <b>CLO4</b> | The concept of homeostasis, including set point, negative and positive feedback loops, and compensatory responses.  | (a), (b),(d), (k) |
| <b>CLO5</b> | Intracellular and extracellular communication systems.  | (a), (b),(d), (k) |
| <b>CLO6</b> | Organization structural and functional organization of the nervous system, including the central and peripheral nervous systems, the autonomic nervous system, and the enteric nervous system | (a), (b),(d), (k) |
| <b>CLO7</b> | The resting membrane potential.   | (a), (b),(d), (k) |
| <b>CLO8</b> | The action potential, action potential propagation along the axon.  | (a), (b),(d), (k) |
| <b>CLO9</b> | Chemical messenger molecules of the nervous system, including classical and non-classical neurotransmitters   | (a), (b),(d), (k) |

|              |   |                      |
|--------------|---|----------------------|
| <b>CLO10</b> | Synaptic neurotransmission.   | (a), (b),(d),<br>(k) |
| <b>CLO11</b> | Basic principles of sensory physiology.   | (a), (b),(d),<br>(k) |
| <b>CLO12</b> | Structure and function of skeletal muscle, including excitation-contraction coupling, sliding filament mechanism, force generation, and isometric versus isotonic contractions.                           | (a), (b),(d),<br>(k) |
| <b>CLO13</b> | Structure and functions of the cardiovascular system, including the mechanical and electrical properties of cardiac muscle function.  | (a), (b),(d),<br>(k) |
| <b>CLO14</b> | Excitation-contraction coupling in cardiac muscle   | (a), (b),(d),<br>(k) |
| <b>CLO15</b> | Reflex regulation of blood pressure.  | (a), (b),(d),<br>(k) |
| <b>CLO16</b> | Structure and functions of the respiratory system, including lung volumes, gas exchange, and gas transport in blood.  | (a), (b),(d),<br>(k) |
| <b>CLO17</b> | Regulation of ventilation   | (a), (b),(d),<br>(k) |
| <b>CLO18</b> | Structure and functions of smooth muscle, including excitation-contraction coupling in smooth muscle.   | (a), (b),(d),<br>(k) |
| <b>CLO19</b> | Principles of hormone action, including structure, mechanism of release from endocrine cell, mode of transport in blood, mechanism of action in target cells, and systemic effects of important hormones. | (a), (b),(d),<br>(k) |
| <b>CLO20</b> | Functions of the endocrine system with focus on classic endocrine glands, including the hypothalamus and the pituitary glands, thyroid and parathyroid glands, adrenal glands, endocrine pancreas.        | (a), (b),(d),<br>(k) |
| <b>CLO21</b> | The renin-angiotensin-system.   | (a), (b),(d),<br>(k) |
| <b>CLO22</b> | Structure and functions of the kidney nephrons, including glomerular filtration, tubular reabsorption, tubular secretion, and excretion.  | (a), (b),(d),<br>(k) |
| <b>CLO23</b> | Transport of water, ions, and organic molecular across the tubular epithelia  | (a), (b),(d),<br>(k) |
| <b>CLO24</b> | Renal clearance.  | (a), (b),(d),<br>(k) |
| <b>CLO25</b> | Urinary concentrating mechanisms.   | (a), (b),(d),<br>(k) |
| <b>CLO26</b> | Acid-base balance.  | (a), (b),(d),<br>(k) |
| <b>CLO27</b> | Motility, secretion, digestion, absorption in the gastrointestinal system   | (a), (b),(d),<br>(k) |

\*(SO) = Student Outcomes Addressed by the Course.

• **Student Outcomes (SO) Addressed by the Course:**

| # | Outcomes Description                          | Contribution |
|---|---|--------------|
|   | Applied and Natural Sciences Student Outcomes |              |

|                          |  |   |
|--------------------------|--|---|
| (a)                      | an ability to apply knowledge of mathematics, science, and applied sciences  | H |
| (b)                      | an ability to design and conduct experiments, as well as to analyze and interpret data                                   | M |
| (c)                      | an ability to formulate or design a system, process or program to meet desired needs                                     | M |
| (d)                      | an ability to function on multidisciplinary teams  |   |
| (e)                      | an ability to identify and solve applied sciences problems   | M |
| (f)                      | an understanding of professional and ethical responsibility  | M |
| (g)                      | an ability to communicate effectively  |   |
| (h)                      | the broad education necessary to understand the impact of solutions in a global and societal context                     | M |
| (i)                      | a recognition of the need for, and an ability to engage in life-long learning  |   |
| (j)                      | a knowledge of contemporary issues   | M |
| (k)                      | an ability to use the techniques, skills, and modern scientific and technical tools necessary for professional practice. | M |
| Low=L ,Medium =M ,High=H |  |   |

### Assessment Instruments

|                   | Mark        |
|-------------------|-------------|
| <b>lecture</b>    |             |
| <b>first</b>      | <b>15%</b>  |
| <b>Second</b>     | <b>15 %</b> |
| <b>Final Exam</b> | <b>40%</b>  |
| Lab               |             |
| Mid               | 10%         |
| Quizzes           | 5%          |
| Final             | 15%         |

### Course policies

*University regulations apply to this course regarding class attendance, punctuality, exams, late submissions, absence with permission, penalties for cheating, and policies for assignments and projects, if any. Students should be aware of all those in addition to other rules and regulations stated and described in the student handbook*