

The Hashemite University



Deanship of Academic Development
and International Outreach

عمادة التطوير الأكاديمي
والتواصل الدولي

Syllabus*: Physiology
Code: 2219011181
Second Semester 2023 - 2024

| COURSE INFORMATION | |
|---|---|
| Course Name: Physiology Semester: Second Semester Department: Basic Dental Sciences Faculty: Dentistry | Course Code: 2219011181 Section: All Core Curriculum: Doctor of Dental Surgery (DDS) |
| Day(s) and Time(s): Section1: Monday: 11:30-13:00 Wednesday: 11:30-13:00 | Credit Hours: 4 (3 Theory + 1 Practical) Prerequisites: None |
| Classroom: Halls 301 and 302, Faculty of Medicine Building | |
| COURSE DESCRIPTION | |
| This course aims to introduce and familiarize first year medical students with basic definitions and principles related to physiology as a study of the living body at molecular, cellular as well as the level of intact organism. The basic knowledge in general and cellular physiology and fundamental of physiological principles needed for their further education are covered during this course. | |
| DELIVERY METHODS | |
| The course will be delivered through a combination of active learning strategies. These will include: <ul style="list-style-type: none">● Power Point lectures and active classroom-based discussion● Relevant papers and reading materials.● E-learning resources: e-reading assignments and practice quizzes through Microsoft Team | |

FACULTY INFORMATION

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|--------------------------|----------------------------------|
| Name: | Gehan el wakeel |
| Academic Title: | Assistant Professor |
| Office Location: | |
| Telephone Number: | |
| Email Address: | Gehanelwakeel19@gmail.com |
| Office Hours: | |

REFERENCES AND LEARNING RESOURCES**Required Textbook**

-Guyton and Hall Textbook of Medical Physiology 14th Edition (Elsevier 2021)

Additional Resources:

- All lecture slides will be uploaded as PDF files.
- All instructors have open discussion with the students during the office hours to answer any question.

Suggested Additional Resources

1. Ganong, S Review of Medical physiology 26th edition (Elsevier 2019)

STUDENT LEARNING OUTCOMES MATRIX*

TOPICS DETAILS/STUDENT LEARNING OUTCOMES MATRIX

| Course objectives | Topic and subject | Lecture No. | Intended learning outcomes | Assessment |
|---|---|--------------------|--|-------------------|
| 1. General Overview of Physiology | <ul style="list-style-type: none"> Introduction | L1 | <ul style="list-style-type: none"> Understand the general outline of the general physiology course. Attendance is optional and the students can contact the teachers about the course | MCQ |
| 1-Organization of the human body. 2 -Intracellular and extracellular fluids. 3 -The term “internal environment” of the body. 4- Homeostasis. 5- The control systems of the body. 6- Negative feedback mechanism of the body control system and the concept of gain of a control system. 7-Positive feedback mechanism 8- Adaptive control system. 9-Body water balance in steady state and functions of body water. | <ul style="list-style-type: none"> Organization of human body <ul style="list-style-type: none"> Body fluids Homeostasis Water balance | L2 | 1. Understand organization of the human body. 2. Contrast intracellular and extracellular fluids. 3. Explain the term “internal environment” of the body. 4. Recognize ionic composition of different body fluids. 5. Define Homeostasis and understand its importance. 6. Describe the control systems of the body. 7. Describe negative feedback mechanism of the body control system and the concept of gain of a control system. 8. Describe positive feedback mechanism and understand why some time this mechanism can be harmful. 9. Adaptive control system. 10. Understand body water balance in steady state and functions of body water. | MCQ |
| 1-General characters, functions structure of cell membran | <ul style="list-style-type: none"> - Cell membrane. - Transport through | L3 | 1. Recognize general characters, functions and structure of cell membrane. | MCQ |

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| <p>2-Basic principles of transport across cell membrane.</p> <p>3-Osmotic pressure</p> <p>4-Isotonic, hypotonic and hypertonic fluids.</p> <p>5-Osmotic pressure, oncotic pressure and hydrostatic pressure as factors influencing movement across the capillary wall.</p> <p>6-Intracellular and extracellular edema.</p> <p>7-Causes and factors that prevent formation of edema.</p> | <p>cell membrane.</p> <ul style="list-style-type: none"> - Basic principles of osmosis and osmotic pressure. Edema. | | <ol style="list-style-type: none"> 2. Understand basic principles of transport across cell membrane. 3. Define osmotic pressure. 4. Define isotonic, hypotonic and hypertonic fluids. 5. Differentiate the following terms: osmotic pressure, oncotic pressure and hydrostatic pressure as factors influencing movement across the capillary wall. 6. Differentiate between intracellular and extracellular edema. 7. Recognize causes and factors that prevent formation of edema. | |
| <p>1- The sympathetic and parasympathetic nervous system</p> | <ul style="list-style-type: none"> - Overview of autonomic nervous system. | <p>L4</p> | <ul style="list-style-type: none"> • Contrast the sympathetic and parasympathetic branches of the autonomic nervous system based on: spinal cord division of origin, length of preganglionic and postganglionic neurons, neurotransmitters and receptors at the ganglionic and target organ synapse. | <p>MCQ</p> |
| <ol style="list-style-type: none"> 1- The general characteristics of blood and its major functions. 2- Structure, production, and function of erythrocytes 3-Types & functions of white blood cells 4-Types of blood and how they differ, Blood | <ul style="list-style-type: none"> - Overview of hematological system. - Red and white blood cells. - Hemostasis and platelets. - Blood grouping and blood transfusion. | <p>L5</p> | <ol style="list-style-type: none"> 1. Describe the general characteristics of blood and discuss its major functions. 2. Describe structure, production, and function of erythrocytes 3. Describe types & functions of white blood cells 4. Explain the types of blood and how they differ. Discuss blood transfusion. 5. Define hemostasis and explain the | <p>MCQ</p> |

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| transfusion. 5-Hemostasis and the mechanism that help to achieve it. | | | mechanisms that help to achieve it. 6. Explain the types of blood and how they differ and discuss blood transfusion. | |
| 1-Membrane potential and mechanism of its generation. 2-How the activity of voltage – gated Na ⁺ and K ⁺ channels generates an action potential and the roles of those channels in each phase (depolarization, overshoot, repolarization, hyperpolarization) of the action potential. 3-The mechanisms of which an action potential is propagated along unmyelinated and myelinated axons. 4-Types of synapses | - Origin of bioelectric potentials - Types of synapses. | L6 | 1. Define resting membrane potential and describe mechanism of its generation. 2. Understand how the activity of voltage – gated Na ⁺ and K ⁺ channels generates an action potential and the roles of those channels in each phase (depolarization, overshoot, repolarization, hyperpolarization) of the action potential. 3. Contrast the mechanisms of which an action potential is propagated along unmyelinated and myelinated axons. 4. Recognize types of synapses. | MCQ |
| | Revision 1 st exam | L7 | | |
| 1-Neuromuscular junction. 2-How acetyl choline is released and destructed at the neuromuscular junction. 3-Properties of neuromuscular transmission | - Neuromuscular junction. - Molecular basis of skeletal muscle contraction | L8 | 1. Define neuromuscular junction. 2. Explain how acetylcholine is released and destructed at the neuromuscular junction. 3. Describe properties of neuromuscular transmission 4. Understand myasthenia gravis as a disease affecting neuromuscular transmission. 5. Identify the thick, thin filaments and bands | MCQ |

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| <p>4-Myasthenia gravis as a disease affecting neuromuscular transmission.</p> <p>5- the thick and thin filaments molecular basis of skeletal muscle contraction</p> | | | <p>of skeletal muscle fiber.</p> <p>6. Describe the molecular basis of skeletal muscle contraction.</p> <p>7. Describe the interaction between myosin and actin and the role of Ca⁺⁺ in muscle contraction.</p> | |
| <p>1-The concept of anatomic dead space.</p> <p>2-Pulmonary ventilation and alveolar ventilation.</p> <p>3-The gas exchange between alveoli and pulmonary blood and factors affect the movement of gases across alveolar wall.</p> <p>4-How oxygen and carbon dioxide are transported to and from tissues in the blood.</p> <p>5-O₂ dissociation curve and physiologic factors that can influence it.</p> <p>6-The transport of carbon dioxide in blood</p> | <ul style="list-style-type: none"> - Overview of respiratory system Alveolar and pulmonary ventilation Respiratory function of the blood | <p>L9</p> | <ol style="list-style-type: none"> 1. Understand the concept of anatomic dead space. 2. Understand the difference between pulmonary ventilation and alveolar ventilation. 3. Describe the gas exchange between alveoli and pulmonary blood and factors affect the movement of gases across alveolar wall. 4. Understands how oxygen and carbon dioxide are transported to and from tissues in the blood. 5. Describe O₂ dissociation curve and physiologic factors that can influence it. 6. Describe the transport of carbon dioxide in blood. | <p>MCQ</p> |
| <p>1-The cardiac cycle.</p> <p>2-Cardiac output and factors affecting it.</p> <p>3- blood pressure and factors affecting it.</p> <p>4-Hemorrhage and its</p> | <ul style="list-style-type: none"> - Overview of cardiovascular system and cardiac cycle. - Cardiac output, blood pressure and | <p>L10</p> | <ol style="list-style-type: none"> 1. Describe the cardiac cycle. 2. Define and understand cardiac output and factors affecting it. 3. Explain how blood pressure is created and factors affecting it. 4. Define hemorrhage and describe its | <p>MCQ</p> |

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| compensatory effects. 5-Shock | factors affecting it. - Shock - Hemorrhage. | | compensatory effects. 5. Define shock recognize its types and its treatment. | |
| 1-Endocrine as control system 2-Hormones, their chemical structure, transport and receptors. 3-The hormones released from the pituitary gland. 4- the relationship between the hypothalamus and anterior and posterior pituitary. 5-The tropic nature of anterior pituitary hormones. 6- Ca homeostasis and major Ca functions. 7- the parathyroid gland and the disorders of its function. 8-Other hormones controlling blood Ca. | - Overview of endocrine system. - Ca homeostasis. - Parathyroid gland - Hormones controlling blood calcium level. | L11 | 1. Compare endocrine with nervous systems as control systems. 2. Define hormones, their chemical structure, transport and receptors. 3. List the hormones released from the pituitary gland. 4. Understand the relationship between the hypothalamus and anterior and posterior pituitary. 5. Understand the tropic nature of anterior pituitary hormones. 6.Understand Ca homeostasis and major Ca functions. 7. Describe the parathyroid gland and the disorders of its function. 8.Recognize other hormones controlling blood Ca level. | MCQ |
| 1-The general aspects of digestion. 2-The major salivary glands, function and composition of saliva. 3-Phases of deglutition. 4-Mechanism of HCL secretion and its function. | - Overview digestives system - Salivary glands. - Deglutition - HCL and gastric mucosal barrier | L12 | 1. Describing the general aspects of digestion. 2. Recognize the major salivary glands, function and composition of saliva. 3. Describe phases of deglutition. 4. Recognize mechanism of HCL secretion and its function. 5. Describe gastric mucosal barrier. | MCQ |

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| 5-Gastric mucosal barrier | | | | |
| 1-Sensory receptors, its functions and classification. 2-pain sensation, its receptors, classification and referred pain. 3- 1ry and 2ry somatic sensory cortex. 4- primary motor area, premotor area 6 and its functions. 5-Headache. 6-Taste sensation, gustatory receptors and mechanism of stimulation of taste buds. | <ul style="list-style-type: none"> - Sensory receptors - Pain sensation - Sensory cortex - Motor cortex - Headache - Taste sensation | L13 | <ol style="list-style-type: none"> 1. Define sensory receptors ,recognize its functions and classification. 2. Define pain sensation, recognize its receptors, classification and referred pain. 3. Understand 1ry and 2ry somatic sensory cortex. 4. Understand primary motor area premotor area 6 and its functions. 5. Define headache and mention its causes 6. Understand taste sensation, gustatory receptors and mechanism of stimulation of taste buds. | MCQ |
| | Revision | L14 | | |
| | Exam | L15 | | |
| | Exam | L15 | | |

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual needs.

Special Needs Section: Student Services and Care
Unit Tel: 053903333 ext.4132/4583/5023

Location: Deanship of Students Affairs
Email: stydent@hu.edu.jo

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offense and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behavior that compromises his/her integrity as well as that of the Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

- Use of the work, ideas, images, or words of someone else without this/her permission or reference to them.
- Use of someone else's wording, name, phrase, sentence, paragraph, or essay without using quotation marks.
- Misrepresentation of the sources that were used.

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected.

Late or Missed exams: In all cases of assessment, students who fail to attend an exam on the scheduled date without prior permission and/or are unable to provide an accepted medical note will automatically receive a fail grade for this part of the assessment.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment, and their final grade will be calculated from the forms of assessment listed below, with their grade weighting taken into account.

| Assessment | Grade Weighting | Assessment Date |
|-------------------|-----------------|-----------------|
| Exam 1 | 50 | TBD |
| Final Exam | 50 | TBD |
| Total final grade | 100 | |

Description of Exams

Test questions will predominately come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of multiple-choice questions for the regular exams and short essay questions for make-up exams (for students with accepted excuses, only documented absences will be considered as per HU guidelines).

Grades are not negotiable and are awarded to the MD program according to the following criteria*:

| Letter Grade | Description | Grade Points |
|--------------|-------------|--------------|
| A+ | Excellent | 4.00 |
| A | | 3.75 |
| A- | | 3.50 |
| B+ | Very Good | 3.25 |
| B | | 3.00 |
| B- | | 2.75 |
| C+ | Good | 2.50 |
| C | | 2.25 |
| C- | | 2.00 |
| D+ | Pass | 1.75 |
| D | Pass | 1.50 |
| F | Fail | 0.00 |
| I | Incomplete | - |

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

TBD

| Week | Topic |
|------------------------|--|
| Week 1 (25/2/2024) | Introduction |
| Week 2 (4/3/2024) | - Organization of human body - Body fluids - Homeostasis -Water balance |
| Week 3 (11/03/2024) | - Cell membrane. - Transport through cell membrane. - Basic principles of osmosis and osmotic pressure. - Edema. |
| Week 4 (18/3/2024) | - Overview of autonomic nervous system. |
| Week 5 (25/3/2024) | - Overview of hematological system. - Red and white blood cells. - Hemostasis and platelets. - Blood grouping and blood transfusion. |
| Week 6 (1/4/2024) | - Origin of bioelectric potentials - Types of synapses. |
| Week 7 (8/4/2024) | Revision 1 st exam |
| Week 8 (15/4/2024) | - Neuromuscular junction. - Molecular basis of skeletal muscle contraction |
| Week 9 (22/4/2024) | - Overview of respiratory system - Alveolar and pulmonary ventilation - Respiratory function of the blood |
| Week 10 (29/4/2024) | - Overview of cardiovascular system and cardiac cycle. - Cardiac output, blood pressure and factors affecting it. - Shock - Hemorrhage. |
| Week 11 (6/5/2024) | - Overview of endocrine system. - Ca homeostasis. - Parathyroid gland - Hormones controlling blood calcium level. |
| Week 12 (13/5/2024) | - Overview digestives system - Salivary glands. - Deglutition - HCL and gastric mucosal barrier |
| Week 13 (20/5/2024) | - Sensory receptors - Pain sensation - Sensory cortex - Motor cortex |

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| | <ul style="list-style-type: none">- Headache- Taste sensation |
| Week 14 (27/5/2024) | Revision |
| Week 15 (3/6/2024) | Exam |
| Week 16 (4/6/2024) | Exam |