



مركز الاعتماد  
وَضمان الجودة  
ACCREDITATION & QUALITY ASSURANCE CENTER



**The University of Jordan**

**Accreditation & Quality Assurance Center**

**COURSE Syllabus**

1	Course title	Introduction to physiology
2	Course number	<b><u>0501110</u></b>
3	Credit hours (theory)	2
	Contact hours (theory, practical)	28
4	Prerequisites/corequisites	
5	Program title	Medical doctors
6	Program code	MD
7	Awarding institution	University of Jordan
8	Faculty	Faculty of Medicine
9	Department	Physiology and Biochemistry
10	Level of course	Bachelor
11	Year of study and semester (s)	First year, Spring semester
12	Final Qualification	-
13	Other department (s) involved in teaching the course	-
14	Language of Instruction	English
15	Date of production/revision	2022/2023

**16. Course Coordinator:**

Dr. Mohamed Khatatbeh  
 Faculty of Medicine, Room 114.  
 Variable office hours according to timetable of the coordinator, please refer to the coordinator.  
 Ext 23477  
[malessa@ju.edu.jo](mailto:malessa@ju.edu.jo)

**17. Other instructors:**

*Prof. Dr. Faisal Ismail*

Faculty of Medicine, Room 111.  
 Variable office hours according to timetable of the staff member, please refer to the instructor.

[fmmed@ju.edu.jo](mailto:fmmed@ju.edu.jo)

**18. Course Description:**

This course focuses on the main physiological principles and laws needed to understand different topics in physiology later on. Negative and positive feedbacks in relation to homeostasis are discussed. Therefore, this course tackles units, body fluid compartments, osmotic pressure & osmolarity, transport mechanisms, different types of action potentials, microcirculations, signal transduction and neurotransmitters, ANS and receptor physiology. Briefly, this course makes it easier for medical students to understand the physiology of different body systems in the next two years. The course does not survey the anatomy and physiology of any of our body organs and systems.

**19. Course aims and outcomes:**

**A- Aims:** By the end of the course the student is expected to:

1. Use the previous knowledge in high school and integrate them in the current course (mathematical equations, concepts in biology, chemistry and physics etc.)
2. Gain the appropriate basic knowledge and skills to help students to understand the normal and abnormal functions of different body systems covered by the 9 systems in the 2nd and 3rd medical years (42 credit hours).

**B- Intended Learning Outcomes (ILOs):**

Successful completion of the course should lead to the following outcomes:

**A. Knowledge and Understanding:** Student is expected to

- A1. Differentiate between negative & positive feedback in maintaining homeostasis, use appropriate examples in each case (Blood Pressure regulation, Hemostasis etc).
- A2. Distinguish between the different components of the cell membrane, how such differences affect membrane permeability.
- A3. Recognize the different types of transport systems (Passive vs. active); their features, significance, sites etc.
- A4. Distinguish between different types of units and terms used in physiology such as moles, osmoles, equivalent, osmosis & osmotic pressure. The student should be able to convert between units and pick up the right unit for each substance
- A5. Identify body fluid compartments in term of fluid distribution & measurements. Know the constituents of EC & IC fluids in term of solutes, electrolytes, osmolarity etc.
- A6. Recognize the difference between tonicity, osmolality and osmolarity.
- A7. Distinguish between different types of body fluid abnormalities: hypo-osmotic dehydration & overhydration, hyper-osmotic dehydration & overhydration. Differentiate between different types of edema (intracellular vs. extracellular; pitting vs. nonpitting; generalized vs. localized etc)
- A8. Predicts the basis of membrane excitability. Resting membrane potential: origin and determinants, distribution of different ions across cell membranes, calculate electrochemical equilibrium for Na<sup>+</sup>, K<sup>+</sup>, Ca<sup>++</sup>, and Cl<sup>-</sup> using Nernst equation as a predictor for RMP plus other more complicated equations (e.g. Goldman-Hodgkin-Katz equation).
- A9. Describe synaptic function, basis of action potential generation and conduction and differentiate between excitatory post synaptic potential EPSP and inhibitory post synaptic potential IPSP.
- A10. Compare and contrast between different types of action Potential AP: Fast response AP vs slow response AP
- A11. Calculate the net filtration pressure across capillary membranes: The microcirculation: capillary structure; fluid filtration & reabsorption (Starling Forces) and the role of the lymphatic system.
- A12. Differentiate between all factors affecting basic neuronal circuits: synapses: types, transmission of AP, neurotransmitters, facilitation, inhibition, summation, electrical events, processing, fatigue...etc.
- A13. Differentiate the different types of neurons and the basis of their classifications
- A14. Predict the different effects of neurotransmitters on their specific receptors
- A15. Compare and contrast the two divisions of the autonomic nervous system; sympathetic and parasympathetic.
- A16. Compare the basis of different types of signal transduction, mechanism of actions, and mediators.
- A17. Describe mechanism of steroid hormones actions.

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to

<p>B1. Integrate physiology with other branches of science (Math, chemistry, biology etc)</p> <p>B2. Apply these basic principles in more complicated Physiological concepts and mechanisms to be discussed in the coming two years (2nd and 3rd medical years).</p> <p>B3. Predict the logic behind using different units in expressing concentrations.</p> <p>B4. Suggest the basic units used in physiological measurements.</p> <p>B5. Suggest the proper equation in calculating RMP</p> <p>B6. Predict the type of AP based on RMP and its importance.</p> <p>B7. Distinguish between physiology of microcirculation and its related pathological changes and thus the formation of edema</p>
<p><b>C. Subject- Specific Skills:</b> Students is expected to</p> <p>C1. Convert concentration in g/l to M/l and Osmole/l</p> <p>C2. Calculate amounts to prepare isotonic solutions from NaCl, CaCl<sub>2</sub> and glucose.</p> <p>C3. Calculate E<sub>Na+</sub>, E<sub>K+</sub>, E<sub>Cl-</sub>, E<sub>Ca++</sub>.</p> <p>C4. Calculate RMP using relative permeability and conductance</p>
<p><b>D. Transferable Key Skills:</b> Students is expected to</p> <p>D1. Implement mathematical equations in physiological concepts</p> <p>D2. Utilize information technology in learning</p>

## 20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Introduction and homeostasis, Cell Membrane Physiology,	1	Physiology section	A1, A2, B1, B2	MCQ exams	Textbook of Medical physiology: Guyton
Transport-I (Passive), Transport-II (Active)	2	Physiology section	A3,	MCQ exams	As above
Units, Body fluid compartments, Body Water,	3	Physiology section	A4, A5, A6, B3, B4, C1, C2	MCQ exams	As above
Abnormalities of body fluid,	4	Physiology section	A7	MCQ exams	As above
Excitable Membranes: Resting Membrane Potential, Electrochemical Equilibrium (Nernst Equation), (Goldman Hodgkin Katz equation)	5	Physiology section	A8, B5, B6, C3, C4, D1	MCQ exams	As above
Action potential: Phases, Conduction,	6	Physiology section	A8, A9	MCQ exams	As above
Synapse, Excitatory Post Synaptic (EPSP) and Inhibitory Post	7	Physiology section	A9	MCQ exams	As above

Synaptic Potential (IPSP), All or none versus graded AP					
Action Potential: Cardiac Action Potential (Fast Response AP) Vs Slow Response AP (The Pacemaker Concept)	8	Physiology section	A10	MCQ Exams	
Microcirculation:	9	Physiology section	A11, B7	MCQ Exams	
Basic neuronal circuits	10	Physiology section	A12	MCQ Exams	
Neurons, Neurotransmitters	11	Physiology section	A13, A14	MCQ Exams	
ANS (Autonomic Nervous System)	12	Physiology section	A15	MCQ Exams	
Receptors	13	Physiology section	A16	MCQ Exams	
Signal transduction, Steroids	14	Physiology section	A16, A17	MCQ Exams	

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### 21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- 1- Didactic lectures presented in power point slides will be provided for students.
- 2- Assigned chapters from the text book are expected to be read by students.

### 22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

- MCQ exams designed to achieve ILO's of the course.
- Midterm 40%, Student activities 10%, Final 50%

### 23. Course Policies:

A- Attendance policies: According to rules and regulation of the University, please refer to University of Jordan Students Handbook (page 13 and 14) <http://registration.ju.edu.jo/Documents/daleel.pdf>

B- Absences from exams and handing in assignments on time: According to rules and regulation of the University, please refer to University of Jordan Students Handbook (page 16 and 17) <http://registration.ju.edu.jo/Documents/daleel.pdf>

C- Health and safety procedures: lab work related health and safety measures are given to students by the instructors in every lab session.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

According to rules and regulation of the University, please refer to University of Jordan Students Handbook (page 62-70) <http://registration.ju.edu.jo/RegRegulations/pdf>

E- Grading policy:

Rules are preset by the Faculty and Department Councils.

F- Available university services that support achievement in the course:

Main University Library, School of Medicine library, Medical Skills lab for illustration and simulation,  
School of Medicine Lab of Physiology.

#### 24. Required equipment:

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#### 25. References:

A- Required book (s), assigned reading and audio-visuals:

Textbook of medical physiology by: Guyton and Hall Textbook of Medical Physiology, 13th Edition

By John E. Hall, PhD

B- Recommended books, materials, and media:

1. Physiology, by: Robert Berne & Matthew Levy, 7th. ed.

2. Best and Taylors Physiological Basis of Medical Practice

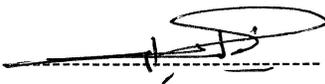
by: John B. West, 12th. ed 1990.

3. Human physiology, by: Lauralee Sherwood, last edition.

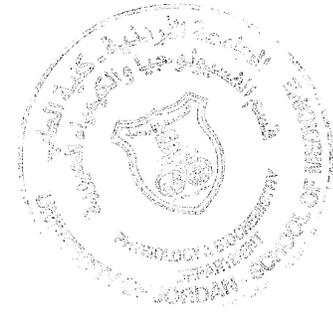
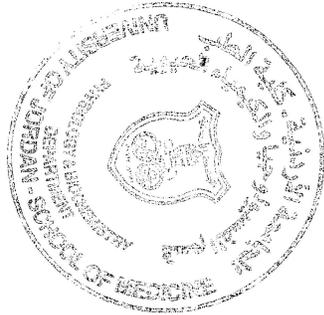
#### 26. Additional information:

Nothing

Course File

Name of Course Coordinator: -----Signature: ----- Date: ----- Head  
of curriculum committee/Department: ----- Signature: -----  
Head of Department: ----- Signature: -----  
Head of curriculum committee/Faculty: *د. نبال سنان* Signature:  -----  
Dean: -----Signature: -----

Copy to:  
Head of Department  
Assistant Dean for Quality Assurance  
Course File



*2022, 2023*