

Course Syllabus

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|----|--|--------------------------------------|--|
| 1 | Course title | Advanced Animal Physiology | |
| 2 | Course number | 0304761 | |
| 3 | Credit hours (theory, practical) | 3 Credit Hour | |
| | Contact hours (theory, practical) | 3 | |
| 4 | Prerequisites/corequisites | None | |
| 5 | Program title | MSc. of Biological Sciences | |
| 6 | Program code | 04 | |
| 7 | Awarding institution | Master degree in Biological Sciences | |
| 8 | School | Science | |
| 9 | Department | Department of Biological Sciences | |
| 10 | Level of course | Graduate | |
| 11 | Year of study and semester (s) | Second semester 2017/2018 | |
| 12 | Final Qualification | MSc. | |
| 13 | Other department (s) involved in teaching the course | None | |
| 14 | Language of Instruction | English | |
| 15 | Date of production/revision | 2018 | |

16. Course Coordinator:

Dr. Hana Hammad

Office No.: 308

Office Hour: Sunday and Tuesday 11:00 – 12:00

Email address: hhammad@ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

None

18. Course Description:

Basic concepts of physiology such as homeostasis, membrane biophysics, signal regulation and transduction, membrane excitabilities and ion channels, patch-clamp and voltage clamp techniques and their applications in the analysis of membrane current ion channels as targets for drugs and toxins, synaptic transmission and sensory transduction.

19. Course aims and outcomes:

A- Aims:

To provide students with advanced knowledge of physiology, such as homeostasis, membrane biophysics, signal regulation and transduction, membrane excitabilities and ion channels, patch-clamp and voltage clamp techniques and their applications in the analysis of membrane current ion channels as targets for drugs and toxins, synaptic transmission and sensory transduction.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to

- 1- Mention The recent fundamental knowledge in the field of cell physiology
- 2- Describe some biophysical laws and their relation to physiology.
- 3- Describe the functional organization of the cell
- 4- Discuss the structure of cell membrane
- 5- Discuss the different classes of membrane proteins.
- 6- Discuss regulation of extracellular fluid composition and volume.
- 7- Discuss plasma proteins, volume they occupy and effect of their charge.
- 8- Explain transport of solutes and water across cell membranes
- 9- Discuss structural and functional characteristics of receptors; receptor-mediated intracellular signaling
- 10- Point out the basis of excitability (membrane potentials) in all living cells especially in nerve and muscle cells.
- 11- Explain ionic basis of membrane potential.
- 12- Discuss mechanisms of nerve and muscle action potentials.
- 13- Point out the ion channels involved in action potential and signal transduction.
- 14- Describe the structure, properties and functions of neuronal synapses grossly and at the molecular level.
- 15- Explain the functions of the nerve cell grossly and at the molecular level.
- 16- Classify the functional organization of neurons.
- 17- Describe the modulatory systems.
- 18- Point out the neurotransmitter systems of the brain
- 19-. Describe the plasticity of central synapses

20. Topic Outline and Schedule:

| Topic | Week | Instructor | Achieved ILOs | Evaluation Methods | Reference |
|--|-------|------------|---------------|--------------------|-----------|
| Introduction | 1 | | | | |
| Structure of Biological Membranes | 2-3 | | 1,2,3,4,5,8 | | |
| Function of Membrane Proteins | 4 | | 5 | | |
| The Intracellular and Extracellular fluids | 5 | | 6,8 | | |
| Diffusion, osmosis, and membrane transport | 6-7 | | 7,8 | | |
| Ion channels and transporters: principles of operation | 8 | | 5,8 | | |
| Mechanisms of cellular communication | 9 | | 5,9 | | |
| Electrophysiology of cell membrane | 10-11 | | 10,11,12,13 | | |
| Mechanisms of nerve and muscle action potential | 12 | | 11,12,13 | | |
| The | 13 | | 14 | | |

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|---------------------------------------|-------|--|-------|--|--|
| neuromuscular junction | | | | | |
| Organization of the nervous system | 14 | | 15.16 | | |
| Neurotransmitter systems of the brain | 15 | | 17,18 | | |
| Synaptic Plasticity | 15-16 | | 19 | | |

21. Teaching Methods and Assignments:

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

Lectures and in class discussion

22. Evaluation Methods and Course Requirements:

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

Written exams, term paper, presentation and papers discussion.

23. Course Policies:

A- Attendance policies:
Students are allowed to not attend 15% of lectures in the whole semester.

B- Absences from exams and handing in assignments on time:
If a student does not attend an exam, he/she will get zero grade in that exam, unless, he/she shows a medical report that proves he/she could not attend the exam. In this case, a makeup exam will be offered to the student as soon as possible.

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

University regulations will be implemented for any cheating attempt, plagiarism and misbehavior.

E- Grading policy:

| Evaluation | Grade |
|----------------------------|--------------|
| Midterm Exam | 30 |
| Final Exam | 40 |
| In class discussion | 10 |
| Term paper | 15 |
| Presentation | 5 |

F- Available university services that support achievement in the course:
The university provides personnel to help in exams.

24. Required equipment: (Facilities, Tools, Labs, Training....)

1. Data show
2. Computer

25. References:

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

Boron, WF. & Boulpaep EL. Medical Physiology, 2nd Updated Ed. Philadelphia, Elsevier Inc. 2012

Recommended books, materials, and media:

26. Additional information:

Name of Course Coordinator: ---Dr. Hana Hammad-----Signature: ----- Date: -23/12/2018

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: -----Signature: -----