The Hebrew University of Jerusalem

Syllabus

introduction to CELLULAR PHYSIOLOGY - 96102

Last update 25-08-2021

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Medicine

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Ein Karem

Course/Module Coordinator: Prof Baruch Minke

Coordinator Email: baruch.minke@mail.huji.ac.il

Coordinator Office Hours: By appointment

Teaching Staff:

Prof Baruch Minke,
Dr. Ithai Rabinowitch,
Ms. Efrat Sheinbach,
Mr. Elad Avidan,
Ms. Maayan Gadot,
Ms. Inbal Fuchs,
Mr. Lior Matityahu,
Mr. Michael Yunerman,
Ms. devora gershon

Course/Module description:
physiology of excitable tissues, nerve, muscle, contractility and synaptic transmission.

Course/Module aims:
To provide an overview of the cellular, molecular and global neuronal processes underlying the functions of excitable tissues.

Learning outcomes - On successful completion of this module, students should be able to:
On successful completion of this module, students should be able to:
• Explain how the electrical activity of neurons is produced in biophysical terms.
• Apply biophysical principles to explain the function of neurons, muscles and sensory systems.
• Describe the mechanisms underlying neuronal function, synaptic transmission.
• Describe the signaling pathways which regulate activity of synapses, skeletal muscles in a state of health and some cases of disease.
• Select techniques suitable for the evaluation of cellular and molecular processes that account for the electrical activity of neurons, muscles and sensory cells as well as their basic functions.

Attendance requirements(%):
Tutorials (100%)
laboratories 100%

Teaching arrangement and method of instruction: Lectures, Tutorials & laboratories (computer simulations)

Course/Module Content:
• Mechanisms of passive and active movement of ions across membranes.

• Hodgkin and Huxley model of channel gating.
• Physiology of axons, propagation of the action potential and molecular structure of ion channels.
• Physiology of muscles, mechanics, structure-function relationship, contractility, molecular mechanism of contraction and excitation contraction coupling.
• Cellular communication, synaptic transmission, pre and post synaptic processes, neurotransmitters, excitatory and inhibitory synapses.

Required Reading:
None

Additional Reading Material:
1. From Neuron to Brain by J.G. Nicholls, R. Martin, B. G. Wallace & P. A. Fuchs 4th edition Sinauer Associates Inc. Publisher
2. Principles of Neural
Science by E.R. Kandel, J.H. Schwartz and T.M. Jessell 5th edition McGraw-HillNY

Course/Module evaluation:
End of year written/oral examination 85 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 15 %
laboratories

Additional information:
Participation in exercises is mandatory. Unjustified absences from Tutorial will subtract 2.5 points from the final grade.
Unjustified absences from
a Laboratory will subtract 5 points from the final grade.
Passing test grade is mandatory for weighting with laboratories grade.