The Hebrew University of Jerusalem

Syllabus

From Molecules to Neurons - 6164

Last update 05-09-2021

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Cognitive and Brain Sciences

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: E. Safra Mt. Scopus

Course/Module Coordinator: Yoav Adam

Coordinator Email: yoav.adam@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Dr. Yoav Adam,
Dr. Noami Habib,
Ms. Maayan Gadot,
Ms. Efrat Sheinbach,
Ms. Eden Deri

Course/Module description:

In this course we will introduce the molecular and cellular basis for the activity of the nervous system. We will start with basic introduction for molecular and cellular biology. We will learn about the organization of living cells, what is the structure and function of fundamental biological molecules (DNA, RNA, Proteins), and the basic processes in living cells and their regulation. Next, we will introduce the various cells in the nervous system and the communication between them. We will study in detail the structure and function of nerve cells, how they integrate and transmit information, and how they communicate. During the course we will also introduce the basic research methods in cellular neurobiology.

Course/Module aims:

The course aims to introduce students to the basic principles necessary for understanding the cellular basis for the function of the nervous system.

Learning outcomes - On successful completion of this module, students should be able to:

At the end of the course the students will be familiar with:
• What are living cells, how are they organized and what are the basic molecules and processes necessary for their function.
• What are the main cell types in the nervous system and what is their function in the healthy and diseased brain
• What are the unique functional and structural properties of neurons
• What are the principles of active and passive propagation in neuros
• What is a synapse? How do synapses function and how they change (synaptic plasticity)

Attendance requirements(%):

Students are expected to participate in most lectures

Teaching arrangement and method of instruction: Frontal lectures and active discussion. Lectures will be recorded.

Course/Module Content:

- *Cell structure*
- *DNA, RNA, and proteins*
- *Basic cellular processes (e.g. transcription, translation) and their regulation*
- *Cells of the nervous system and their function in the healthy and diseased brain*
- *Cellular membrane and its electrical properties*
- *Signal propagation in neurons*
- *Synaptic communication*
- *Synaptic plasticity*

Required Reading:

NA

Additional Reading Material:

No required reading, lectures will be based on selected chapters from the following books:

"Molecular Biology of the Cell", by Lodish (8th edition)
"Principles of Neural Science", by Kandel (5th edition)
"Principles of Neurobiology", by Liqun Luo (1st edition)

Course/Module evaluation:

End of year written/oral examination 80 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 20 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information: