האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

The nervous system of the healthy person - 96207

Last update 29-10-2020

HU Credits: *8*

Degree/Cycle: *1st degree (Bachelor)*

Responsible Department: *Medicine*

Academic year: *0*

Semester: *2nd Semester*

Teaching Languages: *Hebrew*

Campus: *Ein Karem*

Course/Module Coordinator: *Prof. Lili Anglister*

Coordinator Email: *lilia@ekmd.huji.ac.il*

Coordinator Office Hours: *Please set up the appointment by email*

Teaching Staff:

Prof Lili Anglister,
Prof Oded Behar,
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Ms. ,
Ms. ,
Mr. ,
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Ms. ,
Mr. Michael Yunerman

Course/Module description:

This integrative course combines lectures in the fields of neuroanatomy, neurophysiology and neurohistology. The course is given in a 5 week period (overall 120 hours) and contains frontal lectures, as well as laboratories of brain anatomy (dissections); physiology laboratories and exercises in physiology and histology. The syllabus of the course appears below. Briefly, the course begins with description of the structure of nerve cells, their multiple types and biophysical properties. Next, the details of the neuronal organization into functional circuits are discussed. The series of lectures will describe the synaptic properties of central neurons. In parallel the responses of nervous system to trauma (e.g. degeneration, denervation, regeneration and re-innervation) will be taught focusing on trophic interactions between neurons and glia cells and between neurons and their target cells. Next, anatomical, histological and physiological aspects in detection and analysis of tactile, temperature, noxious, visual and auditory stimuli will be taught. It will be followed by studying various aspects of movement and motor control. Finally, structure and function of the limbic system and hypothalamus, functional organization of the cortex and higher brain functions (e.g. language) will be discussed.

Course/Module aims:

Provide students with knowledge of the detailed structures and functions of the central (brain, spinal cord) and peripheral nervous system, based on general developmental and neurobiological principles; Lead to the understanding of the structure-function relationship in the nervous system under normal healthy conditions, and provide the basis for understanding the pathophysiology of trauma, lesions and neurological diseases.

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

- *Recognize in detail the gross anatomy of the central and peripheral nervous*

system.
• Explain how the nervous is constructed based on organization, developmental and neurobiological principles.
• Understand and explain how the nervous system controls and executes various functions of the normal healthy human: sensation, movement, emotion, and higher brain functions.
• Understand and predict the consequences of specific injuries and neurological diseases.

Attendance requirements(%):
100% - The full presence is required for all parts of the course, the failure to fulfill this requirement may lead to reduced grade or failure in the course

Teaching arrangement and method of instruction: Lectures and laboratories of human brain dissections and in physiology histology with personal guidance and discussions, combined with practice using computer software with 3D imaging designed for the study of brain and nervous system structure and function.

Course/Module Content:
Part A - Lectures in Neurobiology and systems:

• Introduction to the cellular composition of the Nervous System (neurons, glia and synapses) and their organization into anatomical-functional circuits.
• Central synapses. Exictatation and inhibition. Glial cells. Synaptic basis of learning and memory.
• Spinal-cord and peripheral nerves.
• Tropic interactions between neurons and glia cells and between neurons and target cells they innervate.
• The response of the Nervous System to trauma.
• Structure and function of somatosensory system
• Visual system.
• Auditory system.
• Motor system.
• Limbic system and hypothalamus.
• Functional organization of the cortex and higher brain functions.

Part B - Structure of the Human Brain (lectures and lab):
• General topography of the brain and spinal cord, development, meninges, ventricles, CSF circulation, blood supply, cranial nerves
• The cerebrum:
- Hemispheres, cortex and topography,
- White matter: association, projection and commissural fibers

- Basal nuclei (ganglia), amygdala, internal capsule
• Diencephalon, lateral and third ventricles, development of the diencephalon, cerebrum and temporal lobe. Choroid plexus and CSF formation
• Sections through the brain: identification of structures in sections and imaging
• Brainstem: midbrain, pons, medulla- nuclei and tracts.
• Cerebellum Functional anatomy of the cerebellum.
• Forth ventricle and neighboring structures.

Required Reading:
- Gitlin's dissector of the human brain
- The Human Nervous System, Kiernan, J.A. Lippincott-Raven
- Anatomy Atlas (Netter/Sobota/Other(

Additional Reading Material:
- Essentials of Neural Science and Behavior, Kandel, E., Schwartz, J.H., Jessel, T.M. Apppelton & Lange
- From Neuron to Brain, Nicholls, J., Martin, A.R., Wallace, B. Sinauer
- Neuroscience, Purves,D., Augustine, G.J., et al. Sinauer
- Gitlin's dissector of the human brain
- The Human Nervous System, Kiernan, J.A. Lippincott-Raven
- Anatomy Atlas (Netter/Sobota/Other)

Course/Module evaluation:
End of year written/oral examination 57 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 20 %
Other 23 %
Practical Exam in dissection

Additional information: