Doctoral School: **Biology Doctoral School**
Doctoral Program: Neuroscience and Human Biology

Subject code: **BIO/7/46**
Subject title: **Psychophysiology of sensory functions L**
Teacher and Neptun code: **Dr. Hajnik Tünde (NG7DEN)**
Credits: 4
Class hours: 2 hours/week, lecture

Aims of the course
The aim of the lecture is to present in detail the physiological and psychological background of various perceptual processes. It also describes the reflexes and movement regulation processes based on certain sensory processes.
Contents of the course
1. General characteristics of sensory functions. Photometric concepts: photon, light intensity, illumination, light temperature, refraction, focal length, diffraction, camera obscura, etc.
2. Structure of the visual organ (structure of the lens of the eye, iris - the 'color of the eye', special structure of the fovea, etc.) Phototransduction, activation and inactivation mechanisms, their role in temporal resolution. The multiple role of the pigment epithelium.
3. Retinal neurons: bipolar, horizontal, amacrine and ganglion cell types. Integration of visual information: on-off system, receptive field, simultaneous contrast, adaptation to lighting conditions Factors influencing resolution. Spatial frequency channels, dark adaptation, aftereffects.
4. Brightness and color constant (and their illusions). Time summation, critical fusion frequency. Midget pathway, parasol system, and rod pathway analysis. The special role of the S pathway.
5. The visual pathway. Structure of the visual cortex: retinotopy, ocular dominance, hypercolumns, blob-interblob structure. Primary cells, complex cells, etc. Extrastriatal cortex. Ventral and dorsal processing pathways. The role of visual attention. Melanopsin-containing ganglion cells.
6. The evolution of color vision. Dichromacy, Trichromacy. Color vision abnormalities. Color theory. Color spaces, color mixing, gamut (color mixing of monitors, printers). Spatial vision, horopter, stereograms, illusions related to spatial vision.
7. Visual persistence, motion blur, apparent motion, history of motion picture, cinematology, TV broadcasting trends. Principles of organizing visual perception.
8. Reflexes related to vision.
9. The sound. Structure of the hearing organ. Tonotopy. Function of hair cells. Hearing thresholds: absolute and differential thresholds for volume and pitch. Musical intervals, musical tunings. The tone (harmonics, vibrato, tremolo). Directional hearing.
10. The auditory pathway. Hearing reflexes. Auditory illusions. Hearing impairments: diagnosis and therapy.
11. Characteristics of somatosensory perception. Thermoreceptor ion channels. Nociception, analgesic mechanisms. The mystique of itching.
12. Chemoreceptors. Cortical processing of chemical information.
Requirements
Written exam
Grade is determined by the exam result.

Literature

Power point slides