

ISTINYE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF NEUROSCIENCE (THESIS)
COURSE DESCRIPTIONS

1st SEMESTER

Neurophysiology-1 | 10 ECTS

Physiological properties of nerve cell, membrane properties and permeability, transport of ions, membrane resting potential, action potential formation and communication, receptors and receptor activation, G proteins in nerve transmission, role of second messengers.

Human Anatomy | 10 ECTS

Basic structures of the nervous system, spinal cord, spinal nerves and plexuses, brain stem, cerebellum and reticular formation, cranial nerves, brain and related structures, brain blood circulation, motor and sensory pathways, movement control, sensory organs, limbic system, autonomic nervous system, high cerebral functions.

Master of Science Thesis Advisory-1 | 1 ECTS

It includes discussions with the student about thesis, considering the interests of the student.

Master Of Science Specialized Field Course-1 | 5 ECTS

Reviewing the topics of interest of all graduate students and evaluating new developments

2nd SEMESTER

Neurophysiology-2 | 10 ECTS

Electrical events in the nerve cell, properties and types of synapses, synaptic transmission mechanism, neurotransmitter release mechanism, microphysiology of chemical transmission, functional properties of synapses, physiology of neuroglia cells, cellular and molecular mechanism of neuronal plasticity

Seminars | 6 ECTS

Oral presentation

Scientific Research Techniques And Publication Ethics | 7 ECTS

The research methods used in neuroscience, statistical analysis and study designs, ethical approaches related to the applications in patients and experimental animals and the publication stage

Master Of Science Thesis Advisory-2 | 1 ECTS

It includes discussions with the student about thesis, considering the interests of the student.

Master Of Science Specialized Field Course-2 | 5 ECTS

Reviewing the topics of interest of all graduate students and evaluating new developments

3rd SEMESTER

Master Of Science Thesis Advisory-3 | 1 ECTS

Students will be able to make literature review and plan their thesis by considering the thesis topic.

Master Of Science Specialized Field Course-3 | 5 ECTS

The students who started the thesis plan the thesis process with the thesis supervisor.

Thesis Project | 24 ECTS

4th SEMESTER

Master of Science Thesis Advisory-4 | 1 ECTS

Students will take technical methodological and theoretical advises about their thesis.

Master of Science Specialized Field Course-4 | 5 ECTS

Student carry out the thesis, provide financial follow-up, provide material, conduct experiments, interpret and report the results and take part in the publication process.

Thesis Project | 24 ECTS

ELECTIVE COURSES

Neurobiochemistry | 8 ECTS

Structures and functions of biomolecules, oxidation, respiratory chain, vitamins, enzymes, metabolic pathways of biomolecules, synthesis of neuronal proteins

Neuroimmunology | 6 ECTS

The concept of immunology, antigens, antibodies, active-passive immunology, function of humoral and cellular immune system, cellular system elements, tissue antigens and compatibility system, major histocompatibility complex in humans, minor histocompatibility of antigens and their properties, immune damage mechanism, central nervous system immunology, peripheral effects of immune system changes on central nervous system, effects of central nervous system on immune system, immune mediators and hormones of central nervous system

Introduction To Electrophysiology | 8 ECTS

Basic electrophysiology techniques used in neuroscience research, basic electroencephalography (EEG), evoked potentials and event related recording techniques, processing of data with advanced processing and analysis programs, long-term EEG / Video monitoring and general operation principles of intracranial EEG systems, electromyography (EMG) and related methods (intraoperative neuromonitorization, etc.) and methods of analyzing the data in patients / patients

Basic Mathematics For Neuroscience | 6 ECTS

Numbers, functions, limit and continuity, arrays, derivatives, integrals, partial derivatives, vectors, infinite series, generalized integrals, Fourier series and integrals, complex variable functions

Imaging Techniques In Neuroscience | 8 ECTS

Brain imaging methods, computed tomography, magnetic resonance imaging, magnetic resonance spectroscopy, SPECT, PET, neurotransmitter marking studies, functional magnetic resonance imaging, imaging of central and peripheral nervous system anomalies and pathologies, imaging techniques in neuroscience research

Computational Neuroscience | 8 ECTS

Introduction to computational neuroscience, computational neuroscience methods for understanding brain function, neuroscience related technologies, brain computer interfaces, neural network modeling, sensory, motor and cognitive modeling, molecular modeling, neuroinformatics, analysis programs and analysis methods of neuroscience data, artificial intelligence, components of human-computer interaction, the use of interactive systems and information technology

Biostatistics | 6 ECTS

Evaluation of scientific data, average, standard error and deviation calculation, parametric and non-parametric statistical tests, graphic and table preparation, statistical meaning and demonstration, the use of statistics in health sciences

Laboratory Rotation | 6 ECTS

The planning phase of the experiment in the laboratory, the use of data collection methods, the development of techniques, the establishment of the system, conducting experiments, evaluating the results and analysis

Cell Culture Techniques In Neuroscience | 7 ECTS

Theoretical knowledge of nerve cell culture as a basic research method and practical application of neuron culture

Neurogenetic | 6 ECTS

Genetic concepts, types of inheritance, genetics of Alzheimer's disease, genetics in Parkinson's disease and other movement disorders, genetics of stroke, genetics of multiple sclerosis, hereditary muscle diseases, genetic characteristics in peripheral nerve diseases

Introduction To Behavioral And Cognitive Neuroscience | 7 ECTS

Neural control of psychological and cognitive functions, neural networks, learning, memory, language, developmental cognitive neuroscience, electroencephalography, executive functions, decision-making, social cognition, neuro-biological factors controlling behavior, stress and social behavior, behavior models of psychiatric and neurological diseases, experimental psychology and analysis methods, the role of neuropeptides in the formation of social behaviors, stress, anxiety, depression, emotional and motivational brain (limbic system), fasting, and hypothalamic control of sexual behavior

Neuropsychology | 7 ECTS

Neuropsychological assessment, neuropsychometric tests, historical perspective, developmental neuropsychology, attention, learning and memory related neuropsychometric assessment, neuropsychometric findings in learning and memory disorders, frontal processes, frontal processes and neuropsychometric reflections, emotion and neural systems, neurophysiology of language, aphasia and neuropsychometric evaluation of dementia, use of neuropsychometry as a research method.

Pathophysiology Of Nervous System | 6 ECTS

Emergence mechanisms and consequences of nervous system disease and traumatic disorders, basic molecular and cellular neurophathologic mechanisms, myelin and autoimmune disorders, overexcitation toxicity, ischemic brain injury, axon damage, disorders related to excitability, toxic damage of the nervous system, Parkinson's disease, amyotrophic lateral sclerosis disease, multiple sclerosis disease, Alzheimer's disease, stroke, epilepsy and migraine

Basic Neuropharmacology | 6 ECTS

Reaction, distribution, biotransformation and excretion, drug-receptor relationship, agonist, antagonist, partial agonist and inverse-agonist definitions, development of tolerance, effects of drugs on synapses and neurosuppressive junctions, excitation, inhibition and disinhibition mechanisms of drugs, neuroregulator, neurotransmitter, neuromodulator, neuromediators, neurohormones, central nervous system effects of drugs, the classification of drugs affecting the central nervous system

Sleep And Basic Features Of Sleep | 8 ECTS

Normal sleep physiology, sleep disorders, related anatomical structures, effect of genetics, etiology, narcolepsy, parasomnias, diagnostic methods, polysomnography, current treatments