**COURSE UNIT (MODULE) DESCRIPTION**

| Course unit (module) title | Code |
|---|---|
| **Neuroanatomy** | |

| Lecturer(s) | Department(s) where the course unit (module) is delivered |
|---|---|
| **Coordinator:** Prof. Dr. Valentina Vengeliene (30 h)<br><br>**Other(s):** PhD student Ieva Pocevičiūtė (18 h) | Department of Neurobiology and Biophysics,<br>Faculty of Natural Sciences, Vilnius University |

| Study cycle | Type of the course unit (module) |
|---|---|
| Second | Compulsory |

| Mode of delivery | Period when the course unit (module) is delivered | Language(s) of instruction |
|---|---|---|
| Face-to-face/remote | 1st (autumn) semester | Lithuanian/English |

| Requirements for students | |
|---|---|
| **Prerequisites:**<br>Good English comprehension. | **Additional requirements (if any):** |

| Course (module) volume in credits | Total student's workload | Contact hours | Self-study hours |
|---|---|---|---|
| 5 | 133 | 48 | 85 |

| Purpose of the course unit (module): programme competences to be developed | | |
|---|---|---|
| This unit will develop key attributes that are essential for neuroscience graduates – knowledge of structural and functional neuroanatomy, basic neuroanatomical research techniques, literature searching skills, and ability to communicate neuroscience through oral presentation. | | |
| **Learning outcomes of the course unit (module)** | **Teaching and learning methods** | **Assessment methods** |
| The student will learn overall organisation and cellular composition of the nervous system, anatomy and functions of the central and peripheral nervous systems, interrelations between them and the most studied functional systems responsible for controlling animal physiology, emotions and behaviour. | Lectures and self-study, face-to-face discussions | Exam |
| The student will learn to search for new or missing information in various databases, to analyse and systemize information. The student will be able to present collected information orally in a systemic, clear way. The student will also learn to ask presentation-related questions. | Lectures, self-study (selected reading from the current literature available on the MEDLINE database), face-to-face discussions during seminars. | Presentation of acquired information orally (ppt presentation). |

| Content: breakdown of the topics | Contact hours | | | | | | | Self-study work: time and assignments | |
|---|---|---|---|---|---|---|---|---|---|
| | Lectures | Tutorials | Seminars | Exercises | Laboratory work | Internship/work placement | **Contact hours** | **Self-study hours** | **Assignments** |
| 1. Introduction: overall organisation and cellular composition of the nervous system, protection of the central nervous system (meninges, blood-brain-barrier, cerebrospinal fluid, ventricular system). | 2 | | | | | | **2** | **4** | Preparing for the exam |
| 2. The central nervous system: anatomy and functions of the brain (cerebral hemispheres, diencephalon, cerebellum, brainstem) and spinal cord. | 12 | | | | | | **12** | **24** | Preparing for the exam |
| 3. Peripheral nervous system: anatomy and functions (cranial and peripheral nerves, innervation, degeneration and regeneration). | 8 | | | | | | **8** | **16** | Preparing for the exam |
| 4. Functional systems: autonomic nervous system, stress system, limbic system, pain perception. | 8 | | | | | | **8** | **16** | Preparing for the exam |
| 5. Seminars for getting acquainted with neuroanatomical research techniques. | | | 18 | | | | **18** | **25** | Oral presentation, face-to-face discussions during seminars. |
| **Total** | **30** | | **18** | | | | **48** | **85** | |

| Assessment strategy | Weight, % | Deadline | Assessment criteria |
|---|---|---|---|
| Seminar | 20% | Mid-semester | Oral presentation of the neuroanatomy-relevant research article/s and participation in discussions during seminars. The student is evaluated by his/her ability to present information orally, to find complete and validated information; to find reliable and comprehensive information sources and to achieve the overall goal of the neuroanatomy seminar. Evaluation of the oral presentation is carried out using a 0-2 point system (worst-best). The opponent will be assigned to each presenter who will be required to ask questions and participate in face-to-face discussion. Good/bad performance of the opponent will affect overall evaluation of the seminar (performance of the opponent will be evaluated by removing/adding up to 0.2 points). |
| 2 tests | 10% each | Mid-semester and end-semester | These tests will be designed in the style of the final exam and will be evaluated using a 0-1 point system (worst-best). |
| Exam | 60% | End-semester | The student is evaluated according to the depth of his/her knowledge. Evaluation is carried out using a 0-6 point system (worst-best). |

| Author | Year of publication | Title | Issue of a periodical or volume of a publication | Publishing place and house or web link |
|---|---|---|---|---|
| **Compulsory reading** | | | | |
| Eds. Mtui E, Gruener G, Dockery P | 2021 | Fitzgerald's Clinical Neuroanatomy and Neuroscience | 8th edition | Elsevier |
| Eds. Kandel ER, Schwartz JH, Jessell TM | 2021 | Principles of Neural Science | 6th edition | McGraw-Hill |
| **Optional reading** | | | | |
| Waxman SG | 2024 | Clinical Neuroanatomy | 30th edition | McGraw Hill |
| Rao M, Gershon M. | 2016 | The bowel and beyond: the enteric | Nat Rev | https://pubmed |

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|---|---|---|---|---|
| | | nervous system in neurological disorders. | Gastroenterol Hepatol 13:517-528 | .ncbi.nlm.nih.gov/ |
| Soria FN, Miguelez C, Peñagarikano O, Tønnesen J | 2020 | Current Techniques for Investigating the Brain Extracellular Space. | Front Neurosci 14:570750. | |
| Murphy | 2019 | Olfactory and other sensory impairments in Alzheimer disease. | Nat Rev Neurol 15:11-24. | |
| Michael FM, Patel SP, Rabchevsky AG | 2019 | Intraspinal Plasticity Associated With the Development of Autonomic Dysreflexia After Complete Spinal Cord Injury. | Front Cell Neurosci, 13:505. | |
| Šimić G, Tkalčić M, Vukić V, et al. | 2021 | Understanding Emotions: Origins and Roles of the Amygdala. | Biomolecules, 11:823. | |
| Fontenas L, Kucenas S. | 2017 | Livin' On The Edge: glia shape nervous system transition zones. | Curr Opin Neurobiol, 47:44-51. | |
| Chen CZ, Neumann B, Förster S, Franklin RJM. | 2021 | Schwann cell remyelination of the central nervous system: why does it happen and what are the benefits? | Open Biol, 11:200352. | |
| Sporns O | 2013 | Structure and function of complex brain networks. | Dialogues Clin Neurosci, 5:247-262. | |
| Power JD, Cohen AL, Nelson, et al. | 2011 | Functional network organization of the human brain. | Neuron, 72:665-678. | |
| Monaghan P, Spencer KA | 2014 | Stress and life history. | Curr Biol, 24:R408-R412. | |
| Bains JS, Wamsteeker Cusulin JI, Inoue W | 2015 | Stress-related synaptic plasticity in the hypothalamus. | Nat Rev Neurosci, 16:377-388. | |