

**DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES  
AT VILNIUS UNIVERSITY**

|   |  |                 |                      |                   |
|---|--|-----------------|----------------------|-------------------|
| <b>Scientific Area/eas, Field/ds of Science</b>   | Medical and Health Sciences (M 000): Medicine (M 001); Public Health (M 004); Nursing (M 005)  |                 |                      |                   |
| <b>Faculty, Institute, Department/Clinic</b>  | Faculty of Medicine<br>Institute of Clinical Medicine<br>Clinic of Neurology and Neurosurgery  |                 |                      |                   |
| <b>Course unit title</b><br>(ECTS credits, hours)   | <b>Head and Spine Trauma</b><br>7 credits (189 hours)  |                 |                      |                   |
| <b>Study method</b>   | <b>Lectures</b>  | <b>Seminars</b> | <b>Consultations</b> | <b>Self-study</b> |
| Number of ECTS credits  | -  | -               | 1                    | 6                 |
| <b>Method of the assessment</b><br>(in 10 point system)   | <b>Examination.</b><br>Exams are conducted in written and oral forms. Two questions on the topics given in the course unit description are asked by the commission. The doctoral student is given time to prepare a written answer. Answers are given orally. The maximum score for each question is 5 points, the total score is the sum of the scores for both questions, rounded to the nearest whole number. The depth of knowledge of the topic, the application of the latest knowledge, the ability to present and discuss it are assessed. |                 |                      |                   |
| <b>PURPOSE OF THE COURSE UNIT</b>   |  |                 |                      |                   |
| Acquire basic knowledge of epidemiology, manifestation, diagnostics, conservative and surgical treatment, prognosis of head and spine trauma.   |  |                 |                      |                   |
| <b>THE MAIN TOPICS OF COURSE UNIT</b>   |  |                 |                      |                   |
| Epidemiology of brain trauma. Disorders of consciousness degree. Coma level assessment. Glasgow coma scale. Etiology of coma. Examination of the patient in coma and the main methods of treatment: cardiovascular stabilization of the patient, basic blood tests. Determination of brain death. Cerebral edema, etiopathogenesis, clinical symptoms, diagnosis. Conservative treatment, indications for surgical treatment and principles of surgical treatment. Dislocations and herniations of the brain and brainstem structures. Differential diagnosis of brain herniations. Classification of traumatic brain injuries. Assessment of the severity of traumatic brain injury. Calvaria and skullbase fractures, clinical and radiological symptoms. Depressed skull fractures. Craniofacial trauma. Characteristics of skull fractures in children. Principles and methods for the treatment of skull fractures. Injuries to the frontal sinus, compound fractures of the orbital roof with optic nerve dysfunction. Brain contusion, concussion, compression: manifestation, diagnostics, principles of treatment. Epidural, subdural and intracerebral traumatic hematomas. Acute, subacute and chronic hemorrhages. Intracranial pressure, its measurement methods and correction. Radiological tests (X-ray, computerized tomography of the head, magnetic resonance imaging). Etiopathogenesis and clinical characteristics, diagnosis and surgical treatment of traumatic cerebral hemorrhages. Mixed brain injuries, clinical features, diagnostics, principles of surgical treatment. Gunshot wounds of the brain. Inflammatory, cerebrospinal fluid circulation and vascular complications of early and late brain injuries. Craniotomy and decompressive craniectomy. Primary burr holes applications. Dural opening, suturing and duraplasty (auto-, homo-, hetero-). Methods of bleeding control in neurosurgery. Homo- and heteroplasty methods for skull defects, indications and techniques for encephalolysis. Skullbase reconstruction due to cerebrospinal fluid fistulas, methods of surgery. Anterior and posterior horn puncture of the lateral ventricles. Methods of |  |                 |                      |                   |

long-term ventricular drainage. Traumatic intracranial hemorrhages removal operations. Cranioplasty surgery. Contrast of cerebrospinal fluid fistula. Post-traumatic hydrocephalus, its diagnostics and treatment methods.

Epidemiology of spinal injury. Simple and neurocompromised vertebral fractures. Biomechanics of spinal fractures, resistance columns. Classification of spinal fractures. Rotational, hyperflexion and hyperextension fracture mechanisms. Pathophysiology of spinal cord injuries, manifestation. Spinal shock. Principles of conservative treatment for spinal shock. The concept of spinal stability. Neurocompromised spinal fractures. Spinal cord injuries: concussion, contusion, compression, complete tearing. Manifestation, topical diagnostics. Syndromes of partial spinal cord injury. Conservative treatment of patients with spinal cord injury, prevention of complications. Surgery for spinal trauma. Methods of surgical treatment of spinal cord injury. Mixed injuries of the spine and spinal cord, principles of surgical treatment. Complications of spinal cord injuries (bedsores, pneumonia, urosepsis, sepsis, muscle spasm, contractures), their prevention and treatment of complications. Neuropathic bladder.

### **RECOMMENDED LITERATURE SOURCES**

1. Winn H. (ed). Youmans and Winn Neurological Surgery. 8th edition. Elsevier, 2022
2. Quinones-Hinojosa A (ed.). Schmidek&Sweet operative neurosurgical techniques: indications, methods, and results. 7th edition. Elsevier. 2021.
3. Budrys V (red.). Klinikinė neurologija. 2as leidimas. Vaistų žinios. 2009.
4. Budrys V. Urgentinė neurologija. Vilnius: Vaistų žinios, 2011
5. Greenberg MS (ed). Handbook of neurosurgery, 9th edition. Thieme. New York. 2019.
6. Watkins RG III, Watkins RG IV (eds.). Surgical approaches to the spine. 3rd edition. Springer. 2015
7. Gean AD. Brain injury: applications from war and terrorism. Wolters Kluwer. 2014
8. Honeybul S (ed). Traumatic Brain Injury: Science, Practice, Evidence and Ethics. Springer. 2021.
9. Cooper PR. Golfinos JG (eds). Head injury. McGraw-Hill. New York. 2000.
10. Ko HY (ed). Management and Rehabilitation of Spinal Cord Injuries. Springer. 2019.

### **CONSULTING LECTURERS**

1. Coordinating lecturer: Saulius Ročka (Prof. Dr.).
2. Robertas Kvaščevičius (Assist. Prof. Dr.).
3. Gunaras Terbetas (Assist. Prof. Dr.).
4. Aidas Preikšaitis (Assist. Prof. Dr.).

### **APPROVED:**

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University:  
29<sup>th</sup> of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė