SYLLABUS

1. General information on the course

Full course name	Neurosurgery
Full official name of a higher education institution	Sumy State University
Full name of a structural unit	Academic and Research Medical Institute. Кафедра нейрохірургії та неврології з курсами психіатрії, наркології, медичної психології, професійних хвороб
Author(s)	Kmyta Oleksii Petrovych
Cycle/higher education level	The Second Level Of Higher Education, National Qualifications Framework Of Ukraine – The 7th Level, QF-LLL – The 7th Level, FQ-EHEA – The Second Cycle
Semester	1 weeks across 9 semester
Workload	1 ECTS, 30 hours. For full-time course 20 hours are working hours with the lecturer (20 hours of seminars), 10 hours of the individual study.
Language(s)	English

2. Place in the study programme

Relation to curriculum	Compulsory course available for study programme "Medicine"
Prerequisites	Krok-1, Necessary knowledge of: Latin language and medical terminology, - medical biology, - medical informatics, - human anatomy, - physiology, - histology, cytology and embryology, - biological and bioorganic chemistry, - microbiology, virology and immunology , - pathomorphology, - pathophysiology, - pharmacology, - hygiene and ecology, - propaedeutics of pediatrics, - nursing practice, - radiology, - general surgery
Additional requirements	There are no specific requirements
Restrictions	There are no specific restrictions

3. Aims of the course

determine the etiological and pathogenetic factors of the most common neurosurgical diseases, determine the tactics of patient management and analyze the data of auxiliary examinations, evaluate the typical clinical picture and make a preliminary diagnosis of the main neurosurgical diseases, analyze the main indicators of laboratory and instrumental research methods, make a diagnosis and provide emergency medical assistance to patients with emergency situations

4. Contents

Topic 1 Closed traumatic brain injury Classification. Clinic, diagnosis and treatment of concussion, stroke and compression of the brain. Obstetric TBI. Providing first aid to patients with TBI at the scene of the accident and at the pre-hospital stage. Modern diagnostic methods, assessment of their informativeness. Cracks and fractures of the skull. Indications for surgical treatment of TBI in the acute and remote periods. Methods of opening the skull cavity, principles of operations on the brain. Methods of stopping bleeding from soft tissues of the head, dura mater, vessels of brain tissue. Early and late complications of closed TBI. Conservative treatment of TBI in the remote period of the disease. Rehabilitation and readaptation of patients who have suffered a closed TBI. Peculiarities of the course of brain injury depending on age. Peculiarities of surgical treatment of TBI in the elderly.
Topic 2 Severe brain injury. Gunshot wounds (damages) to the skull, brain classification, clinic, diagnosis. Combined and combined TBI, clinical and diagnostic features. Principles of providing emergency care to patients with open, combined and combined TBI at the scene of the accident and at various stages of evacuation. Auxiliary methods of research in the diagnosis of TBI. Primary surgical treatment of open penetrating and non-penetrating wounds of the skull and brain. Early and late complications of open TBI, principles of surgical treatment. Plastic surgery of skull bone defects. Gunshot wounds of the skull and brain, their classification and clinic. First aid for skull injuries on the battlefield. Medical sorting and content of medical care at the stages of evacuation. Features of the course of TBI depending on the age and physical condition of patients. Emergency care, principles of treatment and prevention. Dispensary observation, rehabilitation of patients who have suffered severe and gunshot TBI.
Topic 3 Spine and spinal cord injury. Gunshot wounds (damage) to the spine and spinal cord Etiopathogenesis of traumatic lesions of the spine and spinal cord. Classification. Clinic of various types of spinal cord and spine injuries depending on the level of injury. Clinical and instrumental diagnostics. Evaluation of detected changes when using auxiliary methods of diagnosis of traumatic injuries of the spinal cord and spine. Emergency care for patients with traumatic lesions of the spine and spinal cord, basic methods and principles of transport immobilization of patients depending on the level of damage. Indications for surgical treatment of spinal cord injury. Modern methods of treatment of spinal cord and spine injuries. Prevention and treatment of complications in the acute and remote periods. Rehabilitation treatment of patients. Fire injuries of the spine and spinal cord. Clinical picture and diagnosis. Periods of clinical course. First aid on the battlefield. The scope of medical assistance at the stages of medical evacuation. Multiple injuries of the head, spine and other parts of a person (trunk, limbs). Medical assistance in field conditions and extreme situations. Features of preparation for evacuation. Provisions on non-transportability.
Topic 4 Injuries of the peripheral nervous system Classification of traumatic injuries of peripheral nerves. Clinic. Diagnostics. Emergency care for patients with traumatic damage to peripheral nerves. Compression-ischemic (tunnel) neuropathies. Algorithm for determining the tactics of treatment of open and closed injuries of peripheral nerves. Basic principles and methods of surgical interventions for peripheral nerve injury depending on the type, level and mechanism of damage. Principles of restorative treatment of patients in the postoperative period. Peculiarities of the course of peripheral nerve injury and surgical treatment in the elderly.

Topic 5 Brain tumors

Classification. Clinic. Diagnostics. Pathophysiological mechanisms of formation of hypertension syndrome. General brain and focal symptoms. Pathogenesis of primary and secondary symptoms in brain tumors. The value of auxiliary examinations (ophthalmological examination, craniography, ultrasound, ECHOEG, EEG, pneumoencephalography, angiography, computer tomography, MRI, SPECT) in the diagnosis of brain tumors. Principles of surgical treatment of brain tumors depending on histostructure and localization. Radical and palliative operations, their principles. Combined and radiosurgical treatment of brain tumors. Emergency care for acute intracranial hypertension syndrome and dislocation syndromes. Rehabilitation and readaptation of patients after surgical intervention for brain tumors. The importance of bad habits in the occurrence of volume lesions of the brain.

Topic 6 Tumors of the spine and spinal cord. Syringomyelia

Classification. Features of the clinic depending on the localization of the tumor and the nature of its growth. Modern methods of diagnosis of spinal cord tumors. The value of auxiliary methods in the examination of patients with tumors of the spinal cord and the differential diagnosis of this pathology. Methods of surgical treatment of spinal cord tumors. Laminectomy technique. Prevention of complications in spinal cord tumors (urosepsis, sepsis, bedsores). Restorative treatment in the postoperative period. Rehabilitation of patients after removal of spinal cord tumors. Syringomyelia Classification. Pathogenesis. Clinic. Diagnostics. Emergency aid. Indications for surgical treatment and its principles depending on the level and degree of damage. Restorative treatment in the postoperative period, rehabilitation of patients. Rehabilitation and social readaptation of patients with syringomyelia.

Topic 7 Vascular diseases of the brain and spinal cord

Classification. Clinic. Etiopathogenesis. Methods of diagnosis of cerebral vascular pathology. Vascular diseases of the brain that require surgical treatment. Clinic, diagnosis and treatment of aneurysms, arteriovenous malformations, carotid-cavernous shunts in the acute and remote periods. Emergency care for patients with acute disorders of cerebral circulation. Modern methods of surgical treatment of patients with cerebral vascular pathology. Restorative treatment in the postoperative period. Prevention of vascular diseases of the brain. Rehabilitation and readaptation of patients with cerebral vascular pathology. Peculiarities of etiopathogenesis and the course of cerebral vascular pathology in the elderly. Peculiarities of rehabilitation of the elderly after an acute cerebrovascular accident. Types of pathology of main vessels manifested by acute and chronic ischemia of the brain. Classification. Etiopathogenesis. The importance of hypertension and other diseases in the development of atherosclerosis of vessels, as the main factor in the development of cerebral blood circulation disorders of the ischemic type. Clinic, diagnosis and treatment of stenoses, thrombosis and thromboembolism of cerebral vessels.

Topic 8 Degenerative diseases of the spine

Classification. Pathogenesis. Clinic. Diagnostics. Emergency care for radicular pain syndrome. Indications for surgical treatment in degenerative diseases of the spine and its principles depending on the level and degree of damage. Restorative treatment in the postoperative period, rehabilitation of patients. Prevention of osteochondrosis. Rehabilitation and social readaptation of patients with diseases of the spinal cord and spine.

Topic 9 Children's neurosurgery. Malformations of the brain and spinal cord. Hydrocephalus Pathogenesis. Clinic. Diagnostics. Classification. Auxiliary methods of diagnosis of malformations of the brain and spinal cord. Prenatal diagnosis. Modern methods and principles of surgical treatment of congenital CNS lesions. Prevention of malformations of the brain and spinal cord. Auxiliary methods of diagnosis of hydrocephalus. Prenatal diagnosis. Modern methods and principles of surgical treatment of hydrocephalus. The main types of surgical interventions and liquefaction shunt operations, indications for their performance and methods of implementation. Emergency care for shunt dysfunction. Rehabilitation and social readaptation of patients. Restorative treatment of patients in the postoperative period.
Topic 10 Differentiated scoring The final control is carried out by writing a written work in the form of writing tests and a situational task.

5. Intended learning outcomes of the course

After successful study of the course, the student will be able to:

LO1	To be able to collect medical information, analyze clinical data of neurosurgical patients.
LO2	Determine the necessary list of laboratory and instrumental studies and evaluate the results.
LO3	To establish a preliminary and clinical diagnosis of the disease of neurosurgical patients.
LO4	To determine the necessary mode of work, rest and the nature of nutrition in the treatment of diseases of neurosurgical patients.
LO5	Determine the principles and nature of treatment of diseases and perform medical manipulations of neurosurgical patients.
LO6	Diagnose emergency conditions, determine the tactics of providing emergency medical care, conducting treatment and evacuation measures for neurosurgical patients.
LO7	Solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account the aspects of social and ethical responsibility of neurosurgical patients.
LO8	Carry out sanitary and hygienic and preventive measures for neurosurgical patients.
LO9	To carry out examinations of the working capacity of neurosurgical patients.
LO10	Be able to maintain medical documentation of neurosurgical patients, including electronic forms.
LO11	Assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, and population.
LO12	Integrate knowledge and solve complex health care problems in broad or multidisciplinary contexts.

LO13	To determine the principles of the necessary regime of work, rest and the nature of nutrition in the treatment of diseases of neurosurgical patients
LO14	To determine the principles of the nature of nutrition in the treatment of diseases of neurosurgical patients
LO15	To determine the tactics of providing emergency medical aid, carrying out treatment and evacuation measures for neurosurgical patients.
LO16	To determine the principles of performing medical manipulations of neurosurgical patients.
LO17	Be able to identify emergency situations, choose the tactics of providing emergency medical care to neurosurgical patients.

6. Role of the course in the achievement of programme learning outcomes

Programme learning outcomes achieved by the course.
For 222 Medicine:

PO1	Identify and identify leading clinical symptoms and syndromes (according to list 1); according to standard methods, using the previous data of the patient's history, the data of the patient's examination, knowledge about the person, his organs and systems, establish the most likely nosological or syndromic preliminary clinical diagnosis of the disease (according to list 2).
PO2	Collect information about the patient's general condition, evaluate the patient's psychomotor and physical development, the state of organs and systems of the body, based on the results of laboratory and instrumental studies, evaluate information about the diagnosis (according to list 4).
PO3	Prescribe and analyze additional (mandatory and optional) examination methods (laboratory, X-ray, functional and/or instrumental) according to list 4, of patients with diseases of organs and body systems for differential diagnosis of diseases (according to list 2).
PO4	To establish the final clinical diagnosis by making a reasoned decision and logical analysis of the received subjective and objective data of clinical, additional examination, carrying out differential diagnosis), observing the relevant ethical and legal norms, under the control of the head physician in the conditions of a medical institution (according to list 2).
PO5	Determine the main clinical syndrome or what causes the severity of the victim/victim's condition (according to list 3) by making a reasoned decision and assessing the person's condition under any circumstances (at home, on the street, in a health care facility, its unit), including in conditions of emergency and hostilities, in field conditions, in conditions of lack of information and limited time.

PO6	Determine the nature and principles of treatment (conservative, operative) of patients with diseases (according to list 2) in the conditions of a health care facility, at the patient's home and at the stages of medical evacuation, including in field conditions, on the basis of a preliminary clinical diagnosis, observing the relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes based on the principles of evidence-based medicine, in case of the need to expand the standard scheme, be able to justify personalized recommendations under the control of the supervising physician in the conditions of a medical institution.
PO7	Determine the necessary regime of work and rest during the treatment of patients with diseases (according to list 2) in the conditions of a health care institution, at the patient's home and at the stages of medical evacuation, including in the field, on the basis of a preliminary clinical diagnosis, observing the relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes.
PO8	Determine the necessary diet during the treatment of patients with diseases (according to list 2) in the conditions of a health care institution, at the patient's home and at the stages of medical evacuation, including in field conditions on the basis of a preliminary clinical diagnosis, observing relevant ethical and legal norms, by making a reasoned decision according to existing algorithms and standard schemes.
PO11	Determine the tactics of providing emergency medical care, under any circumstances, observing the relevant ethical and legal norms, by making a reasoned decision, based on the main clinical syndrome (severity of the condition) of the diagnosis of an emergency (according to list 3) in conditions of limited time using standard schemes based on the principles of evidence-based medicine.
PO12	Provide emergency medical care, under any circumstances, in compliance with the relevant ethical and legal norms, by making a reasoned decision, based on the main clinical syndrome (severity of the condition) of the diagnosis of an emergency (according to list 3) in conditions of limited time in accordance with the defined tactics, using standard schemes based on the principles of evidence-based medicine.
PO13	To organize medical and evacuation measures among the population and military personnel, in the conditions of an emergency and hostilities, including in field conditions, during the deployed stages of medical evacuation, taking into account the existing system of medical evacuation support.
PO14	Perform medical manipulations (according to list 5) in the conditions of a medical institution, at home or at work based on a previous clinical diagnosis and/or indicators of the patient's condition by making a reasoned decision, observing the relevant ethical and legal norms.
PO15	Perform manipulations of providing emergency medical aid in limited time, using standard schemes, under any circumstances based on the diagnosis of an emergency (according to list 3).
PO16	Plan and implement a system of sanitary-hygienic and preventive measures for the occurrence and spread of diseases among the population.

PO18	Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information. Apply modern digital technologies, specialized software, and statistical data analysis methods to solve complex healthcare problems.
PO19	Assess the impact of the environment on the health of the population.
PO21	To organize the necessary level of individual safety (own and the persons he cares for) in case of typical dangerous situations in the individual field of activity.

7. Soft Skills

SS1	Ability to abstract thinking, analysis and synthesis.
SS2	Ability to learn, master modern knowledge and apply it in practical situations.
SS3	Knowledge and understanding of the subject area and understanding of professional activity.
SS4	Ability to adapt and act in a new situation.
SS5	Ability to make informed decisions; work in a team; interpersonal skills.
SS6	Ability to use information and communication technologies.
SS7	Determination and persistence in relation to assigned tasks and assumed responsibilities.

8. Teaching and learning activities

Topic 1. Closed traumatic brain injury
pr.tr.1 "Closed traumatic brain injury" (full-time course) Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching movies) with further discussion.
Topic 2. Severe brain injury. Gunshot wounds (damages) to the skull, brain
pr.tr.2 "Severe brain injury. Gunshot wounds (damages) to the skull, brain" (full-time course) Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of students' preparation, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities, examination of radiography, computer tomography, and magnetic resonance imaging data using a simulation center. The study of this topic involves the use of virtual simulation (watching films about) with further discussion. Role games. If possible, work at the patient's bedside in specialized departments of the medical institution (according to the cooperation agreement between the medical institution and the university).
Topic 3. Spine and spinal cord injury. Gunshot wounds (damage) to the spine and spinal cord

pr.tr.3 "Spine and spinal cord injury. Gunshot wounds (damage) to the spine and spinal cord" (full-time course)

Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).

Topic 4. Injuries of the peripheral nervous system

pr.tr.4 "Injuries of the peripheral nervous system" (full-time course)

Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).

Topic 5. Brain tumors

pr.tr.5 "Brain tumors" (full-time course)

Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).

Topic 6. Tumors of the spine and spinal cord. Syringomyelia

pr.tr.6 "Tumors of the spine and spinal cord. Syringomyelia" (full-time course)

Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).

Topic 7. Vascular diseases of the brain and spinal cord
pr.tr.7 "Vascular diseases of the brain and spinal cord" (full-time course) Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).
Topic 8. Degenerative diseases of the spine
pr.tr.8 "Degenerative diseases of the spine" (full-time course) Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of training of students, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of radiography data, computer tomography, magnetic resonance tomography using simulation center Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).
Topic 9. Children's neurosurgery. Malformations of the brain and spinal cord. Hydrocephalus
pr.tr.9 "Children's neurosurgery. Malformations of the brain and spinal cord. Hydrocephalus" (full-time course) Control is carried out in accordance with the specific goals of the topic, during the individual work of the teacher with the student. To assess the level of students' preparation, the following are used: oral survey, written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities at the patient's bedside, examination of data from radiography, computer tomography, magnetic resonance tomography, lumbar punctures, examination of the shunt system using the simulation center. Application of virtual simulation (watching films on the methodology of conducting instrumental and functional examination methods) with further discussion. In the absence of quarantine restrictions, work in the departments of the medical institution (according to the cooperation agreement between the medical institution and the university).
Topic 10. Differentiated scoring
pr.tr.10 "Differentiated scoring" (full-time course) To assess the level of students' training, the following are used: written testing, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities.

9. Teaching methods

9.1 Teaching methods

Course involves learning through:

TM1	Team- based learning (TBL)
TM2	Research- based learning (RBL)
TM3	Self-study
TM4	Case-based learning
TM5	Electronic learning

individual work of the teacher with the student during an oral survey, analysis, written testing with a discussion of the results, solving situational problems, problems from the KROC-2 exam, control of practical skills and abilities. The discipline is taught using modern teaching methods (CBL TBL RBL)

communication skills, leadership, the ability to take responsibility and work in critical conditions, the ability to resolve conflicts, work in a team, manage your time, understanding the importance of deadlines, the ability to think logically and systematically, creativity, resourcefulness, stress resistance

9.2 Learning activities

LA1	Watching movies
LA2	Electronic training in systems (Zoom, Meet, Telegram).
LA3	Self-study
LA4	Solving situational problems
LA5	Preparation for current and final control

10. Methods and criteria for assessment

10.1. Assessment criteria

Definition	National scale	Rating scale
Outstanding performance without errors	5 (Excellent)	170 ≤ RD ≤ 200
Above the average standard but with minor errors	4 (Good)	140 ≤ RD < 169
Fair but with significant shortcomings	3 (Satisfactory)	120 ≤ RD < 139
Fail – some more work required before the credit can be awarded	2 (Fail)	0 ≤ RD < 119

10.2 Formative assessment

	Description	**Deadline, weeks**	**Feedback**

FA1 Independent performance of situational exercises by students in practical classes and their discussion.	Establish a clinical diagnosis by making a reasoned decision and logical analysis of the received subjective and objective data of clinical and additional examination methods, carrying out differential diagnosis).	during the entire period of study	adjustment together with students of approaches to learning, taking into account the results of the assessment
FA2 Self-assessment of current testing	Conducting error analysis after testing	during the entire period of study	testing
FA3 Survey and teacher's oral comments based on his results	It provides an opportunity to identify the state of educational experience acquired by students in accordance with the set goals, to find out the prerequisites for the state of formation of the obtained results, the causes of difficulties, to adjust the learning process, to track the dynamics of the formation of learning results and to forecast their development.	during the entire period of study	According to the obtained data on the results of training, based on their analysis, it is proposed to determine the evaluation as an indicator of the achievements of the educational activities of the applicants
FA4 Review and evaluation of written assignments	A method of effective verification of the level of assimilation of knowledge, abilities and skills from each subject of an educational discipline. Testing allows you to check the assimilation of educational material from each subject.	during the entire period of study	The student must provide 60% of the correct answers, which is an admission to the practical part of the lesson
FA5 solving clinical cases	The case method makes it possible to reveal and form the qualities and abilities of medical students necessary for further work, forms clinical thinking, analytical abilities, independence in decision-making, communication, skills for working with a sufficiently large amount of information.	during the entire period of study	Assessment of the student's ability to think clinically, to justify his decisions, to clearly express himself

10.3 Summative assessment

	Description	**Deadline, weeks**	**Feedback**

SA1 Evaluation of written works	interpretation of current performance results	According to the schedule	interpretation of results
SA2 Objective structured clinical examination	The student must prove his ability to examine the patient, make the correct diagnosis, prescribe and carry out treatment taking into account the individual characteristics of the patient.	during the entire period of study	Interpretation of results
SA3 Performing situational exercises (preparation, presentation, defense)	The level of theoretical training is determined	During the entire period of study	Interpretation of results
SA4 Final control: differentiated assessment (in accordance with the regulations)	Solving a clinical problem and testing	According to the schedule	A student can get 80 points for the exam.

Form of assessment:

	Points	Minimum points	Можливість перескладання з метою підвищення оцінки
The semester of teaching	**200 scores**		
SA1. Evaluation of written works	**100**		
Assessment of theoretical knowledge, testing and practical skills	100	78	Yes
SA2. Objective structured clinical examination	**10**		
	10	5	Yes
SA3. Performing situational exercises (preparation, presentation, defense)	**10**		
	10	5	Yes
SA4. Final control: differentiated assessment (in accordance with the regulations)	**80**		
Writing tests and situational problems	80	Не передбачено	Yes

Students who attended all classroom training sessions, completed the training program and scored at least the minimum number of points (72 points) are admitted to the final examination. The final control is carried out by writing a written work in the form of writing tests and a situational task. The maximum number of points for the final control is 80, of which: testing - 50 points; evaluation

of the situational problem - up to 30 points. The possibility of re-crediting the points obtained under the system of non-formal education is provided in accordance with the Regulations.

11. Learning resources

11.1 Material and technical support

MTS1	Library funds
MTS2	Information and communication systems, simulation center
MTS3	Graphical tools (pictures, drawings, geographical maps, charts, posters , etc.)
MTS4	Computers, computer systems and networks
MTS5	"SUMY REGIONAL CLINICAL HOSPITAL"
MTS6	Multimedia, video and sound reproduction, projection equipment (video cameras, projectors, screens, smart boards , etc.)
MTS7	Software maintenance (to support distance learning, online surveys, virtual laboratories, virtual patients for creating computer graphics, simulation, etc. and etc.).
MTS8	Technical means (movies, radio and television programs, audio and video recordings and etc.)

11.2 Information and methodical support

Essential Reading	
1	Neurosurgery. - 2nd type. // Tsymbalyuk VI. - Vinnytsia : Nova Kniga, 2020.— 360 p..
2	Neurosurgery: textbook. way. / V. A. Pyatikop, I. A. Corner, A. V. Kozachenko and others. 2019. - 152 c
Supplemental Reading	
1	Standardization in neurosurgery. Part 1. Traumatic injuries of the central and peripheral nervous system. For order. Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU ”, 2019. 152 p. https://neuro.kiev.ua/wp-content/uploads/Book_01. https://neuro.kiev.ua/wp-content/uploads/Book_01.
2	Standardization in neurosurgery. Part 2. Neurooncology. For order . Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU”, 2019. 152 p. https://neuro.kiev.ua/wp-content/uploads/Book_02.pdf https://neuro.kiev.ua/wp-content/uploads/Book_02.pdf
3	Standardization in neurosurgery. Part 3. Vascular diseases. For order. Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU”, 2020. 96 p. https://neuro.kiev.ua/wp-content/uploads/Book_03.pdf https://neuro.kiev.ua/wp-content/uploads/Book_03.pdf

4	Standardization in neurosurgery. Part 4. Pathology of the spine and spinal cord. For order. Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU ”, 2020. 144 p. https://neuro.kiev.ua/wp-content/uploads/Book_04.pdf https://neuro.kiev.ua/wp-content/uploads/Book_04.pdf
5	Standardization in neurosurgery. Part 5. Pediatric neurosurgery. For order. Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU”, 2020. 352 p. https://neuro.kiev.ua/wp-content/uploads/Book_05.pdf
6	Standardization in neurosurgery. Part 6. Reconstructive and functional neurosurgery. For order. Academician of the National Academy of Medical Sciences of Ukraine, prof. E.G. Pedachenka. Kyiv: State Institution “INH NAMNU ”, 2020. 144 p. https://neuro.kiev.ua/wp-content/uploads/Book_06.pdf
7	Potapov O.O., Rubanets M.M., Kmyta O.P. Clinical aspects of transfusiology. Tutorial. Publication of Sumy State University, Sumy, 2019.