

Danylo Halytsky Lviv National Medical University

Department of Neurology

First Vice-Rector for Scientific and
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2020

WORKING CURRICULUM ON SUBJECT Neurology

training of specialists of the second (master's) level of higher education in the
area of Knowledge 22 "Healthcare"
specialty 222 "Medicine"

medical faculty, IV year

Approved

Затверджено

Discussed and approved at the meeting
of the Department of Neurology

Minutes № 1 from "28" August 2020

Head of the department

prof. Negrych T.



by the profile methodical commission on
therapeutic disciplines

Protocol № 1

from "10" 09 2020

Chairman of the profile methodical
commission, prof. Radchenko O.M.

The work study program of the subject "Neurology" for the preparation of specialists of the second (master's) level of higher education for students of the IV year of medical faculty studying in the specialty 222 "Medicine" compiled by ass. prof. G. Korol', MD, PhD, and ass. prof. N.Malyarska, MD, and PhD prof. T. Negrych, MD, Dr. Med. Sci., on the basis of the exemplary program on the discipline "Neurology", approved by the State Institution "Central Methodical Cabinet for Higher Medical Education of the Ministry of Health of Ukraine" from September 05, 2017 and the curriculum approved by the profile methodical committee on therapeutic subjects (protocol № 4 dated from February 21, 2019)

Changes and additions to the subject's program for 2019-2020

#	Content of changes (additions)	Date and minutes of the department's session	Remarks
1.	List of questions for final control – exam. List of practical skills in the section: "General Neurology" and "Clinical Neurology".	Minutes No. 3 dated by September 24, 2019	

Head of the department, prof. T. Negrych

The program was discussed and approved at a meeting of the Department of Neurology on October 29 (protocol # 8) and at a meeting of a profile methodical committee on therapeutic disciplines on November 14 (protocol # 2).

Reviewers: Head of the Department of Internal Medicine №2, Dr. Med. Sci., prof. O.M. Radchenko, Ass. Prof. Filipyuk A.L., MD, PhD.

Changes and additions to the Curriculum on the subject "Neurology" for the 4th year students of the medical faculty for training of specialists of the second (master's) level of higher education in the field of knowledge 22 "Healthcare", specialty 222 "Medicine" for 2019-2020 academic year

#	Content of changes (additions)	Date and minutes of the meeting of the department	Remark
1.	The list of basic Literature has been amended and supplemented	October 29, 2019 № 8	
2.	The list of references has been modified and supplemented	October 29, 2019 № 8	

Head of the Department of Neurology

Dr. Med. Sci., prof. Negrych T.I.

No changes and additions were made for **2020-2021y.**

Head of the department

prof. T. Negrych

INTRODUCTION

The program of study of the course "Neurology" is made in accordance with the Higher Education Standard of the second (master's) level of higher education, field of knowledge 22 "Health care" specialty 222 "Medicine" for students of the 4th year of medical faculty.

Pursuant to the Law of Ukraine "On Higher Education" of 01.07.2014 No. 1556-VP, Resolution of the Cabinet of Ministers of Ukraine dated 29.04.2015 No. 266 "On approval of the list of branches of knowledge and specialties by which preparation of applicants for higher education" is carried out 1151 from 06.01.2015 "On the peculiarities of introduction of the list of branches of knowledge and specialties by which preparation of higher education applicants, approved by the resolution of the Cabinet of Ministers of Ukraine dated 29.04.2015 No. 266, Order of the Ministry of Education and Science of Ukraine No. 247 of 26.01.2015 anev ", registered at the Ministry of Justice of Ukraine on 04.02.2015 under No. 132/26577, letter of the Ministry of Education and Science of Ukraine dated 02.10.2018, No. 01.6 / 201/26038" Concerning the curricula of institutions of higher education "and the order of the rector of the Danylo Halytsky LNMU of 02.06.2016 No. 1604 "On approval of curricula."

1. Description of the course "Neurology" for students of the Faculty of Medicine:

The course "Neurology" is taught by students of the 4th year of medical faculty during the VII and VIII semesters. For this subject 120 academic hours are provided, which according to the norms of the Ministry of Health of Ukraine corresponds to 4 credits divided as follows:

Structure of the discipline	Number of ours, including				Year of studies	Type of control
	In total	Auditorium		Extra mural		
		Lectures	Classes			
	120	12	68	40	4	Exam
ECTS credits	4,0					

The subject of study of the discipline is the pattern of functioning of the nervous system and features of clinical manifestations of diseases of the nervous system.

Interdisciplinary connections: The curriculum of the course "Neurology" in its content is a document that defines the amount of knowledge to be acquired by students of the 4 course in accordance with the requirements of educational and qualification characteristics of the future specialist, the algorithm of studying the educational material of the discipline based upon interdisciplinary connections.

Neurology as a discipline: a) is based upon the study of students of medical biology, biological and bio-organic chemistry, histology, physiology and pathological physiology, human anatomy and pathological anatomy and integrates with these disciplines; b) is based upon the study of the students of the propedeutical disciplines of therapeutic profile, pharmacology, radiology and integrates with these disciplines; c) integrates with other clinical disciplines (internal medicine,

neurosurgery, oncology, psychiatry, medical genetics, etc.); d) is differentiated into separate areas of neurological science, which have independent international organizations: epileptology; cerebrovascular pathology; neuromuscular diseases; migraine and headache; Parkinson's; multiple sclerosis and demyelinating diseases; degenerative cerebral diseases.

1. The purpose and objectives of the subject

1.1. The purpose of teaching the course "Neurology" is to improve knowledge about the peculiarities of the structure and functioning of different parts of the nervous system, mastering the methodology of neurological status examination, the study of etiopathogenetic features, clinical manifestations, differential diagnostic features and modern directions of treatment and algorithms.

1.2. The main tasks of studying the discipline "Neurology" are:

- to improve knowledge about anatomical and functional features and major syndromes of lesions of the pyramidal, extrapyramidal, cerebellar, sensory systems, cranial nerves, integrative brain systems and the autonomic nervous system;
- to master the methodology of neurological status study;
- to get acquainted with the basic diagnostic methods in neurology (EEG, ultrasound of cerebral vessels, ENMG, evoked potentials, CT, MRI, etc.), their advantages and diagnostic possibilities;
- learn how to independently examine patients with neurological pathology including compiling medical history, establishing topical and clinical neurological diagnoses;
- to study the etiology, pathogenetic features, clinical manifestations, diagnostic and differential-diagnostic features, current directions and algorithms for treatment of various diseases of the nervous system.

1.3 Competences and learning outcomes facilitated by the subject (relationship with the normative content of higher education applicants' training, formulated in terms of higher education outcomes). In accordance with the requirements of the Higher Education Standard, the discipline provides students with competencies:

integral:

- Ability to solve typical and complex specialized tasks and practical problems in the learning process, which involves research and / or innovation and is characterized by the complexity and uncertainty of conditions and requirements

general:

- ability to choose communication strategy; ability to work in a team;
- interpersonal skills;
- ability to communicate in their native language both verbally and in writing;
- ability to communicate in another language;
- information and communication technology skills;
- ability to think abstractly, analyze and synthesize, to be able to learn and be modernly taught;
- ability to evaluate and ensure the quality of work performed;
- determination and perseverance about the tasks and responsibilities.

special (subject-oriented):

- The ability to evaluate the data of functional anatomy and clinical physiology of the human nervous system.
- Collecting medical information about the patient's condition.
- Distinction of leading neurological symptoms and syndromes by standard methods.

- Establishment a topical diagnosis in nervous system damage by logical analysis and justification.
- The ability to determine the etiological factors and pathogenetic mechanisms of major neurological diseases.
- Evaluation of laboratory and instrumental studies' results.
- By making an informed decision, make the most likely clinical diagnosis.
- Diagnosis of urgent conditions.
- Determination of tactics and providing emergency medical care.
- Keeping medical records.
- Processing of state, social and medical information
- Specification of competencies according to the NRC descriptors in the form of the Competence Matrix.

Competence Matrix

№	Competence	Knowledge	Abilities	Communication	Autonomy and responsibility
Integral competence					
The ability to solve typical and complex specialized tasks and practical problems in health care professional work or in a training process that involves research and / or innovation and is characterized by the complexity and uncertainty of conditions and requirements.					
General competences					
1.	The ability to solve typical and complex specialized tasks and practical problems in health care professional work or in a training process that involves research and / or innovation and is characterized by the complexity and uncertainty of conditions and requirements.	To have specialized conceptual knowledge acquired in the learning process.	To be able to solve complex problems and problems that arise in a professional activity.	Clear and unambiguous communication of their own conclusions, knowledge and explanations, which substantiate them to specialists and non-specialists.	To be responsible for decision-making in difficult circumstances.
2.	Knowledge and understanding of the subject area and understanding of professional activity.	To have deep knowledge of the structure of professional activity.	To be able to perform professional activities that require updating and integration of knowledge.	Ability to effectively shape communication strategy in professional activities.	To be responsible for professional development, the ability to further vocational training with a high level of autonomy.
3.	Ability to choose communication strategy; ability to work in a team; interpersonal skills.	Knowledge the tactics and strategies of communication, the laws and methods of communicative behavior.	To be able to choose ways and strategies of communication to ensure effective teamwork.	Usage of communication strategies and interpersonal skills.	To be responsible for the choice and tactics of the communication method.
4.	The ability to adapt and act in a new	To know the types and ways of	To be able to apply self-	To make appropriate	To be responsible for the timely use

	situation.	adaptation, principles of action in a new situation.	regulation tools, to adapt to new situations (circumstances) of life and activity.	connections to achieve results.	of self-regulation methods.
5.	Ability to communicate in their native language both verbally and in writing; ability to communicate in another language.	To have perfect knowledge of the native language and basic knowledge of a foreign language.	To be able to apply native language knowledge, both verbally and in writing, to communicate in a foreign language.	To use in professional and business communication and in preparation of documents the native language. Usage a foreign language in a professional activity.	To be responsible for fluency in the mother tongue, for the development of professional knowledge.
6.	Usage of information and communication technologies.	To have a thorough knowledge of information and communication technologies used in professional activities.	To be able to use information and communication technologies in the professional field, which requires updating and integration of knowledge.	To use information and communication technologies in professional activity.	To be responsible for the development of professional knowledge and skills.
7.	Ability to think abstractly, analyze and synthesize, to be able to learn and to be modernly taught.	To know the methods of analysis, synthesis and further modern learning.	To be able to analyze information, make informed decisions, be able to acquire modern knowledge.	To make the right connections to reach the goals.	To be responsible for the timely acquisition of modern knowledge.
8.	Ability to evaluate and ensure the quality of work performed.	Knowledge the methods of evaluating performance indicators.	To be able to provide quality performance of work.	Make connections to ensure quality of work	Be responsible for quality work.
9.	Determination and perseverance about tasks and responsibilities.	Determination and perseverance about tasks and responsibilities.	To be able to determine the purpose and objectives of being persistent and conscientious in the performance of duties.	Establishment of interpersonal connections for the effective performance of tasks and responsibilities.	To be responsible for the quality of the tasks.

Special (subject-oriented) competences

1.	Ability to evaluate data on functional	To know the anatomy and	To be able to interpret the data	Usage of standard approaches to	Understanding the importance of a
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	anatomy and clinical physiology of the human nervous system.	function of sensitive analyzers, locomotor systems, autonomic system and higher brain functions.	of functional anatomy and clinical physiology of the human nervous system.	assessing nerve system's function.	careful and correct study of the anatomy and function of the nervous system in future professional activity.
2.	Collection of medical history, medical information about the patient's condition	Knowledge the algorithm for interviewing a patient with neurological pathology.	To be able to interview and highlight major complaints, to assess the patient's overall condition.	Compliance with ethics, bioethics and deontology requirements in their professional activities.	To be responsible for the quality of the tasks.
3.	By standard methods to distinguish leading neurological symptoms and syndromes.	To know the main symptoms and syndromes of the affection of different parts of the nervous system.	Examination skills of patients with motor, sensitive disorders; examination of cranial nerves, autonomic nervous system, function of cerebral cortex.	Adhere to the methods of neurological examination, appropriate ethical and legal standards.	Feeling responsible for the correctness, clarity and timeliness of diagnosis
4.	To establish a topical diagnosis of nervous system damage by logical analysis and justification.	Knowledge the leading syndromes of lesions of different levels of the nervous system: sensitive, motor, autonomic and the cerebral cortex.	Ability to investigate the patient's neurological status, to identify leading clinical syndromes, to conduct differential diagnosis of levels of damage to the nervous system.	Following the rules of medical deontology, humane treatment of the patient.	Responsibility for complex clinical, diagnostic tasks and correct diagnosis.
5.	The ability to determine the etiological factors and pathogenetic mechanisms of development of major neurological diseases.	Knowledge the etiology, pathogenesis, pathomorphology of the nervous system diseases.	Ability to list the etiological factors of the disease, to name known mechanisms of pathogenesis of neurological diseases.	Qualified tasks' performance, competent and organized actions for timely diagnosis.	To be responsible for the use of modern methodological and scientific achievements.
6.	Evaluation of laboratory and instrumental research results.	Knowledge the standard methods of conducting examinations and laboratory tests in neurological practice.	Ability to analyze the results of laboratory and instrumental research and on the basis of it to evaluate information on the	Reasonably to nominate and evaluate the results of examinations and laboratory tests.	To be responsible for deciding on the evaluation of laboratory examinations and results.

			damage of the nervous system.		
7.	By making an substantiated decision, to make the most likely clinical diagnosis.	Knowledge the current classification, clinical picture of diseases of the nervous system, neurological syndromes in diseases of the internal organs.	Ability to supervise a patient, choose a diagnostic algorithm, treat clinical symptoms, perform differential diagnosis and establish a clinical diagnosis.	To master the skills of making psychological contact with patients and their relatives.	Responsibility for the patient's state of health, for the timely establishment of clinical diagnosis and the provision of medical care.
8.	Diagnosis of urgent conditions	To have specialized knowledge of emergency diagnostics in neurology.	To diagnose urgent conditions according to the standard scheme.	Determination the tactics of emergency medical care according to the algorithm.	To be responsible for the development of professional knowledge and skills.
9.	Defining tactics and providing emergency medical care.	Knowledge the methods of evaluating performance indicators.	Ability to provide the necessary assistance according to the standard.	Reasonably to carry out assistance during procedures and to evaluate the results of medical procedures.	To be responsible for the development of professional knowledge and skills.
10.	Keeping medical records.	Knowledge the rules and standards of medical records. To know the basic types of medical documentation concerning the patient and population (card of outpatient / the inpatient patient, medical history, sanatorium-resort card, official accounting documents of medical treatment and preventive institutions).	To be able to complete and maintain medical records for the patient and the population using standard technology, based on regulatory documents.	Use standard approaches to medical records. Establishment of interpersonal links for effective medical records	To be responsible for the correctness of keeping medical records. Responsibility for the quality of the completion and maintenance of medical records.
11.	Processing of state, social and medical information.	Knowledge the methods of processing state, social, medical information.	Ability to analyze and evaluate state, social, medical information.	To use standard approaches to assessing information, computer information technology.	Responsibility for processing state, social, medical information.

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Learning outcomes: To conduct interviews and physical examination of patients and analyze their results in an internal medicine clinic. To analyze the results of basic laboratory and instrumental research methods. To identify leading symptoms in an internal medicine clinic.

Integrative final program learning outcomes facilitated by the subject: to evaluate information about diagnosis in a healthcare setting, its unit, using knowledge on humans, their organs and systems, based upon the results of laboratory tests

Learning outcomes for the subject: to specify and identify leading clinical symptoms; by standard methods, using preliminary data of the patient's anamnesis, data of the patient's examination, knowledge about the person, his organs and systems, to establish a probable syndromic preliminary clinical diagnosis. Collection of information about the patient's general condition, evaluation the diagnostic information based on the results of laboratory and instrumental studies.

2. Information volume of the subject

The educational process is organized according to the credit-transfer system. According to the Experimental Curriculum of Specialist Training, 4.0 credits (120 hours) were allocated to study of the course "Neurology", 80 hours of which are classroom training (in the form of lectures – 12 hours and practical classes – 68 hours) and 40 hours - independent (extramural) work of students. The amount of student workload is described in ECTS credits, which are credited to students upon successful completion of the corresponding final credit (exam). The program of the course "Neurology" is presented in two sections "General Neurology" and "Special Neurology".

Information volume of the subject

Section 1. General neurology

Topic 1. The main stages of development of neurological science

The first studies of diseases of the nervous system (Hippocrates, Galen, Avicenna) Study of neurology in the universities of the Middle Ages and the Renaissance. Organization of the first departments of neurology at universities (Moscow, Kharkiv, St. Petersburg, Kyiv, Lviv, etc.). Domestic and foreign neurological schools. Modern directions of development of neurology: differentiation of neurologic science (creation of separate centers and scientific units for the study of cerebrovascular, demyelinating diseases, epilepsy, neuromuscular pathology, etc.) and integration with other sciences (somatoneurology etc.).

Topic 2. Principles of structure and functioning of the nervous system. The functional unit of the nervous system - neuron. The motor system. The concept of reflex and reflex arc.

The main stages of the phylo- and ontogenesis of the nervous system. Structural and functional unit of the nervous system. The main anatomic and topographic parts of the nervous system: hemispheres, subcortical ganglia, brain stem, spinal cord, roots, spinal ganglia, plexus, nerves. Types of neurons, their functional significance. Neuroglia, its functional value. The autonomic nervous system, its supersgmental and segmental divisions. Limbico-reticular complex. Cortex. Cytoarchitectonic fields. Localization of functions in the cerebral cortex. The concept of functional systems.

Blood supply to the brain and spinal cord. Meninges. Cerebrospinal fluid. The concept of reflex and reflex arc, conditional and unconditioned reflexes, levels of realization of skin, tendon and periosteal reflexes. Anatomical features and neurophysiology of the system of voluntary motions, extrapyramidal system and cerebellum. The methodology of the study of the motor system.

Topic 3. Arbitrary Movements and Their Disorders. Pyramid system. Cortical-nuclear and cortical-spinal pathways. Symptoms of central and peripheral paresis.

The realization of voluntary movements. Pyramid system. Central and peripheral motor neurons. Symptoms of central (spastic) paralysis. Pathophysiology of muscle hypertonia, hyperreflexia, pathological reflexes, reduction of abdominal reflexes. Symptoms of peripheral (flaccid) paralysis. Pathophysiology of atony, areflexia, atrophy. Paralysis, paresis, monoplegia, paraplegia, hemiplegia, triplegia, tetraplegia.

Topic 4. Syndromes of the affection of the motor pathways at the different levels.

Syndrome of motor disorders in the affection of the motor pathways at different levels: anterior central gyrus (irritation and negative syndromes), corona radiata, brain stem (alternating paralysis), different levels of the spinal cord (above cervical enlargement, at the level of cervical enlargement thoracic level, lumbar enlargement, spinal conus), different levels of peripheral motor neuron (anterior horn, anterior root, nervous plexuses, separate peripheral nerves).

Topic 5. Extrapyramidal system and syndromes of its lesions

Anatomical data: basal ganglia (lenticular, caudal nucleus, claustrum, subthalamus), brain stem formations (red nucleus, black substance, reticular formation). Relationships of subcortical ganglia with different parts of the brain and spinal cord. Physiology of the extrapyramidal system, its involvement in providing unconditional reflexes, implementation of stereotyped automated movements, muscle readiness for action.

Biochemistry of the extrapyramidal system. Modern notions about the metabolism and concentration of catecholamines in the nigrostriatal system. Syndromes of the lesion of the extrapyramidal system. Akinetic-rigid (Parkinson's) syndrome, its biochemical aspects. Key clinical manifestations of parkinsonism: oligo-bradykinesia, muscle rigidity, parkinsonian tremor, postural instability.

Differential diagnosis of plastic and spastic hypertonus. Hyperkinetic syndromes. Types of hyperkinesia: athetosis, choreic, hemiballism, tics. Muscular dystonia (focal (blepharospasm, facial hemispasm, torticollis, oromandibular dystonia, hand dystonia, foot dystonia, torsion dystonia), segmental, generalized).

Topic 6. Cerebellum and cerebellar syndromes.

Anatomic and physiological features of the cerebellum. Connections of the cerebellum with different parts of the brain and spinal cord (homo- and heterolateral). Afferent and efferent pathways. Vermis and cerebellar hemispheres. Functions of the cerebellum: providing balance, coordination, synergism of movements, regulation of muscle tone. Syndromes of cerebellar affection. Concepts of static and locomotor ataxia, asynchrony, muscle atony, intentional tremor, adiadochokinesis, dysmetria, hypermetria, nystagmus, scanning speech. Types of ataxia: (cerebellar, cortical, vestibular, sensitive).

Topic 7. Sensitive system and symptoms of its affection. Types and kinds of sensory deficit.

The concept of reception. Types of receptors. Extroceptive, proprioceptive, interoceptive sensitivity. Clinical classification of sensitivity. Conductive pathways of sensitivity. Methods of their research. Kinds of sensitive disorders: anesthesia, hypesthesia, hyperesthesia, hyperpathy, dysesthesia. Synesthesia, dissociated disorders, polyesthesia, paresthesias. Pain and its classification. Concepts of nociceptive and antinociceptive systems of the brain. Topical types of sensory disorders: mononeuritic, polyneuritic, radicular, posterior hornal, conductive (when lesions are located at the level of the spinal cord, medial loop, thalamus, internal capsule); cortical type (irritative and negative syndromes). Spinal cord hemisection syndrome (Brown-Séquard syndrome).

Topic 8. Practical skills.

Topic 9. Pathology of olfactory and visual analyzers. Syndromes of the oculomotor nerves affection.

1st pair – olfactory nerve (sensitive): basic anatomical and physiological data. Olfactory analyzer: first neuron (ganglion cells of the nasal mucosa); the second neuron (olfactory bulbs, olfactory pathway); the third neuron (primary subcortical olfactory centers – olfactory triangle, septum pellucidum, anterior perforated substance); cortical olfactory center (medial surface of cerebral temporal lobe). Study of olfactory analyzer. The symptoms of lesion – hyposmia, anosmia, hyperosmia, olfactory hallucinations.

2nd pair – optic nerve (sensitive). Anatomic and physiological features: parts – peripheral (rods and cones, bipolar cells, ganglion cells, optic nerve, optic chiasm, optic tract), central (lateral geniculate bodies, upper hillocks of lamina tecti, pulvinar thalami), Gracile bundle, occipital lobe (cortical center of the analyzer). Symptoms of affection: amaurosis, amblyopia, homonymous and heteronymous hemianopia (binasal, bitemporal), visual hallucinations, changes in the optic disc (on fundoscopy).

3th, 4th, 6th pairs – oculomotor (mixed), trochlear, abducens (motor) nerves: localization of nuclei, nerves' exit from the skull, zones of peripheral innervation. Symptoms of affection:

ptosis, strabismus, diplopia, impaired convergence and accommodation, ophthalmoplegia (partial and complete); pupillary reactions, reflex arc of the pupillary reflex, disorders of pupillary reactions (Argyle-Robertson syndrome), miosis, mydriasis, anisocoria.

Topic 10. The trigeminal, facial, vestibule-cochlear nerves and symptoms of their affection.

5th pair – trigeminal nerve (mixed): nerve's nuclei, exit on the basis of brain, branches and areas of their innervation (ophthalmic, maxillary, mandibular). Symptoms of lesions of the trigeminal system: lesions of the branches of the trigeminal nerve (shooting pains, disturbance of all kinds of sensitivity in the innervated zone of the corresponding branches, loss of the corneal reflex, paresis of the chewing muscles, loss of the mandibular reflex); lesions of the trigeminal ganglion (herpetic rash, pain, disorders of all kinds of sensitivity on half of the face, reduction of corneal, mandibular reflexes); lesions of the spinal sensory nucleus of the trigeminal nerve – (segmental-dissociative type of impaired pain and temperature sensitivity on half of the face); lesions of the thalamus (hemianesthesia of all kinds of sensitivity, contralateral thalamic pain); lesion of the cortex of postcentral gyrus.

7th pair – facial nerve (mixed). Anatomical and physiological features; intracranial branches of the nerve (larger petrosal nerve, stapedius nerve, chorda tympani, facial nerve alone). Symptoms of facial nerve damage: peripheral paresis of facial muscles (nerve lesions in the canal, pontocerebellar angle, brainstem (alternating pontine syndromes)) and central paresis of the facial muscles (internal capsule; lower part of precentral gyrus).

8th pair – vestibule-cochlear nerve (sensitive). Anatomic and physiological data, cochlear and vestibular parts. Pathology of cochleo-vestibular apparatus: lesions of the sound-perceiving apparatus (high-pitched hearing disorder), lesions of the sound-conductive apparatus (low-pitched hearing disorder); lesions of the vestibular part (dizziness, nystagmus, imbalance, discoordination of movements, autonomic disorders), lesions of the temporal lobe (irritative - auditory hallucinations).

Topic 11. Pathology of IX-XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.

IX pair – glossopharyngeal nerve (mixed);

X pair – vagus nerve (mixed);

XI pair – accessory nerve (motor);

XII pair – hypoglossal nerve (motor).

Anatomical and physiological features. Localization of nuclei in the medulla oblongata. Bulbar and pseudobulbar syndromes: common signs (dysphagia, dysphonia, dysarthria) and differences between them (fibrillation and atrophy of the lingual muscles, hyperorality reflexes, forced laughter and crying). Disorders of the innervation of lingual muscles – peripheral and central paresis.

Topic 12. Pathology of the autonomic nervous system.

Anatomical and physiological features and functions of the autonomic nervous system.

Segmental level of the autonomic nervous system. Sympathetic nervous system: lateral horns of the spinal cord, sympathetic trunk, ganglia. Parasympathetic nervous system: craniobulbar and sacral parts.

Supersgmental level of autonomic functions: hypothalamus, limbic system, reticular formation of brainstem. Ergotropic and trophotropic activity. Methods for the study of autonomic functions. Autonomic dystonia syndrome. Permanent and paroxysmal course. Hypothalamic syndrome.

Autonomic-vascular paroxysms: sympathetic-adrenal, vagal-insular, mixed. Syndrome of the segmental autonomic nervous system affection. Damage to the brain stem, lateral horns of the spinal cord, ganglia of the borderline trunk, plexuses, nerves. Claude-Bernard-Horner syndrome. Visceral symptoms. Regulatory levels of pelvic functions and their disorders.

Topic 13. Localization of functions in the cerebral cortex. Syndromes of cortical lesions.

Cerebrospinal fluid and its changes. Meningeal syndrome.

The structure of the cerebral hemispheres. Cyto- and myeloarchitectonics of the cortex. Localization of functions in the cerebral cortex. Dynamic localization of functions. Motor and sensory representations in the cortex. The concept of hemispheric functional asymmetry. Gnostic functions. Types of disorders of gnostic functions: visual, olfactory, taste, auditory agnosia,

asterogenesis, autotopagnosia, anosognosia. Praxis. Types of apraxia: constructive, ideational, motor. Speech. Speech disorders: motor, sensory, amnesic aphasia. Syndromes of affection of separate cortical parts: frontal, temporal, parietal, occipital lobes, limbic cortex. Syndromes of irritation of cortex. Persistent vegetative state. "Locked-in" syndrome. Syndrome of brain death. Lumbar puncture.

Meninges. The physiology of CSF formation. The composition of the cerebrospinal fluid is normal condition, its changes in meningitis, tumors, hemorrhagic stroke, neurotuberculosis. Cell-to-protein, protein-to-cell dissociation. Pleocytosis.

Meningeal symptoms: headache, vomiting, general hyperesthesia, photophobia, occipital rigidity, Kernig's symptom, Brudzinski's symptoms (upper, middle, lower), trismus, local reactive pain phenomena, Mendel's sign, pain when pressing the exit points of the greater and lesser occipital nerves. Meningeal posture of the patient. Lesage's sign.

Topic 14. Functional diagnostics of neurological diseases.

X-ray (craniography, spondylography); contrast X-ray examination (myelography, angiography, ventriculography); ultrasonic (Doppler sonography); electrophysiological (electroencephalography, electroneuromyography etc.); neuroimaging (computed tomography, magnetic resonance imaging, including vascular imaging).

Topic 15. Practical skills.

Section 2. Special Neurology.

Topic 16. Independent curation of patient and writing case history.

Topic 17. Vascular diseases of the brain and spinal cord.

Classification. Acute disorders of the cerebral circulation: strokes and transient cerebral disorders (transient ischemic attacks and cerebral hypertensive crises). Chronic disorders of the cerebral circulation: early and late forms. Vascular dementias. Etiological factors and pathogenesis of stroke.

Hemorrhagic and ischemic (thrombotic and non-thrombotic) strokes, subarachnoid hemorrhages. Symptoms of involvement of the anterior, middle, posterior cerebral arteries. Syndromes of occlusion and stenosis of the principal cerebral vessels. Non-focal and focal syndromes. Quantitative and qualitative types of disorders of consciousness (productive and unproductive symptoms).

Differential diagnosis of strokes. Modern methods of undifferentiated and differentiated therapy of strokes. Concept of the "therapeutic window". Indications and contraindications for the surgical treatment of strokes. Hemorrhage into the spinal cord and spinal meninges. Ischemic spinal strokes. Etiology and pathogenesis. Semiology. Diagnosis. Intensive care in the acute period. Treatment of patients in the residual period after cerebral and spinal strokes. Rehabilitation and examination of non-disabled patients. Prevention of neurovascular diseases.

Topic 18. Epilepsy and non-epileptic paroxysmal conditions.

Epilepsy. Pathogenetic essence of the epileptic focus in the development of the disease. The role of endogenous and exogenous factors involved in the formation of this focus. Classification of epileptic seizures: generalized, partial and partially-generalized. Principles of differentiated treatment of epilepsy. Epileptic status (diagnosis, first aid).

Non-epileptic paroxysmal conditions. Conditions with convulsions: spasmophilia, febrile seizures, toxic seizures, hysterical paroxysms. Conditions without convulsions: vegetative paroxysms, migraines, syncope. Differential diagnosis of epilepsy and non-epileptic paroxysmal conditions. Treatment of paroxysm and treatment in the interictal period.

Topic 19. Headache. Sleep disorders and alertness.

Etiology and mechanisms of headache: vascular, liquorodynamic, neuralgic, muscular, psychological, mixed. Classification. Nosological forms of headache: migraine, tension headache, cluster headache. Differential diagnostics, principles of treatment.

Migraine – etiology, actual mechanisms of pathogenesis. Clinical forms (common migraine – without aura, associated), diagnosis, differentiated diagnosis, principles of treatment (during the attack and interictal period).

Headache in intracranial hypotension and hypertension (etiopathogenetic factors, subjective data, clinical and instrumental data).

Sleep disorders: sleep stages, sleep disorders – presomnia, insomnia, causative factors, treatment. Hypersomnia – pathological drowsiness. Sleep apnea syndrome. Treatment.

Topic 20. Occupational and habitual neurotoxicities. Affection of the nervous system under the influence of physical factors.

Neurotropic industrial poisonings (lead, mercury, manganese, tetraethyl lead, arsenic, carbon monoxide, methyl alcohol, carbon disulfide, organophosphorus compounds). Clinical picture, neurological syndromes, treatment, prevention. Food poisoning, botulism. Korsakoff's syndrome and other neurological manifestations of alcoholism. Clinical picture of acute barbiturate poisoning. Emergency care. Vibration disease, radiation damage, electric affection of the nervous system, the influence of permanent and alternating magnetic fields, Heat stroke. Clinical picture, neurological syndromes, treatment, prevention.

Topic 21. Neurological aspects of traumatic brain injury. Spinal trauma.

Current aspects of the classification of traumatic brain injury. Concussion. Differential diagnosis of contusion and cerebral compression. Intracranial hemorrhage. Complications of traumatic brain injury: post-traumatic encephalopathy, post-traumatic arachnoiditis, post-traumatic seizure syndrome, post-traumatic asthenic syndrome. Chronic hematomata (epidural and subdural). First aid for traumatic brain injury.

Spinal injury. Clinical picture, diagnosis, treatment. Injuries of peripheral nerves.

Topic 23. Meningitides.

Meningitides. Classification of meningitis: primary and secondary, purulent and serous. Purulent meningitis. Primary meningococcal meningitis, clinical picture, diagnosis, course, atypical forms. Secondary meningitis: pneumococcal, staphylococcal. Clinical picture, diagnostics, cerebrospinal fluid changes, treatment, prevention.

Serous meningitis. Primary viral: lymphocytic choriomeningitis, enteroviral meningitis (ECHO, Coxsackie), mumps-related and others. Secondary: tuberculous meningitis and meningitis in other specific infections. Clinical picture, diagnostics, value of the CSF tests in differential diagnostics, treatment, prevention.

Topic 24. Arachnoidites. Encephalitides.

Arachnoidites. Etiology, pathogenesis. Pathomorphology: adhesive, cystic. Localization classification: arachnoiditis in posterior cranial fossa, basal, convex. Clinical picture, course, diagnosis. Differential diagnostics. Treatment and prevention. Encephalitides. Classification. Primary encephalitis: epidemic, tick-borne, herpes simplex. Secondary encephalitides: rheumatic (chorea minor), post-vaccine, varicella-related, measles-related, rubella-related. Clinical picture, course, clinical forms of the disease, diagnosis.

Neurological complications of influenza (flu-related hemorrhagic encephalitis, encephalopathy). Infectious encephalopathy – dyscirculatory-dystrophic changes of the brain without pronounced focal lesions with predominance in the clinical picture of asthenic manifestations, autonomic dystonia, intracranial hypertension. Course, diagnosis, differential diagnosis, treatment, prevention.

Topic 25. Poliomyelitis. Acute transverse myelitis. Amyotrophic lateral sclerosis.

Poliomyelitis. Etiology, pathogenesis, epidemiology, ways of transmission. Pathomorphology. Clinical classification: non-paralytic (abortive, subclinical) and paralytic forms (pre-paralytic and paralytic stages) and brainstem forms. Diagnosis, differential diagnosis. The value of virological and serological studies in the diagnosis of the disease. Treatment in the acute and recuperation period. Consequences. Prevention.

Polio-like diseases in children caused by Coxsackie and ECHO, mumps, herpes simplex viruses, adenoviruses. Clinical forms, course, prognosis, diagnosis, treatment, prevention.

Acute transverse myelitis. Etiology (in primary myelitis – neuroviruses, tuberculosis, syphilis; in secondary one – as complications of infectious diseases – measles, scarlet fever, typhoid, pneumonia, influenza or sepsis). Pathogenesis. Pathomorphology. Clinical picture and clinical forms (symptom complex of spinal cord lesions in the lumbar, thoracic regions, at the level

of cervical enlargement, in the upper cervical area). CSF diagnostics. Differential diagnosis. Treatment.

Amyotrophic lateral sclerosis. Etiology (excitotoxic damage to peripheral and central motoneurons due to increased glutamate receptor activity). Pathogenesis. Pathomorphology. Clinical picture and clinical forms (bulbar, cervical, thoracic, lumbosacral). Differential diagnosis. Anti-glutamate treatment.

Topic 26. Neurosyphilis. Neurological manifestations of polymyositis-dermatomyositis.

Neurosyphilis. Early neurosyphilis (mesodermal): generalized syphilitic meningitis, meningovascular syphilis, gummas of cerebral and spinal cord, latent asymptomatic meningitis (liquor syphilis). Late neurosyphilis (parenchymal): tabes dorsalis, progressive paralysis. Diagnosis, methods of treatment.

Neurological manifestations of poliomyositis-dermatomyositis: etiology, pathogenesis, clinical manifestations (muscular-skeletal syndrome, myofascial pain syndrome, myotonic syndrome, Raynaud's syndrome); neurological disorders (CNS lesions, autonomic disorders, hypothalamic dysfunction, tunnel neuropathies), additional methods of examination, differential diagnosis, treatment, prevention.

Topic 27. Neurological manifestations of HIV infection. Tuberculosis of the nervous system.

NeuroAIDS. Etiology, pathogenesis, key clinical manifestations: dementia, acute meningencephalitis and atypical aseptic meningitis, myelopathy, peripheral nervous lesions.

Neurological manifestations associated with infections due to immunodeficiency caused by toxoplasmosis, herpes simplex virus, cytomegalovirus, papovavirus, fungi (cryptococci, candidiasis). Tumors of the central nervous system in AIDS: primary CNS lymphoma, Kaposi's sarcoma. Disorders of cerebral circulation in patients with AIDS. Diagnosis of neurological manifestations of AIDS. Treatment. Prognosis. Prevention.

Tuberculosis of the nervous system. Tuberculous meningitis (clinical picture, course, CSF assay). Tuberculous spondylitis, solitary cerebral tuberculoma. Diagnosis, modern methods of treatment, prevention.

Topic 28. Demyelinating diseases of the nervous system.

Acute multiple encephalomyelitis. Multiple sclerosis. Modern theory of pathogenesis (autoimmune disease, genetic predisposition). Pathomorphology (numerous foci of demyelination in the brain and spinal cord). Early symptoms. The main clinical forms (cerebral: bulbar, cerebellar, optic, hyperkinetic; spinal, cerebrospinal). Charcot's triad. Marburg's pentad. Clinical forms of the disease. Differential diagnostics. Treatment (during exacerbation - plasmapheresis, pulse therapy with corticosteroids; during remission – beta-interferons, cytostatics).

Subacute sclerosing panencephalitis. Leukodystrophy: metachromatic, globoid-cellular, sudanophilic, diagnostic express-methods.

Topic 29. Parasitic diseases of the nervous system, prion infections, neuroborreliosis.

Cysticercosis, echinococcosis. Toxoplasmosis. Ways of infection. Clinical picture. Diagnosis, treatment, prevention. Prion infections. Creutzfeldt-Jakob disease (etiology, pathogenesis, clinical picture, diagnosis, prophylaxis).

Neuroborreliosis (Lyme disease, tick borreliosis) – ways of infection, clinical and epidemiological data, tick-borne migrating erythema, prophylaxis, laboratory diagnostics, treatment (antibiotics – tetracyclines, penicillins, cephalosporins).

Topic 30. Diseases of the peripheral nervous system.

Clinical classification of PNS diseases.

Vertebrogenic lesions of the peripheral nervous system.

Cervical level: reflex syndromes (cervicago, cervicalgia; cervicocranioalgia or posterior vertebral artery syndrome and cervicobrachialgia with muscular-tonic, autonomic-vascular or neuro-dystrophic manifestations). Radicular syndromes (discogenic lesions of roots). Radicular vascular syndromes (radiculoischemia).

Thoracic level; reflex syndromes (thoracago, thoracalgia with muscular-tonic vegetative-visceral or neurodystrophic manifestations).

Lumbar syndromes (discogenic root lesions – radiculopathies). Lumbar-sacral level: reflex syndromes (lumbago, lumbalgia, lumbarischalgia with muscular-tonic, autonomic-vascular or neurodystrophic syndromes). Radicular vascular syndromes (radiculoischemia).

Affection of the cranial nerves. Trigeminal neuralgia, neuropathy of the facial nerve and other cranial neuropathies.

Affection of individual spinal nerves (traumatic). Upper extremities: radial, ulnar, median, musculocutaneous and other nerves. Lower extremities: femoral, gluteal, tibial, common peroneal and other nerves.

Plexopathy. Affection of the plexuses: cervical, upper humeral (Erb-Duchenne palsy); lower humeral (Klumpke's paralysis); total brachial; lumbosacral (partial or total).

Compression-ischemic mononeuropathy (most commonly – in tunnel syndromes). Upper extremities: carpal tunnel syndrome (median nerve); Guyon's canal syndrome (ulnar nerve). Lower extremities: tarsal canal syndrome (tibial nerve); meralgia paraesthetica (Bernhardt-Roth syndrome) (entrapment of the lateral cutaneous femoral nerve). Multiple radicular lesions.

Infectious polyneuropathies, infectious-allergic polyradiculoneuropathies (Guillain-Barre syndrome).

Polyneuropathies. Toxic: in chronic habitual or industrial intoxication (alcohol, lead, chlorophos and others); toxic infections (diphtheria, botulism); allergic (medicamentous and others); dysmetabolic: hypo- or avitaminosis, in endocrine diseases - diabetes, hepatic and renal diseases etc.; vascular: in nodular periarteritis, rheumatic and other vasculitides, idiopathic and hereditary forms.

Treatment of PNS diseases: medical, orthopedic, surgical, resort. Physiotherapy. Prevention and disability assessment.

Topic 31. Perinatal diseases of the nervous system.

Etiological factors (intrauterine, birth trauma, brain lesions in the early postpartum period). Hypoxic-ischemic encephalopathy (acute period, recuperation period).

Cerebral palsy, clinical forms – spastic, hemiplegic, atactic, quadriplegic, hyperkinetic. Diagnosis. Treatment (pharmacological, non-pharmacological). Prevention.

Topic 32. Somatoneurological syndromes.

Somatoneurological syndromes resulting from impaired metabolism of the nervous system, hypoxia, pathological reflex impulses in somatic human diseases. The most common somatoneurological syndromes: asthenic, autonomic dystonia, polyneuropathic, neuromuscular disorders. Somatoneurological syndromes in diseases of the lungs, heart, blood, digestive canal, liver, kidneys, endocrine system, collagenoses. Paraneoplastic syndrome. Treatment. Prevention.

Topic 33. Hereditary and degenerative diseases of the nervous system.

Modern principles of classification. Neuromuscular diseases. Progressive Muscular Dystrophy. Myopathies: pseudogypertrophic Duchenne, juvenile Erba-Rotha, shoulder-scapula-facial Landuzzi-Degerina; amyotrophies: Werndig-Hoffman spinal, Kugelberg-Welander spinal, Charcot-Marie neural.

Myotonia. Thomson's disease. Dystrophic myotonia (Curschmann-Steinert-Batten disease). Myasthenia gravis. Myasthenic syndromes.

Paroxysmal myoplegias. Syndrome of paroxysmal myoplegia.

Extrapyramidal degenerations. Hepatocerebral degeneration – Wilson's disease: pathogenesis, clinical syndromes, diagnosis, treatment. Huntington's disease (pathogenesis, leading clinical syndromes, diagnosis, treatment). Current biochemical aspects of Parkinson's disease and its treatment.

Muscular dystonia (primary hereditary, secondary due to organic brain diseases), etiology, principles of treatment. Spinocerebellar ataxias. Friedrich's ataxia. Pyramidal degeneration. Hereditary spastic paraplegia (Stumpel's disease). Principles of treatment.

Topic 34. Congenital defects of the spine and spinal cord. Syringomyelia.

Craniovertebral anomalies: Klippel-Weil syndrome, Arnold-Chiari syndrome. Underdevelopment of the spinal cord. Spinal cord hernia.

Syringomyelia – etiology, pathogenesis, pathomorphology, clinical forms, major clinical syndromes (lesions of the posterior horn, anterior and lateral horns, lesions of the leading pathways of the white matter of the lateral and posterior columns of the spinal cord, dysraphic status). Diagnostic criteria. Differential diagnostics. Principles of therapy.

Topic 35. Drug used in neurology.

Groups of drugs used for the treatment of neurological diseases: neuroprotectors; drugs that improve cerebral hemodynamics; antiparkinsonian agents; anticonvulsants; anti-migraine, autonomic, anti-atherosclerotic, biogenic stimulants; neuroleptics; anti-stress drugs; interferons; remedies used in neuro-muscular, autoimmune and demyelinating diseases, herpetic infections, muscular dystonia and hyperkinesia etc.

3. Structure of the subject

Topics	Lectures	Classes	Extramural work	Individual work
Section 1 of the subject "General Neurology"				
Topic 1. The main stages of development of neurological science.	-	-	1	Completion of clinical cases on topical diagnostics; creating of schemes and tables
Topic 2. Principles of structure and functioning of the nervous system. Functional unit of the nervous system. Clinical classification of sensitivity. Anatomy of sensory pathways. Methods of study of sensation. Types and kinds of sensory disorders (symptom complexes of sensory disorders linked to the lesions at different levels of sensory pathways).	1	2	2	
Topic 3. The concept of reflex and reflex arc. Pathological reflexes, technique of elicitation.	-	2	1	
Topic 4. Voluntary movements and their disorders. Pyramid system. Cortical-nuclear and cortical-spinal pathways. Symptoms of central and peripheral paresis, pathogenesis of symptoms.	1	4	2	
Topic 5. Symptom-complexes of movement disorders due to affection of different levels of cortico-muscular way.	-	2	1	
Topic 6. Extrapyramidal system and syndromes due to its affection.	-	2	1	
Topic 7. The cerebellum. Syndromes of the cerebellar injury. Types of ataxia.	-	2	1	
Topic 8. Pathology of olfactory and visual analyzers. Syndromes of oculomotor nerves' lesions.	-	2	1	
Topic 9. Trigeminal, facial, vestibulo-cochlear nerve and syndromes of their affection.	-	2	1	
Topic 10. Affection of IX-XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.	-	2	1	

Topic 11. Anatomical and physiological data, pathology and methods of investigation of the autonomic nervous system.	1	2	1	
Topic 12. Anatomical and physiological data, technique for study of the cortical functions. Syndromes of lesions and irritation of the cortex. Disorders of higher cerebral functions (aphasia, agnosia, apraxia and other).	1	2	1	
Topic 13. CSF diagnosis. Meningeal syndrome. Functional diagnostics of neurological diseases.	-	2	2	
Topic 14. Practical skills. Final control #1 "General neurology".	-	2	2	
In total on the subject's section 1 "General Neurology"	4	28	18	
Section 2 of the subject "Special Neurology"				
Topic 15. Independent curation of patient with compilation of case history.	-	2	-	Preparation of of clinical cases for "KROK-2", preparation of reports at scientific conferences, participation in inter-university conferences.
Topic 16. Headaches. Sleep Disorders.	-	2	1	
Topic 17. Vascular diseases of the brain and spinal cord. Transient ischemic attacks.	2	4	2	
Topic 18. Epilepsy and non-epileptic paroxysmal conditions.	2	2	2	
Topic 19. Occupational and habitual neurotoxicities. Affection of the nervous system due to the influence of physical factors.	-	2	1	
Topic 20. Neurological aspects of traumatic brain injury. Spinal trauma.	2	2	1	
Topic 21. Meningitis. Encephalitis. Arachnoidites.	-	2	1	
Topic 22. Poliomyelitis. Acute transverse myelitis. Neurosyphilis. Neurological manifestations of polymyositis-dermatomyositis.	-	2	1	
Topic 23. Neurological manifestations of HIV infection. Tuberculosis of the nervous system. Neuroborreliosis.	-	2	1	
Topic 24. Parasitic diseases of the nervous system, prion infections.	-	-	2	
Topic 25. Amyotrophic lateral sclerosis.	1	2	1	
Topic 26. Demyelinating diseases of the nervous system.	1	2	1	
Topic 27. Diseases of the peripheral nervous system.	-	4	1	
Topic 28. Perinatal affections of the nervous system.	-	2	1	

Topic 29. Congenital defects of the spine and spinal cord. Syringomyelia.		2	1	
Topic 30. Somatoneurological syndromes.		2	1	
Topic 31. Hereditary and degenerative diseases of the nervous system.		4	1	
Topic 32. Drugs used in neurology.	-	-	2	
Topic 33. Practical skills.	-	2	1	
In total on the subject's section 2 "Special Neurology"	8	40	22	
Number of hours in total _120_ / _4,0_ ECTS credits				
Final control				Exam

4. Thematic plan of lectures

#	Topic	Number of hours
1.	Voluntary movements and their disorders. Pyramid system. Cortical-nuclear and cortical-spinal pathways. Bulbar and pseudobulbar paralysis. Alternating syndromes.	2
2.	Anatomical and physiological data, pathology of the autonomic nervous system. Cerebral cortex. Disorders of higher cerebral functions (aphasia, agnosia, apraxia).	2
3.	Vascular diseases of the brain and spinal cord. Transient ischemic attacks.	2
4.	Epilepsy and non-epileptic paroxysmal conditions.	2
5.	Amyotrophic lateral sclerosis. Demyelinating diseases of the nervous system. Myasthenia gravis. Parkinson's disease.	2
6.	Diseases of the peripheral nervous system.	2
	<i>In total</i>	<i>12</i>

5. Thematic plan of practical classes

#	Topic	Number of hours
1.	Principles of structure and functioning of the nervous system. Functional unit of the nervous system. Clinical classification of sensitivity. Anatomy of sensory pathways. Methods of study of sensation. Types and kinds of sensory disorders (symptom complexes of sensory disorders linked to the lesions at different levels of sensory pathways).	2
2.	The concept of reflex and reflex arc. Pathological reflexes, technique of elicitation.	2
3.	Voluntary movements and their disorders. Pyramid system. Cortical-nuclear and cortical-spinal pathways. Symptoms of central and peripheral paresis, pathogenesis of symptoms.	4
4.	Symptom-complexes of movement disorders due to affection of different levels of cortico-muscular way.	2
5.	Extrapyramidal system and syndromes due to its affection.	2
6.	The cerebellum. Syndromes of the cerebellar injury. Types of ataxia.	2
7.	Pathology of olfactory and visual analyzers. Syndromes of oculomotor nerves' lesions.	2

8.	Trigeminal, facial, vestibulo-cochlear nerve and syndromes of their affection.	2
9.	Affection of IX-XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.	2
10.	Anatomical and physiological data, pathology and methods of investigation of the autonomic nervous system.	2
11.	Anatomical and physiological data, technique for study of the cortical functions. Syndromes of lesions and irritation of the cortex. Disorders of higher cerebral functions (aphasia, agnosia, apraxia and other).	2
12.	diagnosis. Meningeal syndrome. Functional diagnostics of neurological diseases.	2
13.	Topic 14. Practical skills. Final control #1 "General neurology".	2
14.	Independent curation of patient with compilation of case history.	2
15.	Headaches. Sleep Disorders.	2
16.	Vascular diseases of the brain and spinal cord. Transient ischemic attacks.	4
17.	Epilepsy and non-epileptic paroxysmal conditions.	2
18.	Occupational and habitual neurotoxicities. Affection of the nervous system due to the influence of physical factors.	2
19.	Neurological aspects of traumatic brain injury. Spinal trauma.	2
20.	Meningitis. Encephalitis. Arachnoidites.	2
21.	Poliomyelitis. Acute transverse myelitis. Neurosyphilis. Neurological manifestations of polymyositis-dermatomyositis.	2
22.	Neurological manifestations of HIV infection. Tuberculosis of the nervous system. Neuroborreliosis.	2
23.	Amyotrophic lateral sclerosis.	2
24.	Demyelinating diseases of the nervous system.	2
25.	Diseases of the peripheral nervous system.	4
26.	Perinatal affections of the nervous system.	2
27.	Congenital defects of the spine and spinal cord. Syringomyelia	2
28.	Somatoneurological syndromes.	2
29.	Hereditary and degenerative diseases of the nervous system.	4
30.	Practical skills.	2
	<i>In total</i>	68

6. Thematic plan of students' extramural work

#	TEMA	Number of hours	Type of control
1.	The main stages of development of neurological science.	1	Ongoing control at the classes
2.	Principles of structure and functioning of the nervous system. Functional unit of the nervous system. Clinical classification of sensitivity. Anatomy of sensory pathways. Methods of study of sensation. Types and kinds of sensory disorders (symptom complexes of sensory disorders linked to the lesions at different levels of sensory pathways).	2	
3.	The concept of reflex and reflex arc. Pathological reflexes, technique of elicitation.	1	
4.	Voluntary movements and their disorders. Pyramid	2	

	system. Cortical-nuclear and cortical-spinal pathways. Symptoms of central and peripheral paresis, pathogenesis of symptoms.		
5.	Symptom-complexes of movement disorders due to affection of different levels of cortico-muscular way.	1	
6.	Extrapyramidal system and syndromes due to its affection.	1	
7.	The cerebellum. Syndromes of the cerebellar injury. Types of ataxia.	1	
8.	Pathology of olfactory and visual analyzers. Syndromes of oculomotor nerves' lesions.	1	
9.	Trigeminal, facial, vestibulo-cochlear nerve and syndromes of their affection.	1	
10.	Affection of IX-XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.	1	
11.	Anatomical and physiological data, pathology and methods of investigation of the autonomic nervous system.	1	
12.	Anatomical and physiological data, technique for study of the cortical functions. Syndromes of lesions and irritation of the cortex. Disorders of higher cerebral functions (aphasia, agnosia, apraxia and other).	1	
13.	CSF diagnosis. Meningeal syndrome. Functional diagnostics of neurological diseases.	2	
14.	Practical skills. <u>Final control #1 "General neurology"</u> .	2	
15.	Headaches. Sleep Disorders.	1	
16.	Vascular diseases of the brain and spinal cord. Transient ischemic attacks.	2	
17.	Epilepsy and non-epileptic paroxysmal conditions.	2	
18.	Occupational and habitual neurotoxicities. Affection of the nervous system due to the influence of physical factors.	1	
19.	Neurological aspects of traumatic brain injury. Spinal trauma.	1	
20.	Meningitis. Encephalitis. Arachnoidites.	1	
21.	Poliomyelitis. Acute transverse myelitis. Neurosyphilis. Neurological manifestations of polymyositis-dermatomyositis.	1	
22.	Neurological manifestations of HIV infection. Tuberculosis of the nervous system. Neuroborreliosis.	1	
23.	Parasitic diseases of the nervous system, prion infections.	2	
24.	Amyotrophic lateral sclerosis.	1	
25.	Demyelinating diseases of the nervous system.	1	
26.	Diseases of the peripheral nervous system.	1	
27.	Perinatal affections of the nervous system.	1	
28.	Congenital defects of the spine and spinal cord. Syringomyelia.	1	
29.	Somatoneurological syndromes.	1	

30.	Hereditary and degenerative diseases of the nervous system.	1		
31.	Drugs used in neurology.	2		
32.	Practical skills.	1		
	<i>In total</i>	40		12

7. Individual tasks. Individual tasks in the study of discipline "Neurology" include:

- writing a medical history;
- drafting topical diagnostics tasks;
- the creation of the musculoskeletal, sensitive, cerebellum pathways schemes.
- drawing up of situational tasks, "Step-2" tasks;
- preparation of reports for the scientific conference;
- participation in inter-university competitions.

Individual tasks are performed by students independently under the guidance of teachers.

The purpose of the individual educational research task – independent study of part of the program material, systematization, deepening, generalization and practical application of the student's knowledge from the educational course, development of independent work skills. The completed individual task has a cover page, the content of the individual task, theoretical and practical component, conclusion, list of used literature. Disclosure of an individual task should have a practical orientation, connection with a specific object of activity in the field of medicine.

8. Educational methods

Types of educational activities of students according to the curriculum are:

- a) lectures,
- b) practical classes,
- c) independent work of students (IWS).

Practical classes include:

- 1) examination of the neurological status of a healthy person by students;
- 2) examination of the neurological status of patients with various diseases of the nervous system by students; identification of symptoms and syndromes;
- 3) diagnosing of topical and clinical diagnosis; differential diagnosis;
- 4) prescribing modern treatment for neurological patients;
- 5) solving situational tasks, tasks by type of licensing exam "Step-2".

The main purpose of the neurology course is to teach students the theoretical basics, skills of neurological patients' examination, methodology of diagnosing of neurological disease, the choice of treatment tactics and providing urgent assistance in emergency situations.

Separate place should be given to the study of acute conditions - disorders of the brainblood circulation, epileptic status, neurological pain syndromes, nervous system lesions due to pathology of internal organs, disorders of the autonomic and peripheral nervous system. For students of the medical faculty provides an in-depth study of features of vascular pathology of the brain, infectious lesions of the nervous system, features of the clinic and treatment of peripheral diseases of the nervous system.

For students of the medical faculty an in-depth study of features of vascular pathology of the brain, infectious lesions of the nervous system, features of the clinic and treatment of peripheral diseases of the nervous system are provided.

In addition, for the students of this faculty, program issues are age-adjusted. Much attention is paid to the study of the effects of perinatal pathology and birth trauma, hereditary-degenerative diseases.

Also are included issues of occupational diseases of the nervous system, which are caused by intoxication, adverse effects of physical factors of the environment, emotional and physical overload. It is important to give students an idea of the pathogenetic mechanisms of nervous system diseases, methods of preventing nervous system damage.

Therefore, medical students who will be studying a neurology course on the proposed program should know the clinical anatomy, physiology of the nervous system, symptoms of lesions of

different parts of the nervous system; should be able to diagnose neurological disease, conduct differential diagnosis and treatment of patients with vascular, infectious, demyelinating, hereditary-degenerative diseases, epilepsy, diseases of the peripheral and autonomic nervous systems, and more.

Students must also acquire practical skills in the study of the condition of a neurological patient, the study of the motor, sensory systems, cranial nerves; to understand the basic indicators of ancillary examination methods in a neurological clinic (radiological, computed tomography, electrophysiological, biochemical, etc.).

9. Control methods

Types of control (current and final)

- **Form of final control according to the curriculum** - (exam)
- **Evaluation criteria**

The control measures include the current and final semester control. The current control is carried out during the educational lessons and is aimed at verification of students' mastering of educational material. The form of current control during training sessions is determined by the course's work curriculum.

During assessment of mastering of each topic for the current educational activity, student is given grades on a 4-point (traditional) scale, taking into account the approved evaluation criteria for the respective discipline. This takes into account all types of work provided by the curriculum. The student must receive a grade on each topic. Forms of evaluation of current learning activities should be standardized and include control of theoretical and practical preparation.

10. Current control is carried out at each practical lesson according to the specific objectives of the topic, during the individual work of the teacher with the student for those topics that the student processes independently and they are not included in the structure of the practical lesson.

It is recommended to use the following tools to evaluate student preparation: computer tests; solving situational tasks – typical and atypical; structured writing; the procedure for the control of practical skills and competences (assessment of knowledge and ability to analyze and interpret macro- and microscopic changes of cells, tissues, organs and systems in certain pathological processes).

10. Evaluation of current educational activity: When mastering each topic of the module for the current educational activity of the student grades are given on 4-point traditional scale.

Current control is carried out during the practical lessons and is aimed at checking students mastering of educational material.

For control it is recommended to use the following ways of students preparation level diagnostics: computer tests, control of practical skills in the methods of patients examination with further interpretation of the obtained data, analysis of the results of instrumental and laboratory tests.

Criteria for evaluating the student's current educational activity:

Excellent ("5") – The student correctly, clearly, logically and completely answers all standardized questions of the current topic, including the questions of the lecture course and independent work. Closely binds theory to practice and correctly demonstrates the implementation (knowledge) of practical skills. Freely reads results of analysis, solves situational tasks of increased complexity, is able to generalize material, know methods of patients examination to the extent necessary for the doctor's activity. Completed the scheduled individual work.

Good ("4") – The student correctly and essentially answers the standardized questions of the current topic, including the questions of the lecture course and independent work. Demonstrates the implementation (knowledge) of practical skills. Correctly uses theoretical knowledge to solve practical tasks. Able to solve easy and medium complexity situational tasks. Possesses the necessary practical skills and techniques of their execution in the amount exceeding the required minimum.

Satisfactory ("3") - Student incompletely, with the help of additional questions, answers standardized questions of the current topic, lecture course and independent work. Can not independently build a clear, logical answer. The student makes mistakes while answering and

demonstrating practical skills. The student solves only the easiest tasks, knows only the required minimum of methods of study.

Unsatisfactory ("2") - The student does not know the material of the current topic, can not construct a logical answer, does not answer additional questions, does not understand the content of the material. The student makes significant, gross mistakes when answering and demonstrating practical skills.

Evaluation of independent work: evaluation of independent work of students, which is provided in the subject along with the classroom work, is carried out during the current control of the topic at the appropriate classroom lesson. Evaluation of topics that are presented only for independent work and are not included in the topics of classroom lessons, is held at the final session.

11. Final control: Final control is carried out upon completion of the study of all topics in the discipline.

For the subject "Neurology" form of final control is an exam:

The student is admitted to the exam, if the requirements of the curriculum are fulfilled and if he/she received positive marks for the current educational activity and scored a minimum number of points - 72 points.

12. Scheme of calculation and distribution of points that students will receive:

The maximum number of points a student can earn for their current academic activity per semester for admission to the exam is **120 points**.

The minimum number of points that a student must earn for his/her current academic activities per semester for admission to the exam is 72 points.

The calculation of the number of points is made on the basis of the student's scores on the traditional scale during the study of the discipline, by calculating the arithmetic mean (AM), rounded to two decimal places. The resulting value is converted to scores on a multimark scale as follows:

$$x = \frac{CA \times 120}{5}$$

For convenience, a conversion table is provided on a 200-point scale:

Table 1.

Recalculation of the average grade for current activity into a multimark scale for subjects that finish with the exam.

4-points scale	200-points scale	4-points scale	200-points scale	4-points scale	200-points scale	4-points scale	200-points scale
5	120	4.45	107	3.91	94	3.37	81
4.95	119	4.41	106	3.87	93	3.33	80
4.91	118	4.37	105	3.83	92	3.29	79
4.87	117	4.33	104	3.79	91	3.25	78
4.83	116	4.29	103	3.74	90	3.2	77
4.79	115	4.25	102	3.7	89	3.16	76
4.75	114	4.2	101	3.66	88	3.12	75
4.7	113	4.16	100	3.62	87	3.08	74
4.66	112	4.12	99	3.58	86	3.04	73
4.62	111	4.08	98	3.54	85	3	72
4.58	110	4.04	97	3.49	84	Less than 3	Insufficient
4.54	109	3.99	96	3.45	83		
4.5	108	3.95	95	3.41	82		

Final control is conducted to evaluate the learning outcomes at a particular educational qualification level and at some of its completed stages on a national and ECTS scale. Final control includes semester control and student certification.

Semester control is carried out in the forms of semester exam of the study discipline in the amount of study material defined by the work program of the subject and in terms set by the work curriculum, the individual curriculum of the student.

The semester exam is a form of final control of the student's acquisition of theoretical and practical material of the study discipline for the semester, which is conducted as a control measure.

A student is considered to be admitted to the semester examination of a studied subject if he has attended all the prescribed curriculum of the discipline, completed all types of work provided by the curriculum of the discipline and in its study during the semester gained points not less than minimal (72 points).

Methods of conducting semester exam and exam questions in "Neurology": The semester exam is conducted in writing during the exam session, according to the schedule. The exam form is standardized and includes control of theoretical and practical preparation. The exam controls the theoretical and practical preparation of students. There are 4 questions in the exam tickets:

1. Questions in general neurology (topical diagnosis of levels of lesion of the nervous system).
2. Diseases of the nervous system (etiology, pathogenesis, clinic, diagnosis, treatment, prognosis, etc.).
3. Solution of the situational task (to indicate pathological symptoms, syndromes; to establish the level of the lesion; clinical diagnosis, treatment).
4. Practical skills in the examination of neurological status

The maximum number of points that student can gain in the examination is **80**. **The minimum number of points** for the exam- at least **50**.

Table 2.

Evaluation table and system of distribution of exam points.

Answers	1 question: Topical diagnosis of levels of lesion of the nervous system.	2 question: Diseases of the nervous system.	3 question: Solution of the situational tasks.	4 question: Practical skills in the examination of neurological status.
(91-100%)	20 points	30 points	20 points	10 points
(71-90%)	15 points	24 points	15 points	8 points
(50-70%)	12 points	20 points	12 points	6 points
Less than 50%	0 points	0 points	0 points	0 points

Determining the number of points that student has scored from discipline

Score for the discipline which is completed by the exam is defined as the sum of the points for the current learning activity (**at least 72**) and points for the exam (**at least 50**).

The points from the discipline are independently converted to both the ECTS and the 4-point scale. ECTS points are not converted to the 4-point scale and vice versa.

The points of students, studying in one specialty, based on the number of points gained in the subject, are ranked on the ECTS scale as follows:

Table 3

ECTS score	Statistics
A	Top 10% of students
B	Next 25% of students
C	Next 30% of students
D	Next 25% of students
E	The last 10% of students

Subject points for students who have successfully completed the program are converted to the traditional 4-point scale by the absolute criteria given in the table below:

Table 4

Subject points	Score on a 4-point scale
From 170 to 200 points	5
From 140 to 169 points	4
From 139 points to the minimum number of points that student must gain	3
Below the minimum number of points that student must gain	2

The ECTS score is not converted to the traditional scale because the ECTS scale and the four-point scale are independent.

The objectivity of the evaluation of student learning activity is verified by statistical methods (the correlation coefficient between the ECTS score and the national scale score).

13. Methodological support:

Taking into consideration the specific features of the current state of vocational training and the activation of scientific and information processes, doubling the amount of scientific information, the complexity of study programs, increasing the pace of study the department as to solve the following professional problems:

- a) to implement new learning technologies / technologies of problematic learning, technologies of integrated interdisciplinary learning, etc. /:

1/ technologies of problematic learning: problematic issues; problematic lectures, problematic situations in neurology; problematic issues; problematic seminars; problematic tasks, etc.

2/ training – technology: skills based on training; multiple, automated performing of actions; operation of skills, knowledge in complicated situations.

- b) to teach students to learn independently, constantly update their knowledge

List of questions on final control.

GENERAL NEUROLOGY

1. Reception and sensation. Clinical classification of sensation.
2. Anatomy of superficial and deep sensation tracts.
3. Kinds of sensory deficit. Classification and clinical presentation of pain.
4. Types of sensory deficit (classification, presentation).
5. Thalamus, symptoms of lesion.
6. Brown-Sequard syndrome.
7. Characteristics of the peripheral types of sensory deficit.
8. Characteristics of the spinal types of sensory deficit.
9. Characteristics of cerebral types of sensory deficit.
10. Meninges. Meningeal syndrome.
11. Meningeal syndrome – clinical presentation.
12. Reflex apparatus of the spinal cord. Reflex, reflex arc. Unconditioned reflexes.
13. Tendon and periosteal reflexes – examination and reflex arches.
14. Pathological reflexes.
15. Cortico-spinal (pyramidal) tract (anatomy).
16. Cortico-nuclear tract (anatomy).
17. Central (spastic) paralysis (circumstances of onset, signs).
18. Peripheral (flaccid) paralysis. Pathogenesis of atonia, areflexia, atrophy.
19. Symptoms of affection of anterior spinal horn, anterior root, peripheral nerve.
20. Syndromes of transverse affection of the spinal cord above the cervical enlargement.
21. Syndromes of transverse affection of the spinal cord at the level of cervical enlargement.
22. Syndromes of transverse affection of the spinal cord at the thoracic level.
23. Syndromes of transverse affection of the spinal cord at the level of lumbosacral enlargement.
24. Internal capsule, symptoms of lesion.
25. Extrapyramidal system (structure, function).
26. Syndrome of the lesion of pallidum system (parkinsonism).
27. Parkinson's syndrome. Its biochemical mechanisms.
28. Syndromes of the lesions of striatal system (hyperkinesias).
29. Types of hyperkinesias (circumstances of development, signs).
30. Cerebellum, anatomical and physiological features. Symptoms of lesion.
31. Ataxia (types, clinical presentation).
32. Types of pathological gait, their features.
33. Symptoms of the visual analyzer's damage (nerve, tract, cortex).
34. Signs of lesion of the trigeminal nerve's sensory part at the different levels.

35. Signs of lesion of the trigeminal nerve's first branch.
36. Signs of lesion of the trigeminal nerve's second branch.
37. Signs of lesion of the trigeminal nerve's third branch.
38. Symptoms of the oculomotor nerve's lesions.
39. Symptoms of lesions of the abducens and trochlear nerves.
40. Signs of peripheral and central paralysis of mimic muscles.
41. Signs of damage of the peripheral neuron of facial nerve at the different levels.
42. Signs of peripheral and central paralysis of the lingual muscles.
43. Bulbar paralysis (circumstances of development, signs).
44. Pseudobulbar paralysis (circumstances of development, signs).
45. Peduncular alternating syndromes (definitions, examples).
46. Pontine alternating syndromes (definitions, examples).
47. Bulbar alternating syndromes (definitions, examples).
48. Weber's alternating syndrome.
49. Foville's alternating syndrome.
50. Millard–Gubler alternating syndrome.
51. Wallenberg's alternating syndrome.
52. Jackson's alternating syndrome.
53. Symptoms of the autonomic nervous system affection (sympathicotonia, vagotonia).
54. Supra-segmental part of the autonomic nervous system. Function, syndromes of affection.
55. Segmental part of the autonomic nervous system. Function, syndromes of affection.
56. Bernard-Horner syndrome.
57. Cerebral cortex – syndromes of lesion.
58. Symptoms of the temporal lobe's lesion.
59. Symptoms of the frontal lobe lesions.
60. Symptoms of the parietal lobe lesion.
61. Symptoms of the occipital lobe affection.
62. Speech disorders (dysarthrias, aphasias, their diagnostics).
63. Types of aphasia.
64. Types of agnosias.
65. Types of apraxias.
66. Normal CSF content.
67. CSF formation and circulation, normal CSF content.
68. Blood supply of the brain.
69. Blood supply of the spinal cord.

CLINICAL NEUROLOGY

1. Classification of cerebrovascular diseases.
2. Ischemic stroke (etiology, pathogenesis, classification).
3. Ischemic stroke (clinical picture, diagnosis, treatment).
4. Transient ischemic attacks (clinical picture, management).
5. Hemorrhagic stroke (etiology, pathogenesis, clinical picture, treatment).
6. Subarachnoid hemorrhage (etiology, clinical picture, diagnosis, management).
7. Hemorrhagic parenchymal stroke (clinical picture, diagnosis, management).
8. Primary and secondary stroke's prevention.
9. Principles of non-differentiated treatment of stroke.
10. Principles of differentiated treatment of stroke.
11. Classification of headaches.
12. Migraine (pathogenesis, clinical picture, treatment).
13. Cluster headache (pathogenesis, clinical picture, treatment).
14. Tension headache (pathogenesis, clinical picture, treatment).
15. Insomnias, hypersomnias.
16. Epilepsy (definition, diagnosis, therapeutic principles).
17. Epilepsy (classification of epileptic seizures).

18. Phases of the generalized tonic-clonic seizure (grand mal) – clinical presentation.
19. Epileptic status, emergency aid.
20. Meningitis (classification, clinical picture, diagnosis, management).
21. Acute meningococcal meningitis.
22. Tuberculous meningitis.
23. Encephalitis (primary, secondary).
24. Epidemic encephalitis (etiology and pathogenesis, clinical picture of acute stage).
25. Epidemic encephalitis (etiology and pathogenesis, clinical picture of chronic stage).
26. Herpes simplex encephalitis.
27. Acute infectious myelitis (etiology, clinical picture, diagnostics, management).
28. Poliomyelitis (etiology, clinical picture, diagnostics, management).
29. Tuberculosis of the nervous system.
30. Neurological manifestations of HIV-infection (neuro-AIDS).
31. Multiple sclerosis (types of course, clinical picture).
32. Multiple sclerosis (pathogenesis, modern methods of management).
33. Acute disseminated encephalomyelitis.
34. Neurosyphilis – early forms.
35. Neurosyphilis – late forms.
36. Neuroborreliosis.
37. Amyotrophic lateral sclerosis.
38. Trigeminal neuralgia (etiology, clinical picture, management).
39. Neuropathy of the facial nerve (Bell's palsy) – causes, clinical picture, management.
40. Diabetic polyneuropathy (etiology, clinical picture, management).
41. Alcohol polyneuropathy (clinical picture, diagnosis and treatment).
42. Diphtheroid polyneuropathy (etiology, clinical picture, treatment, complications).
43. Radial neuropathy.
44. Median neuropathy.
45. Ulnar neuropathy.
46. Vertebrogenic lumbo-sacral radiculoneuropathy.
47. Neurological manifestations of vertebral osteochondrosis (pain syndromes).
48. Upper brachial plexopathy (Erb-Duchenne palsy).
49. Lower brachial plexopathy (Dejerine–Klumpke palsy).
50. Guillain–Barré syndrome.
51. Tibial neuropathy.
52. Common peroneal neuropathy.
53. Radicular syndromes (cervical and lumbar ones).
54. Syringomyelia, syringobulbia (etiology, pathogenesis, diagnosis, clinical picture, outcome).
55. Cerebral palsy – clinical types, treatment.
56. Closed head injury – cerebral concussion.
57. Closed head injury – cerebral contusion.
58. Closed head injury – cerebral compression.
59. Progressive muscular dystrophies.
60. Myasthenia gravis. Myasthenic syndromes.
61. Myasthenic crisis (causes, clinical picture, treatment).
62. Cholinergic crisis (causes, clinical picture, treatment).
63. Charcot–Marie–Tooth disease.
64. Hereditary spastic paraplegia (Strümpell's disease).
65. Spinocerebellar ataxias. Friedreich's ataxia.
66. Spinocerebellar ataxias. Pierre Marie ataxia.
67. Modern neurochemical aspects of Parkinson's disease and its management.
68. Hepatocerebral dystrophy (Wilson's disease).
69. Huntington's disease.
70. Somato-neurological syndromes in cardiovascular diseases.

71. Somato-neurological syndromes in respiratory diseases.
72. Somato-neurological syndromes in endocrine diseases.
73. Somato-neurological syndromes in gastrointestinal diseases.
74. Somato-neurological syndromes in renal diseases.

LIST OF PRACTICAL SKILLS

1. Examination of superficial sensation.
2. Examination of deep sensation.
3. Examination of complex and special sensation.
4. Examination of the stretch signs.
5. Examination of meningeal symptoms.
6. Examination of voluntary movements.
7. Examination of active and passive voluntary movements' range, Barre's and Buddha's tests).
8. Examination of the muscular tone and strength.
9. Examination of physiological reflexes (superficial and deep ones).
10. Examination of pathological reflexes (hyperorality and pathological pyramidal ones).
11. Examination of olfactory analyzer.
12. Examination of the visual acuity and color perception.
13. Examination of the visual fields and their changes due to visual analyzer's affection.
14. Describe the fundoscopic picture in various pathological conditions (optical neuritis, primary and secondary atrophy, papilledema, Foster-Kennedy syndrome).
15. Examination of the sensory functions of trigeminal nerve.
16. Examination of the motor functions of trigeminal nerve.
17. Examination of the functions of oculomotor group of nerves.
18. Assessment of the autonomic innervation of the eye.
19. Examination of the function of facial nerve.
20. Examination of auditory, vestibular and gustatory analyzers.
21. Examination of the functions of glossopharyngeal and vagus nerves.
22. Examination of the functions of hypoglossal nerve.
23. Examination of the functions of bulbar group of cranial nerves (9-12th).
24. Methods of examination of cerebellar functions (finger-to-nose, heel-to-shin, dysmetria tests, dysdiadochokinesia etc).
25. Examination of functions of the striopallidar system (gait, active movements, muscular tone etc).
26. Examination of gnosis, praxis, speech (dysarthria, aphasia, etc.).
27. Analysis of the normal CSF assay. CSF changes in the different neurological conditions (subarachnoid hemorrhage, multiple sclerosis, meningitis, encephalitis, neurotuberculosis, Guillain-Barre syndrome).
28. Lumbar puncture – description of the procedure, indications, contraindications, complications.
29. Radiological diagnostic methods in neurology (craniography, spondylography, myelography, angiography) – physical principles, diagnostic value, indications.
30. Main radiological signs of vertebral osteochondrosis.
31. CT, MRI, PET – physical principles, diagnostic value in neurology.
32. Describe typical CT changes in ischemic stroke, hemorrhagic stroke, head injury, subarachnoid hemorrhage).
33. Describe MRI changes in the brain and spinal of patients with multiple sclerosis (regimens, characteristics of foci).
34. MRI changes in multiple sclerosis, stroke, acute disseminated encephalomyelitis, neuroAIDS.
35. Ultrasound of the cervical and cranial vessels – physical principles, diagnostic value in neurology, indications
36. Neuromyography – physical principles, interpretation and diagnostic value of the method, indications.
37. Typical neuromyographic changes in ALS, myotonia, myasthenia gravis, polyneuropathy.

38. EEG – diagnostic value of the method, indications for usage. Describe EEG-changes in epilepsy.
39. Describe the EEG changes of patients with epilepsy (absence seizure, focal seizures, generalized seizures, status epilepticus).
40. Describe the scales for assessing the state of consciousness.

14. Changes and additions to the list of literature (protocol # 8 from October 29, 2019) in the subject "Neurology":

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