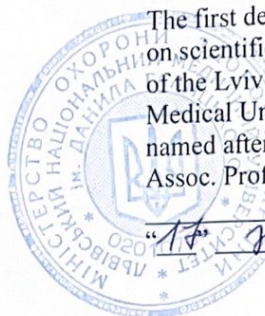


DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY  
DEPARTMENT OF NEUROLOGY



The first deputy vice-rector  
on scientific and pedagogical work  
of the Lviv National  
Medical University  
named after Danylo Halatsky,  
Assoc. Prof. I. SOLONYNKO

*I. Solonynko*  
"17" *жовтня* 2023

EDUCATIONAL WORKING PROGRAM  
NEUROLOGY, INCLUDING NEURODENTISTRY

OK 22.1

4 year of study

training of specialists  
of the second level of higher education (master of medicine)  
field of knowledge 22 "Health"  
specialty 221 "Dentistry"

Discussed and approved  
at a meeting of the Department  
of neurology  
protocol №  
from "11" *October* 2023  
Head of the Department of  
neurology  
prof. T. Nehrych

*T. Nehrych*

Approved by the profile  
methodical commission on  
therapeutic disciplines  
protocol №  
"12" *October* 2023  
Chairman of the profile methodical  
commission  
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## INTRODUCTION

The program for studying the discipline “Neurology, incl. neurodentistry” is compiled according to the Standart of higher education of the second (master's) level of higher education, branch of knowledge 22 “Healthcare”, speciality 221 “Dentistry”

### Description of the curriculum in the subject "Neurology including neurodentistry" for students of the faculty of dentistry

Structure of the educational discipline	Number of hours, of them			Year of studying	Type of control	
	All	Classroom				SIW
		Lectures	Practical classes			
Subjects: “Neurology. incl. neurodentistry”	60 hours/ 2.0 credits ECTS	6	24	30	4 years/ VIII semester	balans

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

Neurology, including neurodentistry as a discipline: a) is based on the studying with students of medical biology, biological and bioorganic chemistry, histology, physiology and pathological physiology, human anatomy and pathological anatomy and integrates with these disciplines; b) is based on the studying of the students of the propedeutical disciplines of therapeutic and dental profile, pharmacology, radiology and integrates with these disciplines; c) integrates with other clinical disciplines (internal medicine, dentistry, neurosurgery, oncology, psychiatry, medical genetics, etc.).

#### 1. Purpose and objectives of the subject

1.1. The purpose of teaching the discipline "Neurology, incl. neurodentistry» is the improvement of knowledge about the peculiarities of the structure and functioning of different departments of the nervous system, mastering the methodology of examination of neurological status, the study of etiopathogenetic features, clinical manifestations, differential diagnostic features, modern directions and algorithms for the treatment of various diseases of the nervous system and neurostomatological diseases.

1.2. The main tasks of studying the discipline "Neurology, incl. neurodentistry»is

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

**1.3 Competences and learning outcomes** facilitated by discipline (relationship with the normative content of higher education applicants' training, formulated in terms of results of studying in Standarts of higher education).

In accordance with the requirements of the Higher Education Standard, the discipline provides students with **competencies**:

**integral:**

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

**common:**

- Ability to choose communication strategy; ability to work in a team;
- Interpersonal skills;
- Ability to communicate in English 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 (specialty, subject):**

- 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.

- By standard methods to distinguish leading neurological symptoms and syndromes.
- Establish a topical diagnosis of nervous system damage by logical analysis and justification.
- Evaluation of laboratory and instrumental research results.
- Diagnosis of urgent conditions.
- Determining of management and providing emergency medical care.
- Keeping medical records.
- Processing of state, social and medical information.

**Detailing competencies according to the NRC descriptors in the form of the «Competence Matrix».**

**Competence Matrix**

№	Competence	Knowledge	Skills	Communications	Autonomy and responsibility
<b>Integral competence</b>					
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.					
<b>Commoncompetence</b>					
<b>1.</b>	Ability to apply knowledge of topical diagnosis of levels of nervous system damage in practical situations.	Have specialized conceptual knowledge acquired in the learning process.	Have specialized conceptual knowledge acquired in the learning process.	Clear and unambiguous communication of their own conclusions, knowledge and explanations, which substantiate them to specialists and non-specialists.	Responsible for decision-making under difficult circumstances.
<b>2.</b>	Knowledge and understanding of the subject area of propedeutics of internal medicine.	Have deep knowledge of the structure of professional activity.	Be able to perform professional activities that require updating and integration of knowledge.	Ability to effectively shape communication strategy in professional activities.	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.	Know the tactics and strategies of communication, the laws and methods of communicative behavior.	Be able to choose ways and strategies of communication to ensure effective teamwork.	Use communication strategies and interpersonal skills..	Be responsible for the choice and tactics of the communication method.
4.	Ability to communicate in English both verbally and in writing; ability to speak a second language.	Have perfect knowledge of the native language and basic knowledge of a foreign language.	Be able to apply English, both verbally and in writing, be able to communicate in a foreign language.	To use in professional and business communication and in preparation of documents the English. Use a foreign language in a professional activity.	To be responsible for fluency in the English, for the development of professional knowledge.
5.	Use of information and communication technologies.	Have a thorough knowledge of information and communication technologies used in professional activities.	Be able to use information and communication technologies in the professional field that requires updating and integration of knowledge.	To use information and communication technologies in professional activity.	Be responsible for the development of professional knowledge and skills.
6.	Ability to think abstractly, analyze and synthesize, to be able to learn and to be modernly taught.	Ability to think abstractly, analyze and synthesize, to be able to learn and to be modernly taught.	Be able to analyze information, make informed decisions, be able to acquire modern knowledge.	Make the right connections to reach the goals.	Be responsible for the timely acquisition of modern knowledge.

7.	Ability to evaluate and ensure the quality of work performed.	Know the methods of evaluating performance indicators.	Be able to ensure quality work	Establish links to ensure quality work	Be responsible for quality work.
8.	Determination and perseverance about tasks and responsibilities.	Know the responsibilities and ways of accomplishing the tasks.	Be able to determine the purpose and objectives of being persistent and conscientious in the performance of duties.	Establish interpersonal connections for the effective performance of tasks and responsibilities	Responsible for the quality of the tasks.

### Special (specialized, subject) competences

1.	Ability to evaluate data on functional anatomy and clinical physiology of the human nervous system.	Know the anatomy and function of sensitive analyzers, locomotor systems, autonomic system and higher brain functions.	Be able to interpret data on functional anatomy and clinical physiology of the human nervous system.	Use standard approaches to assessing nerve function systems.	Understanding the importance of a 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.	Know the algorithm interviewing a patient with neurological pathology.	Be able to interview and highlight major complaints, assess the patient's overall condition.	Comply with ethics, bioethics and deontology requirements in their professional activities.	Responsible for the quality of the tasks.
3.	By standard methods to distinguish leading neurological symptoms and syndromes.	Know the main symptoms and syndromes of the defeat of different parts of the	Examination skills of patients with motor, sensitive disorders; examination of	Follow methods of conducting neurological examination, relevant ethical and	A sense of responsibility for the correctness, clarity and timeliness of diagnosis

		nervous system.	cranial nerves, autonomic nervous system, function of cerebral cortex.	legal standards.	
4.	To establish a topical diagnosis of nervous system damage by logical analysis and justification.	Know leading lesions of the various levels of the nervous system: sensory, motor, autonomic and syndromes of the cerebral cortex.	Be able to investigate the patient's neurological status, to identify leading clinical syndromes, to conduct differential diagnosis of levels of damage to the nervous system.	Follow the rules of medical deontology, humane treatment of the patient.	Responsibility for complex clinical, diagnostic tasks and correct diagnosis.
5.	Evaluation of laboratory and instrumental research results.	Know the standard methods of conducting examinations and laboratory tests in neurological practice.	Be able to analyze the results of laboratory and instrumental research and on the basis of it to evaluate information on the lesion of the nervous systems.	It is reasonable to nominate and evaluate the results of examinations and laboratory tests.	Be responsible for deciding on the evaluation of laboratory examinations and results.
6.	Diagnosis of urgent conditions	Have specialized knowledge of the diagnosis of urgent conditions in neurology.	Diagnose urgent conditions according to the standard scheme.	Determine the tactics of emergency medical care according to the algorithm.	Be responsible for the development of professional knowledge and skills.
7.	Defining tactics and providing emergency medical care.	Know the methods of evaluating performance indicators.	Be able to provide the necessary assistance according to the standard.	It is reasonable to carry out assistance procedures and to evaluate the results of medical	Be responsible for the development of professional knowledge and skills.



				procedures.	
8.	Keeping medical records.	Know the rules and standards of medical records. Know the basic types of medical records for the patient and the population (map outpatient / s tertiary patient, medical history, etc.	Be able fill in and to keep medical documentation regarding the patient and contingent people, using standard technology on basis regulatory documents.	To use standard approaches to medical records. Establish interpersonal links for effective medical records.	Be responsible for the correctness of keeping medical records Responsible for the quality of the completion and maintenance of medical records.
9.	Processing of state, social and medical information.	Know the methods of processing state, social, medical information.	Be able to analyze and evaluate state, social, medical information.	Use standard approaches to assessing information, use computer information technology.	Be responsible for processing state, social, medical information.

**Learning outcomes:** Conduct interviews and physical examination of patients and analyze their results in an internal medicine clinic. Analyze the results of basic laboratory and instrumental research methods. Determine the leading symptoms in the clinic of nervous and neurostomatological diseases.

**Integrative end programmatic learning outcomes facilitated by the discipline:** Evaluate information on diagnosis in a healthcare setting, its unit, using knowledge of humans, their organs and systems, based on the results of laboratory tests.

**Learning outcomes for the discipline:** Select 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. Collect information about the patient's general condition, evaluate the diagnosis information based on the results of laboratory and instrumental studies.

## 2. Information volume of the discipline

The educational process is organized according to the credit-transfer system. According to the curriculum for training specialists, to study the discipline “Neurology, incl. Neurodentistry” isolated 1.5 credits (45 hours), 30 hours, of which the class preparation (in the form of lectures - 6 hours and practical classes - 24 hours) and 15 hours - independent work of students. The amount of student

workload is described in ECTS credits - colloquium credits, which are credited to students upon successful completion of the corresponding colloquium credit (credit).

**The discipline program consists of the following units:**

- 1. Neurology.*
- 2. Neurodentistry.*

### **Unit 1. Neurology**

**1. The main stages of development of neurological science. Principles of structure and functioning of the nervous system. Voluntary movements and their disorders. Pyramid system. Symptoms of central and peripheral paresis. Extra pyramid system and its lesion syndromes.**

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 departments of the nervous system: hemispheres, subcortical nodes, brain stem, spinal cord, roots, spinal ganglia, plexus, plexus. The functional unit of the nervous system is the neuron. Types of neurons, their functional significance. Neuroglia, its functional significance.

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. Brain and spinal cord. Cerebrospinal fluid.

Perceptions of reflex and reflex arc, conditional and unconditioned reflexes, levels of closure of skin, tendon and periosteal reflexes. Anatomical features and neurophysiology of the system of voluntary motions, extrapyramidal system and cerebellum. Methods of study of the motor system. Realization of voluntary movements. Pyramid system. Central and peripheral motor neurons. Cortical-nuclear and cortical-spinal pathways.

Symptoms of central (spastic) paralysis. Syndrome of motor disorders at defeat of a motor pathway at different levels.

Anatomical data: basal ganglia (lenticular, caudal nucleus, claustrum, subthalamus), brain stem formation (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 participation in providing unconditional reflexes, implementation of stereotypical automated movements, muscle readiness for action. Syndromes of the lesions of the extrapyramidal system.

Akinetic-rigid syndrome, or Parkinson's syndrome, its biochemical aspects. Key clinical manifestations of Parkinsonism: oligo-bradykinesia, muscle rigidity, Parkinson's tremor, postural instability.

Hyperkinetic syndrome. Types of hyperkinesis: athetosis, choreic, hemiballism, tics. Muscular dystonia (focal (blepharospasm, facial hemispasm, spastic curvature, oromandibular dystonia, brush dystonia, foot dystonia, torsional dystonia), segmental, generalized).

## **2. The cerebellum, syndromes of the cerebellum. Sensitive system and its symptoms. Kinds and types of sensitive disorders.**

Anatomic and physiological features of the cerebellum. Relationships of the cerebellum with different parts of the brain and spinal cord (homo- and heterolateral). Afferent and efferent pathways. Worm and cerebellar hemisphere. Functions of the cerebellum: providing balance, coordination, synergism of movements, regulation of muscle tone. Syndromes of the cerebellum. The concept of static and locomotor ataxia. Types of ataxia: (cerebellar, cortical, vestibular, sensitive).

The concept of reception. Types of receptors. Extroceptive, proprioceptive, interoceptive sensitivity. Clinical classification of sensitivity. Leading pathways of sensitivity. Methods of 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 horn, conduction (when lesions of the leading sensory pathways at the level of the spinal cord, medial loop, optic hump, inner capsule); cortical type (irritation and fallout syndromes).

## **3. Pathology of olfactory and visual analyzers. Syndromes of lesions of oculomotor nerves. Localization of functions in the cerebral cortex. Syndromes of lesions. Cerebrospinal fluid, its changes. Meningeal syndrome.**

**I pair** – the olfactory nerve (sensitive nerve): 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, transparent septum, anterior punctured substance); cortical olfactory center (medial surface of temporal lobe of the brain). Research on olfactory analyzer. The lesions are hyposmia, anosmia, hyperosmia, olfactory hallucinations.

**II pair** – optic nerve (sensitive nerve).

Anatomic and physiological features: divisions - peripheral (sticks and cones, bipolar cells, ganglion cells, nerve itself, chiasm, optic tract), central (lateral cranial bodies, upper hillocks of four four (subcortical centers), Graziote bundle, spur fissure of the occipital lobe (analyzer cortical center).

Symptoms of lesion: amaurosis, amblyopia, homonymous and heteronymous hemianopsia (binasal, bitemporal), visual hallucinations. Changes in the optic disc (changes in the fundus).

**III, IV, VI pairs** – oculomotor (mixed), block, branching (motor) nerves: localization of nuclei, root exit from the skull, zone of innervation at the periphery.

Symptoms of defeat: 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.

The structure of the cerebral hemispheres. Cyto- and myeloarchitectonics of the cortex. Localization of functions in the cerebral cortex. Praxis. Types of apraxia: constructive, ideational, motor. Language disorders: motor, sensory, amnesic aphasia.

Spinal puncture. Brain and spinal cord. The physiology of liquid formation. The composition of the cerebrospinal fluid is normal, its changes in meningitis, tumors, hemorrhagic stroke, tuberculosis. Cell-protein, protein-cell dissociation. Pleocytosis.

Meningeal symptoms: headache, vomiting, general hyperesthesia, photophobia, rigidity of occipital muscles, Kernig's symptom, Brudzinski's symptoms (upper, middle, lower), trismus, local reactive pain phenomena of Mendel village, extracellular villus when pressing the exit points of the small and large occipital nerves. Meningeal posture of the patient. Symptom of Lesage.

#### **4. Epilepsy and non-epileptic paroxysmal conditions.**

Epilepsy. Pathogenetic essence of the epileptic cell in the development of the disease. The values of endogenous and exogenous factors involved in the formation of this lesion. 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 inter-onset period.

#### **5. Vascular diseases of the brain and spinal cord.**

Classification. Acute disorders of the cerebral circulation: strokes and fleeting disorders of the cerebral circulation (transient ischemic attacks and cerebral hypertensive crises). Chronic disorders of the cerebral circulation: early and late forms. Vascular dementia.

Etiological factors and pathogenesis of acute disorders of cerebral circulation. Hemorrhagic and ischemic (thrombotic and non-thrombotic) strokes, subarachnoid hemorrhages. Symptoms of damage to the anterior, middle, posterior cerebral arteries. Syndromes of occlusion and stenosis of the cerebral vessels. Brain and focal syndromes. Quantitative and qualitative types of disorders of consciousness (Productive and unproductive symptoms). Differential diagnosis of different types of acute disorders of cerebral circulation. Modern methods of undifferentiated and differentiated therapy of acute disorders of cerebral circulation. The "therapeutic window" period. Indications and contraindications for the surgical treatment of disorders of the cerebral circulation.

Hemorrhage into the spinal cord and its shell. Ischemic spinal strokes. Etiology and pathogenesis. Semiology. Diagnosis. Intensive care in the acute period.

#### **6. Infectious diseases of the nervous system.**

Meningitis. Classification of meningitis: primary and secondary, purulent and serous.

Purulent meningitis. Primary meningococcal meningitis, clinic, diagnosis, features of the course, atypical forms. Secondary meningitis: pneumococcal, staphylococcal. Clinic, diagnostics, indicators of cerebrospinal fluid, treatment, prevention. Serous meningitis. Primary viral: lymphocytic choriomeningitis, enterovirus meningitis (ECNO, Coxsackie), mumps and others. Secondary: tuberculous meningitis and meningitis in other infections. Clinic, diagnostics, value of research of liquor in differential diagnostics, treatment, prophylaxis. Encephalitis. Classification. Primary encephalitis: epidemic, tick-borne spring-summer, herpetic. Secondary encephalitis: rheumatic (small chorea), post-vaccine, with varicella, rubella. Clinic, course, forms of the disease, diagnosis. Nervous system lesions in influenza (influenza hemorrhagic encephalitis, encephalopathy).

Neurosyphilis. Early neurosyphilis (mesodermal): generalized syphilitic meningitis, meningovascular syphilis, gums of the brain and spinal cord, latent asymptomatic meningitis (cerebral syphilis). Later neurosyphilis (parenchymal). Diagnosis, methods of treatment.

Neuro-AIDs. Etiology, pathogenesis, key clinical manifestations: dementia, acute meningencephalitis and atypical aseptic meningitis, myelopathy, peripheral nervous system lesions.

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

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

### **7. 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: stem, cerebellum, optic, hyperkinetic, spinal, cerebrospinal). The Charcot Triad. The Pentad of Mumburg. Forms of the disease. Differential diagnostics. Treatment (during exacerbation - exchange plasmapheresis, pulse therapy with corticosteroids, cytostatics, desensitizing therapy, antihistamines, antioxidants; during remission - interferons - drugs that improve trophic nervous system, blood vessels).

### **8. Functional diagnostics of diseases of the nervous system.**

X-ray (cranio-, spondylography); Contrast X-ray examinations (myelography, angiography, ventriculography); Ultrasound (echoencephalography, Doppler ultrasound); Electrophysiological (electroencephalography, rheoencephalography, echo-encephalography, electromyography, etc.); Neuroimaging methods (computer tomography, magnetic resonance imaging, including vascular mode).

### **Unit 2. Neurodentistry**

## **9. Headache.**

Etiology and mechanism of headache: vascular, fluidynamic, neuralgic, retardation, mental, altered. Classification. Nosological forms of headache: migraine, tension and cluster headache. Differential diagnostics, principles of treatment. Migraine-etiology, modern structures of pathogenesis. Clinical forms (simple migraine - without aura, associated), diagnosis, differentiated diagnosis, management (at the time of admission and prophylactic). Headache according to intracranial hypotension syndrome and intracranial hypertension syndrome (etiopathogenetic factors, subjective data, clinical and instrumental data).

## **10. Pathology of the autonomic nervous system.**

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

Segmental part of the autonomic nervous system. Sympathetic nervous system: lateral horns of the spinal cord, sympathetic trunk, ganglia. Parasympathetic nervous system: craniobulbar, sacral (sacral) part. Subsegmental department of autonomic functions: hypothalamus, limbic system, reticular formation of brainstem. Ergotropic and trophotropic activity. Methods of examination.

Syndromes of disorders of the transsegmental department of the autonomic nervous system. Vegetative Dystonia Syndrome. Permanent and paroxysmal course. Hypothalamic syndrome. Vegetative-vascular paroxysms: sympatho-adrenal, weight-insular, mixed. Syndrome of disorders of the segmental autonomic nervous system. Damage of the brainstem, lateral horns of the spinal cord, ganglia of the border trunk, plexuses, nerves. Claude-Bernard-Horner syndrome. Visceral symptoms. Levels of regulation of pelvic functions and their disorders.

## **11. Trigeminal, facial, vestibulo-cochlear nerves and symptoms of their lesions.**

V pair - trigeminal nerve (mixed): nerve nuclei, root output on the basis of brain, skull, nerve branches and areas of their innervation (ocular nerve, 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 zone of innervation of the corresponding branches, loss of the corneal reflex, paresis of the chewing muscles, loss of the mandibular reflex); lesions of the node of the trigeminal nerve (herpetic rash, pain, disorders of all kinds of sensitivity on half of the face, reduction of corneal, mandibular reflexes); lesions of the sensory nucleus of the trigeminal nerve - nucleus of the spinal cord (segmental - dissociated type of impaired pain and temperature sensitivity in half of the face); lesions of the thalamus (hemianesthesia of all kinds of sensitivity, thalamic pain on the opposite side of the hearth; lesions of the cortex postcentral twist.

VII pair - facial nerve (mixed). Anatomic and physiological features; the constituent branches of the nerve (large stony nerve, stirrup nerve, eardrum, facial nerve itself). Symptoms of facial nerve damage: peripheral paresis of facial muscles (nerve lesions in the canal, bridge-cerebellum, brainstem (alternating bridge syndromes)) and central paresis of the facial muscles (inner capsule; lower anterior central gyrus).

VIII pair - the vestibulocochlear nerve (sensitive). Anatomic and physiological data, cochlear and vestibular nerves. Pathology of cochleo-vestibular apparatus: lesions of the sound-sensing apparatus (hearing disorder in high tones), lesions of the sound-conduction apparatus (hearing disorders in low tones); lesions of the parietal part (dizziness, nystagmus, imbalance, coordination of movements, autonomic disorders, lesions of the temporal lobe (sometimes irritation-auditory hallucinations).

### **12. 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).

Anatomy - physiological features. Localization of nuclei in the medulla oblongata. Bulbar and pseudobulbar syndromes: common signs (dysphagia, dysphonia, dysarthria) and differences (fibrillation and atrophy of the muscles of the tongue, reflexes of oral automatism, forced laughter, crying). Disorders of the innervation of the muscles of the tongue - peripheral and central paresis.

### **13. Trigeminal neuralgia.**

- Trigeminal neuralgia mainly of central genesis. Classical trigeminal neuralgia.
- Postherpetic lesion of the branches of the trigeminal nerve.
- Trigeminal neuralgia mainly of peripheral genesis. Odontogenic trigeminal neuralgia.
- Nasal nerve neuralgia (Charlene's syndrome).
- Neuralgia of the temporal nerve (Frey's syndrome).

Etiology, pathogenesis, clinic, diagnosis, differential diagnosis, treatment.

### **14. Neuropathy of the trigeminal nerve and its individual branches. Iatrogenic trigeminal neuropathies.**

- Neuropathy of the lower alveolar nerve.
- Neuropathy of the buccal nerve
- Neuropathy of the lingual nerve (glossalgia).
- Neuropathy of the upper alveolar nerve.
- Iatrogenic trigeminal neuropathies.

Etiology, pathogenesis, clinic, diagnosis, treatment.

### **15. Facial nerve lesions.**

- Facial nerve neuropathy.
- facial nerve node's syndrome (Hunt Syndrome).
- Vidian's nerve neuralgia (File syndrome).

Etiology, pathogenesis, clinic, treatment.

### **16. Syndromes of the lesion of the glossopharyngeal, vagus and hypoglossal nerves.**

- Neuralgia of the glossopharyngeal nerve.
- Air drum nerve neuralgia (Reicher's syndrome).
- Auricular nerve neuralgia.
- Upper laryngeal nerve neuralgia.

- Hypoglossal nerve neuralgia.

Etiology, clinic, treatment.

**17. Autonomic prosopalgia and other neurogenic diseases of the face.**

- Cervical ganglionitis (Oppenheim's syndrome).
- Ganglionitis of palatine wing node (Sluder's syndrome).
- Auricular node ganglionitis.
- Ganglionitis of undermandibular and sublingual nodes.
- Ganglionitis of cervical sympathetic nodes.
- Cluster cephalgia.
- Angioneurotic edema (Quincke edema).
- Rossolimo-Melkerson-Rosenthal syndrome.
- Sjogren's syndrome.
- Progressive facial hemiotrophy (Parry-Romberg syndrome).

Etiology, clinic, treatment.

**18. Diseases of the peripheral nervous system.**

Clinical classification of diseases of peripheral nervous system diseases.

Lesions of individual spinal nerves. Traumatic. On the upper extremities: radial, elbow, median, skin-muscular and other nerves. On the lower extremities: femur, gluteus, tibia, tibia and others.

Plexopathy. Injuries of the plexuses: cervical, upper humerus (Erb-Duchenne paralysis); lower humerus (paralysis of DeGerin-Kluumpke); shoulder (total); lumbosacral (partially or totally).

Multiple lesions of nerve roots. Infectious polyneuropathies, infectious-allergic polyradiculoneuropathies (Landry, Hyena-Barre). Polyneuropathy. Toxic: in chronic household or industrial intoxication (alcohol, lead, chlorophyll and others); for toxic infections (diphtheria, botulism); allergic (medicamentous and others); dysmetabolic: hypo- or avitaminosis, in endocrine diseases - diabetes, diseases of the liver, kidneys, etc. ; dyscirculatory: at nodular periarteritis, rheumatic and other vasculitis, idiopathic and hereditary forms. Treatment of diseases of the peripheral nervous system: medical, orthopedic, surgical, sanatorium-spa. Treatment by physical training. Prevention and expertise.

**3. Structure of the discipline**

**"Neurology, including neurodentistry"**

**Unit 1. Neurology**

**Unit 2. Neurodentistry**

Theme	Lectures	Practical kessons	SIW	Individual SIW
<b><u>Unit 1«Neurology»</u></b>				
1. The main stages of development of neurological		2	2	



science. Principles of structure and functioning of the nervous system. Sensitive system and its symptoms. Kinds and types of sensitivity disorders.				
2. Voluntary motions and their disorders. Pyramid system. Symptoms of central and peripheral paresis.	2	2	2	
3. Extrapyramidal system and its syndromes. Cerebellum, cerebellar syndromes.		2	2	
4. Pathology of olfactory and visual analyzers. Syndromes of lesions of oculomotor nerves. Localization of functions in the cerebral cortex. Syndromes of lesions. Cerebrospinal fluid, its changes. Meningeal syndrome.		2	2	
5. Epilepsy and non-epileptic paroxysmal conditions.		1	2	
6. Vascular diseases of the brain and spinal cord. Infectious diseases of the nervous system.	2	2	2	
7. Demyelinating diseases of the nervous system.		1	2	
8. Functional diagnostics of nervous system diseases.			2	
<b>Unit 2«Neurodentistry»</b>				
9. Headache.		1	1	Participation in the student scientific group, inter-university competitions
10. Pathology of the autonomic nervous system.		2	1	
11. The trigeminal, facial, optic nerve and symptoms of their involvement.		2	2	
12. Pathology of IX - XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.		1	2	
13. Trigeminal neuralgia. Iatrogenic trigeminal neuropathies.		1	2	
14. Syndromes of lesions of the facial, glossopharyngeal, vagus and hypoglossal nerves.		1	2	
15. Vegetative prosopalgia and other neurogenic diseases of the face.	2	1	2	

16. Diseases of the peripheral nervous system		1	1	
<b>Credit lesson.</b>	-	-	1	
<b>All hours – 60</b>	<b>6</b>	<b>24</b>	<b>30</b>	
<b>Credits ECTS – 2.0</b>				

#### 4. Thematic plan of lectures on discipline

№	Theme	Hours
<b><i>Unit 1«Neurology»</i></b>		
1	Vascular diseases of the brain and spinal cord.	2
<b><i>Unit 2«Neurodentistry»</i></b>		
2	Headache. The autonomic nervous system.	2
3	Major neurostomatological diseases and syndromes.	2
	<b>TOTAL, number of hours in the discipline</b>	<b>6</b>

#### 5. Thematic plan of practical classes in the discipline

№	Theme	Hours
<b><i>Unit 1«Neurology»</i></b>		
1.	The main stages of the development of neurological science. Principles of structure and functioning of the nervous system. Sensitive system and its symptoms. Kinds and types of sensitive disorders.	2
2.	Voluntary movements and their disorders. Pyramid system. Symptoms of central and peripheral paresis	2
3.	Extrapyramidal system and its lesion syndromes. Cerebellum, cerebellar lesions.	2
4.	Pathology of olfactory and visual analyzers. Syndromes of lesions of oculomotor nerves. Localization of functions in the cerebral cortex. Syndromes of lesions. Cerebrospinal fluid, its changes. Meningeal syndrome.	2
5.	Epilepsy and non-epileptic paroxysmal conditions	1
6.	Vascular diseases of the brain and spinal cord. Infectious diseases of the nervous system.	2

7.	Demyelinating diseases of the nervous system.	1
<b><i>Unit 2«Neurodentistry»</i></b>		
8.	Headache.	2
9.	Pathology of the autonomic nervous system.	1
10.	The trigeminal, facial, optic nerve and symptoms of their involvement.	2
11.	Pathology of IX - XII pairs of cranial nerves. Bulbar and pseudobulbar syndromes.	1
12.	Trigeminal neuralgia. Iatrogenic trigeminal neuropathies.	1
13.	Syndromes of lesions of the facial, glossopharyngeal, vagus and hypoglossal nerves.	1
14.	Autinomic prosopalgia and other neurogenic diseases of the face.	1
15.	Diseases of the peripheral nervous system. Credit lesson.	1
<b>TOTAL, number of hoursof practical classes in the discipline</b>		<b>24</b>

**Thematic plan of practical classes ( 3 acad.hours.)**

№.	<i>Unit 1«Neurology»</i>	Hours
1.	<p>The main stages of development of neurological science. Principles of structure and functioning of the nervous system.</p> <p>Sensory system and symptoms of its affection. Types and kinds of sensory disorders.</p> <p>Pathology of olfactory and visual analyzers.</p> <p>The trigeminal, vestibulocochlear nerves and symptoms of their lesions.</p>	3
2.	<p>Voluntary movements and its disorders.</p> <p>Pyramidal system. Symptoms of central and peripheral paresis.</p> <p>Syndromes of lesions of the oculomotor nerves and facial nerve.</p> <p>Pathology IX - XII pairs of cranial nerves.</p> <p>Bulbar and pseudobulbar syndromes.</p>	3

3.	<p>Extrapyramidal system and syndromes of its lesions.</p> <p>Cerebellum, syndromes of its lesion.</p> <p>Localization of functions in the cerebral cortex. Syndromes of lesions.</p> <p>Cerebrospinal fluid, its changes.</p> <p>Meningeal syndrome.</p>	3
4.	<p>Headache.</p> <p>Epilepsy and non-epileptic paroxysmal states.</p>	3
5.	<p>Vascular diseases of the brain and spinal cord. Vascular pain in the face.</p> <p>Infectious diseases of the nervous system.</p> <p>Demyelinating diseases of the nervous system.</p>	3
6.	<p>Pathology of the autonomic nervous system.</p> <p>Lesions of the autonomic ganglia of the face: pterygopalatine, ciliary, submandibular, sublingual, ear nodes, cervical sympathetic trunk. Visceral pain in the face.</p>	3
7.	<p>Lesions of the trigeminal nerve system: trigeminal neuralgia, odontogenic trigeminal neuralgia, postherpetic trigeminal neuropathy, neuralgia of the main branches of the trigeminal nerve. Iatrogenic trigeminal neuropathy.</p> <p>Lesions of the lingual-pharyngeal, vagus and sublingual nerves.</p>	3
8.	<p>Diseases of the peripheral nervous system.</p> <p>Facial neuritis, gangliopathy of the geniculate ganglion of the facial nerve.</p> <p>Syndromes of oral cavity.</p> <p>Stomalgia. Glossalgia. Psychalgia.</p> <p>Myofascial pain syndrome.</p> <p>Diseases of the temporomandibular joint.</p> <p><b>Credit class.</b></p>	3
	<b>TOTAL</b>	<b>24</b>

### 6. Thematic plan of students' independent work (SIW)

№	THEME	Hours	Types of control
<i>Unit 1«Neurology»</i>			
1.	Self-generated topics:	2	
1.1.	The main stages of the development of neurological science.	2	During the practical classes
1.2.	Voluntary movements and their disorders. Pyramid system. Symptoms of central and peripheral paresis.	2	Circuits of the cortex.
1.3.	Extrapyramidal system and its lesion syndromes. Cerebellum, cerebellar syndromes.	2	Current control on practical classes
1.4.	Localization of functions in the cerebral cortex. Syndromes of lesions.	2	- ” -
1.5.	Non-epileptic paroxysmal conditions.	2	- ” -
1.6.	Demyelinating diseases of the nervous system.	2	- ” -
1.7.	Functional diagnostics of nervous system diseases.	2	- ” -
<i>Unit 2«Neurodentistry»</i>			
1.8.	Pathology of the autonomic nervous system.	2	Current control on practical classes
1.9.	Iatrogenic trigeminal neuropathies.	2	- ” -
1.10	Autonomic prosopalgia	2	- ” -
1.11	Diseases of the peripheral nervous system.	2	- ” -
2.	<i>Individual independent work.</i> Participation in the student scientific group, inter-university competitions	2	- ” -
3.	<i>Preparation for the credit class</i>	4	Final lesson.
<b>TOTALSIW in the discipline</b>		<b>30</b>	

### 7. Individual tasks.

Individual tasks in the study of the discipline "Neurology, including neurodentistry" include:

- folding cases of topical diagnostics;
- the creation of schems of the cortico-muscular, sensitive pathways, cerebellum pathways;
- solving situational cases, "Step-2";

- 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 is independent study of part of the program material, systematization, deepening, generalization and practical application of the student's knowledge from the training course, development of independent work skills. The completed individual assignment has a cover letter, the content of the individual assignment, theoretical and practical component, conclusion, list of used literature. Disclosure of an individual assignment should have a practical orientation, communication with a specific object of activity in the field of medicine or pharmacy.

## **8. Learning methods.**

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

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

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

The main purpose of the course in neurology, incl. neurostomatology is teaching students the theoretical basics, skills of examining of neurological patients, methodology for making a diagnosis of a neurological disease, choosing treatment tactics and providing urgent assistance in emergency situations.

A special place should be devoted to the study of acute conditions - disorders of circulation in the brain, epileptic status, neurological pain syndromes, nervous system lesions in the pathology of internal organs, disorders of autonomic and peripheral nervous system functions.

Students of the Faculty of Dentistry have an in-depth study of the features of the pathology of the trigeminal, facial, lesions of the glossopharyngeal, vagus and hypoglossal nerves. It is necessary to know vegetative prosopalgia and other neurogenic diseases of the face.

Thus, students of the Faculty of Dentistry, who will study the course of neurology on the proposed program, should know the clinical anatomy, physiology of the nervous system, symptoms of lesions of different departments of the nervous system; should be able to diagnose neurological disease, carry out differential diagnosis and treatment of patients with vascular, infectious, demyelinating, epilepsy, diseases of the peripheral nervous system and vegetative prosopalgia.

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

research methods in a neurological clinic (radiological, computer tomography, electrophysiological, biochemical, etc.).

### **9. Control methods.**

**Current control** is carried out at each practical class according to the specific objectives of the topic, during the individual work of the teacher with the student for those that the student develops independently and they do not fit into the structure of the practical lesson. We recommend that you use the following tools to diagnose your students' level of 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).

**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.

**Evaluation of students' individual work**, which is provided in the subject along with the classroom work, is carried out during the ongoing control of the topic at the appropriate classroom activity. classroom lessons. Assessments of topics that are solely for independent work and are not included in the topics of classroom training are also monitored in the during the lesson.

### **Form of final control according to the curriculum (credit)**

**10. Current control** is carried out during the lessons and is aimed at checking students' learning of the teaching material. The form of current control during the lessons is determined by the course's work curriculum. During assessment of mastering of each topic for the current educational activity of the student grades on a 4-point (traditional) scale are given, 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 assessment of current learning activities should be standardized and include control of theoretical and practical training.

### **Criteria for evaluating the student's current educational activity:**

At each practical lesson, the teacher evaluates each student's knowledge of the four-point system. The weight of each topic within one module should be the same.

**Excellent ("5")**- The student correctly, clearly, logically and completely answers all standartquestions 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 the results of analyzes, solves situational cases of increased complexity, is able to generalize material, has methods of examination of the patient to the extent necessary for the activity of a doctor. Completed the scheduled individual work.

**Good ("4")** - The student correctly and essentially answers the standartquestions 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 cases. Able to

solve light and medium complexity situational cases. Possesses the necessary practical skills and techniques of their implementation in the amount that exceeds the required minimum.

**Satisfactory ("C")** - Student incomplete, with the help of additional questions answers standart 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 cases, has 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.

**11. The final control** is carried out in order 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. **The semester credit** is a form of final control, which consists in the assessment of the student's learning of the material from the discipline solely on the basis of the results of the completion of all types of educational work provided for by the work curriculum. The semester credit is set according to the results of the current control.

#### **12. Scheme of calculation and distribution of points received by students.**

**For the discipline - Neurology, including neurodentistry - a form of final control is the credit:** 200 points are *the maximum number of points* that a student can earn for the current academic activity in the study of the discipline.

The resulting value is converted to scores on a multipoints scale as follows:

$$\underline{CA \times 200}$$

x =

5

For convenience, there is the table of calculating on a 200-point scale:

Table 1

**Recalculation of the average grade for current activity into a multi-mark scale for the discipline completed with credit**



4-point score	200-point score
5	200
4.97	199
4.95	198
4.92	197
4.9	196
4.87	195
4.85	194
4.82	193
4.8	192
4.77	191
4.75	190
4.72	189
4.7	188
4.67	187
4.65	186
4.62	185
4.6	184
4.57	183
4.52	181
4.5	180
4.47	179

4-point score	200-point score
4.45	178
4.42	177
4.4	176
4.37	175
4.35	174
4.32	173
4.3	172
4.27	171
4.24	170
4.22	169
4.19	168
4.17	167
4.14	166
4.12	165
4.09	164
4.07	163
4.04	162
4.02	161
3.99	160
3.97	159
3.94	158

4-point score	200-point score
3.92	157
3.89	156
3.87	155
3.84	154
3.82	153
3.79	152
3.77	151
3.74	150
3.72	149
3.7	148
3.67	147
3.65	146
3.62	145
3.57	143
3.55	142
3.52	141
3.5	140
3.47	139
3.45	138
3.42	137
3.4	136

4-point score	200-point score
3.37	135
3.35	134
3.32	133
3.3	132
3.27	131
3.25	130
3.22	129
3.2	128
3.17	127
3.15	126
3.12	125
3.1	124
3.07	123
3.02	121
3	120
Less than 3	Insufficient

Determination of the number of points that the student has earned from the discipline Marc of the disciplines, **the form of final control of which is the credit**, is based on the results of the current educational activity and is expressed on a two-point scale "enrolled" or "not enrolled". For enrollment, students must earn at least **60%** of the maximum points in the discipline (200 points) for their current academic activities. 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 discipline, are ranked on the ECTS scale as follows:

**Table2**

ECTS score	Statistics
A	Top 10 % of students
B	Next25 % of students
C	Next30 % of students
D	Next25 % of students
E	The last10 % of students

Discipline 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:

**Table3**

Discipline 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.
- b) to teach students to learn independently, constantly update their knowledge
- c) to teach to think, to act, both in typical and atypical complicated situations and to make decisions independently;
- d) develop flexible, variative predictive thinking;

e) to learn to operate knowledge, skills in difficult situations, to develop a bank of situational typical and atypical tasks

f) broader implementation of unrestricted counseling and one-on-one tutoring with non-attending students.

The department has created the conditions for the study of the discipline "Neurology including neurostomatology": lectures are prepared, typographic manuals are issued handbooks, methodical recommendations for practical classes and independent work., Curation of patients, working out of practical skills, study of off-audit. Methodological support and availability of literature are sufficient.

#### **14. Recommended literature on the subject "Neurology including neurodentistry"**

1. Neurology : texbook for students of higher education establishments - medical universities, institutes and academies. / edit by L.A.Hryhorova, L. I. Sokolova. - K. : AUS Medicine Publishing, 2017. - 624 p.
2. Shkrobot, S. I. Neurology in lectures (Selected lectures) [Текст] : Навч. посібник для студ. вищ. мед. навч. заклад. IV р. акред., які опановують навч. дисципл. англ. мовою / S. I. Shkrobot, I. I. Hara. - Ternopil : Ukrmedknyga, 2018. - 320 p.
3. Alice W Flaherty, Natalia S Rost The Massachusetts General Hospital Handbook of Neurology (Paperback) Lippincott Williams & Wilkins; 2 edition (April 1, 2017)

#### **15. Internert resources:**

[http://meduniv.lviv.ua/index.php?option=com\\_content&view=article&id=137&Itemid=173&lang=uk](http://meduniv.lviv.ua/index.php?option=com_content&view=article&id=137&Itemid=173&lang=uk)

1. [Nevrologi.com.ua](http://Nevrologi.com.ua)

2. [Neurology.com.ua](http://Neurology.com.ua)

5. <http://www.mif-ua.com/archive/mezhdunarodnyj-nevrologicheskij-zhurnal/numbers>

<http://neuronews.com.ua>