Ministry of Health of the Russian Federation

federal state budgetary educational institution
higher education
"North-Western State Medical University named after I.I. Mechnikov"

Ministry of Health of the Russian Federation

(Federal State Budgetary Educational Institution of Higher Education North-Western State Medical University named after I.I. Mechnikov of the Ministry of Health of the Russian Federation)

DISCIPLINE WORK PROGRAM

Clinical Pathophysiology

Specialty: 31.05.01 General Medicine

Focus: Organization and provision of primary health care to the adult population in medical organizations

Implementation language: Russian, English

2021

Подлинник электронного документа, подписанного ЭП, хранится в системе электронного документооборота ФГБОУ ВО СЗГМУ им. И.И.Мечникова Минздрава России
СВЕДЕНИЯ О СЕРТИФИКАТЕ ЭП
Сертификат 00CDEE3BD65A19B375D4FAEE2ABC26F298
Владелец Сайганов Сергей Анатольевич
Действителен с 03.12.2025 12:23:25 по 26.02.2027 12:23:25

The work program of the discipline 'Clinical Pathophysiology' was prepared on the basis of the Federal State Educational Standard of Higher Education for the specialist degree program in specialty 31.05.01 General Medicine, approved by Order No. 988 of the Ministry of Science and Higher Education of the Russian Federation dated August 12, 2020.

Compilers of the work program of the discipline:
Nikolaev V.I., Head of the Department of Pathophysiology, Doctor of Medical Sciences, Professor; Belogurova E.A., Associate Professor, Department of Pathophysiology, Candidate of Medical Sciences; Denisenko N.P., Professor, Department of Pathophysiology, Doctor of Medical Sciences.

Reviewer:
Vasiliev A.G., Head of the Department of Pathophysiology with courses in Theoretical Immunopathology and Medical Informatics, St. Petersburg State Pediatric Medical Academy; Doctor of Medical Sciences, Professor

The work program of the discipline was discussed at a department meeting
Pathophysiology
April 22, 2021. Protocol No. 8

Head of Department _____ / V.I. Nikolaev /
(signature) (full name)

Approved by the Methodological Commission for the specialty 31.05.01 General Medicine
April 00, 2021. Protocol No. 0.

Chair _____ / I.G. Bakulin /
(signature) (full name)

Reviewed by the Methodological Council and recommended for approval by the Academic Council
May 20, 2021

Chair _____ / S.A. Artyushkin /
(signature) (full name)

Date of update:

CONTENTS

1.The purpose of mastering the discipline4 4
2. The place of discipline in the structure of the educational program4 4
3.List of planned learning outcomes in the discipline, correlated with the planned results of mastering the educational program4 4
4.Scope of discipline and types of academic work4 7
5. Contents of the discipline, structured by sections (topics) indicating the number of academic hours and types of training sessions5 7
6.Guidelines for students on mastering the discipline7 10
7.Evaluation materials8 12
8.List of educational literature and Internet resources necessary for mastering the discipline8... 12
9.List of information technologies used to master the discipline, including a list of software, professional databases and information reference systems8 13
10. Logistics support for discipline10..... 14
Appendix A11 16

1. The purpose of mastering the discipline

The purpose of mastering the discipline 'Clinical Pathophysiology' is to develop students' competencies in current knowledge of the general patterns and specific mechanisms underlying the onset, development, and outcomes of pathological processes, individual diseases, and disease states, as well as the etiopathogenetic principles of diagnosis, pathogenetic therapy, and prevention of typical pathological processes and organ-system lesions.

2. The place of discipline in the structure of the educational program

The discipline 'Clinical Pathophysiology' belongs to the part of Block 1 'Disciplines (Modules)' formed by participants in educational relations within the main professional educational program in specialty 31.05.01 General Medicine (specialist degree level), focus: Organization and Delivery of Primary Health Care to the Adult Population in Medical Organizations. The discipline is mandatory.

3. List of planned learning outcomes in the discipline, correlated with the planned results of mastering the educational program

Code and name of competency	Code and name of the competency achievement indicator
UC-1. Able to critically analyze problem situations using a systems approach and develop a strategy for action.	ID-1 UK-1.1. Analyzes a problem situation as a system, identifying its components and connections between them
	ID-2 UK-1.2. Identifies gaps in information needed to resolve a problem situation and designs processes to address them
	ID-3 UK-1.3. Critically evaluates the reliability of information sources, works with conflicting information from different sources
	ID-4 UC-1.4. Develops and substantively supports a strategy for solving a problem situation using systems and interdisciplinary approaches.
	ID-5 UK-1.5. Identifies and evaluates practical consequences of possible solutions and problems
GPC-5. Able to assess morphofunctional and physiological conditions and pathological processes in the human body in order to solve professional tasks.	ID-1 GPC-5.1. Assesses the patient's degree of functional activity and independence in self-care, mobility, and communication.
	ID-2 GPC-5.2. Determines and interprets the patient's vital signs during follow-up.
	ID-3 GPC-5.3. Determines the principal indicators of a patient's physical development and functional status with due regard to age-related anatomical and physiological characteristics.
OPK-10. Able to understand the operating principles of modern information technologies and use them to solve professional problems	ID-1 OPK-10.1. Applies modern information technologies, searches for information on the Internet to solve professional problems

PC-2. Able to examine a patient in order to identify major pathological conditions, symptoms, disease syndromes, and nosological entities.	ID-1 PC-2.1. Interviews and examines the patient (collects complaints and medical and life history; performs inspection, palpation, percussion, and auscultation). ID-2 PC-2.2. Formulates a preliminary diagnosis, prepares an investigation plan, and refers the patient for laboratory and/or instrumental testing when medically indicated, in accordance with current medical-care procedures, clinical guidelines, and standards of care. ID-3 PC-2.3. Refers the patient for specialist consultation and/or specialized inpatient or day-hospital care when medically indicated, in accordance with current medical-care procedures, clinical guidelines, and standards of care.

Competency achievement indicator code	Learning outcomes (assessment indicators)	Evaluation tools
ID-1 UK-1.1.	**knows the principal concepts of general nosology and general and systemic pathophysiology**	test questions, test tasks, situational tasks
	is able to establish causal relationships and analyze a problem situation as a system by identifying its components and interconnections; analyze issues of general pathology and current theoretical concepts and trends in medicine	
ID-2 UK-1.2.	**Knows the core terminology of general and systemic pathophysiology; methods for analyzing problems in nosology and systemic pathophysiology; and professionally appropriate styles of written and spoken language.**	test questions, test tasks, situational tasks
	Is able to identify information gaps required to solve a problem situation; perform pathophysiological analysis of professional and model clinical situations; and use educational and scientific literature.	
ID-3 UK-1.3.	**Knows the core terminology of general and systemic pathophysiology and methods for analyzing problems in nosology and systemic pathophysiology.**	test questions, test tasks, situational tasks
	Is able to assess the reliability of information sources, work with conflicting information, and formulate and present an independent viewpoint based on problem analysis and logical reasoning.	
ID-4 UK-1.4.	**Knows methods for analyzing problems in nosology and systemic pathophysiology and the principal ways to solve problem situations using systems and interdisciplinary approaches.**	test questions, test tasks, situational tasks

	Is able to substantively support a problem-solving strategy, establish causal relationships, use educational, scientific, and popular-science literature and Internet resources professionally, and defend a viewpoint.	
ID-5 UK-1.5.	**Knows the general patterns and specific mechanisms underlying the onset, development, and outcomes of pathological processes, individual diseases, and disease states.**	test questions, test tasks, situational tasks
	Is able to analyze issues of general pathology and current theoretical concepts and trends in medicine and determine and assess the practical consequences of potential decisions and tasks.	
ID-1 GPC-5.1.	**Knows the etiopathogenetic rationale for diagnostic and therapeutic measures in first aid for urgent and life-threatening conditions, and the principles of diagnosis, pathogenetic therapy, and prevention of typical pathological processes and organ-system lesions.**	test questions, test tasks, situational tasks
	Is able to identify the leading signs, symptoms, and syndromes of pathological processes and nosological entities and assess the patient's functional activity and independence in self-care, mobility, and communication.	
ID-2 GPC-5.2.	**Knows the fundamentals of terminology and classification of typical pathological processes, syndromes, and diseases;** - general patterns and specific mechanisms underlying the onset, development, and outcomes of pathological processes, diseases, and disease states; - pathogenetic foundations and diagnostic principles for the principal forms of dysfunction;	test questions, test tasks, clinical cases,
	Is able to determine and interpret the patient's vital signs during follow-up.	
ID-3 GPC-5.3.	**Knows the functional systems of the human body and their regulation and self-regulation in interaction with the environment in health and disease, and the structural and functional basis of diseases and pathological processes.**	test questions, test tasks, clinical cases,
	Is able to determine the principal indicators of a patient's physical development and functional status, taking into account age-related anatomical and physiological characteristics.	
ID-1 OPK-10.1.	**Knows the most common functional and laboratory diagnostic methods used to identify disease.**	test questions, test tasks, clinical cases,
	Is able to apply fundamental physicochemical concepts and research methods to professional tasks, use current information technology, and search for information on the Internet.	

ID-1 PC-2.1.	**Knows the principal terminology and classification of typical pathological processes, syndromes, and diseases;** - causes and principal mechanisms underlying the development and outcomes of typical pathological processes and organ-system dysfunction;	test questions, test tasks, clinical cases,
	Is able to correlate the morphological and clinical manifestations of diseases. - is able to identify the leading signs, symptoms, and syndromes of pathological processes and nosological entities;	
ID-2 PC-2.2.	**Knows the most important diagnostic methods in general and systemic pathology;** - algorithm for establishing a preliminary diagnosis; - pathogenetic foundations of diagnostic and therapeutic measures in first aid for urgent and life-threatening conditions; **Is able to interpret the results of common functional diagnostic methods and correlate morphological and clinical manifestations of diseases.**	test questions, test tasks, clinical cases,
ID-3 PC-2.3.	**Knows the etiopathogenetic rationale for diagnostic and therapeutic measures and the principal pathogenetic diagnostic principles for typical pathological processes and organ-system lesions.** **Is able to substantiate the principles of pathogenetic therapy for the most common diseases.**	test questions, test tasks, clinical cases,

4. Scope of discipline and types of academic work

Type of educational work	Labor intensity	Semesters
		9
Contact work between students and teachers	**48**	**48**
Classroom work:	**46**	**46**
Lectures (L)	12	12
Practical exercises (PP)	34	34
Independent work:	**24**	**24**
during the period of theoretical training	20	20
preparation for the test	4	4
Intermediate assessment: test, including delivery and group consultations	2	2
Total workload: academic hours	**72**	
credit units	**2**	

5. The content of the discipline, structured by sections (topics) indicating the number of academic hours and types of training sessions

5.1.Content of discipline sections

item no.	Name of discipline section	Annotated content of the discipline section	List of competencies formed in the process of mastering the section
I	Clinical pathophysiology of typical pathological processes and disorders of metabolism and regulation	*Clinical pathophysiology of typical pathological processes: inflammation, immunopathology, and cell pathology* *Clinical pathophysiology of metabolic and regulatory disorders: fluid and electrolyte imbalance; acid-base disorders; etiopathogenetic rationale for treatment.*	UK-1 GPC-5 OPK-10 PC-2
II	Clinical pathophysiology of organs and systems	*Clinical pathophysiology of the cardiovascular, endocrine, respiratory, and digestive systems; liver; blood and immune-surveillance systems; renin-angiotensin-aldosterone system; psychosomatic disorders; and etiopathogenetic rationale for treatment.*	UK-1 GPC-5 OPK-10 PC-2

5.2.Thematic plan of lectures

item no.	Name of discipline section	Lecture topics	Active learning formats*	Labor intensity (academic hours)
I	Clinical pathophysiology of typical pathological processes and disorders of metabolism and regulation	L.1. Clinical pathophysiology of psychosomatic disorders	*IL – interactive lecture*	2
		L.2. Immunopathology. Clinical pathophysiology of immune-surveillance disorders	*IL – interactive lecture*	2
		L.3. Secondary immunodeficiencies.	*IL – interactive lecture*	2
		L.4. Cell pathology	*IL – interactive lecture*	2
		L.5. Clinical pathophysiology of the renin-angiotensin-aldosterone system	*IL – interactive lecture*	2

item no.	Name of discipline section	Lecture topics	Active learning formats*	Labor intensity (academic hours)
		L.6. Clinical pathophysiology of acid-base balance.	*IL – interactive lecture*	2
			TOTAL:	12

5.3.Thematic plan for practical classes

№ p/p	Name of discipline section	Topics of practical classes	Active forms of learning	Current control forms	Labor intensity (academic hours)
I	Clinical pathophysiology of typical pathological processes and disorders of metabolism and regulation	PC1. Clinical pathophysiology of inflammation	AC	Test items and clinical cases	2
		PC2. Clinical pathophysiology of fluid and electrolyt balance	AC	Test items and clinical cases	4
		PC3. Clinical pathophysiology of neoplasia. Paraneoplastic syndrome	AC	Test items and clinical cases	4
II	Clinical pathophysiology of organs and systems	PC4. Clinical pathophysiology of the erythron	AC	Test items and clinical cases	4
		PC5. Clinical pathophysiology of the liver. Liver failure	AC	Test items and clinical cases	4
		PC6. Clinical pathophysiology of the endocrine system	AC	Test items and clinical cases	4
		PC7. Clinical pathophysiology of the cardiovascular system	AC	Test items and clinical cases	4
		PC8. Clinical pathophysiology of the urinary system. Renal failure	AC	Test items and clinical cases	4
		PC9. Clinical pathophysiology of the digestive system.	AC	Test items and clinical cases	4
			TOTAL		**34**

***CA – case analysis**

5.4. Seminar schedule: not applicable.

5.5. Laboratory-work schedule: not applicable.

5.6. Independent work:

item no.	Name of discipline section	Types of independent work	Current control forms	Labor intensity (academic hours)
1	Clinical pathophysiology of typical pathological processes and disorders of metabolism and regulation Clinical pathophysiology of organs and systems	Preparation for ongoing in-class assessment: 1. Review of lecture material. 2. Work with educational literature.	Test items, oral-assessment questions, and clinical cases	20
		Preparation for interim certification (pass/fail assessment)	Test items and oral-assessment questions,	4
			TOTAL:	24

6. Guidelines for students on mastering the discipline

To study Clinical Pathophysiology effectively, students should independently review the teaching materials in MOODLE, participate actively in practical-class discussions, and seek instructor guidance when necessary.

To pass the interim pass/fail assessment, students must carefully prepare all assessment materials: oral-assessment questions and clinical cases.

Planning and organizing the time needed to study the discipline

Successful mastery of the discipline requires proper organization of work and even distribution of the workload according to the academic schedule. A semester, monthly, weekly, and daily plan can help direct free time toward study and improve efficiency. Work for the following day should be planned each evening.

At the end of each day, students should review whether the plan was completed and identify the reasons for any deviations. Self-monitoring is essential. Unfinished work should be completed without reducing the weekly workload. Tasks for practical classes and independent work should be completed immediately after the corresponding lecture topic to improve retention, identify knowledge gaps, systematize prior material, and support acquisition of new knowledge and skills.

The university education system is based on a rational combination of several types of training sessions (primarily lectures and practical classes), the work of which has certain specifics.

Preparing for lectures

The discipline is introduced in the first lecture, where students must not only pay attention but also prepare their own notes. Some lectures answer specific questions, whereas others reveal relationships between phenomena and help students understand deeper developmental processes in the subject, both historically and currently.

Lecture note-taking is a demanding classroom activity. Notes are useful when they contain the essential points and are prepared by the student. Verbatim transcription should be avoided. Students should first understand the lecturer's main idea and then record it, preferably on one side of the page or with margins for later additions and questions.

It is better to divide the lecture notes into points, observing the red line. This will be greatly facilitated by the lecture plan questions proposed to the teachers. You should pay attention to the accents and conclusions that the lecturer makes, marking the most important points in the lecture material with the remarks "important", "well remember", etc. You can also do this using colorful markers or pens, emphasizing terms and definitions.

It is advisable to develop your own system of abbreviations, abbreviations and symbols. However, when further working with notes, it is better to replace the symbols with ordinary words for quick visual perception of the text.

When working on lecture notes, it is always necessary to use not only the textbook, but also the literature that the lecturer additionally recommended. It is this kind of serious, painstaking work with the lecture material that will allow you to deeply master the theoretical material.

Preparation for practical exercises

Careful thinking through and study of the plan's issues is based on studying the current lecture material, and then studying the required and additional literature recommended for this topic. All new concepts on the topic being studied must be memorized and included in a glossary, which should be kept from the very beginning of the course.

The result should be the ability to answer theoretical practical-class questions freely, speak and participate in group discussions, and complete practical tasks and assessments correctly.

In the process of preparing for practical classes, it is necessary to pay special attention to independent study of the recommended literature. Despite the completeness of the lecture notes, it is impossible to present all the material in it due to the limit of classroom hours. Therefore, independent work with textbooks, teaching aids, scientific and reference literature, materials from periodicals and the Internet is the most effective method of obtaining additional knowledge, allows you to significantly intensify the process of mastering information, promotes a deeper assimilation of the material being studied, and forms the correct attitude to a specific problem.

Recommendations for working with literature

It is advisable to start working with literature by studying general works on the topic, as well as textbooks and teaching aids. Next, it is recommended to move on to the analysis of monographs and articles that consider individual aspects of the problems studied in the course, as well as official materials and unpublished documents (research papers, dissertations), which may contain the main issues of the problem being studied.

Working with sources should begin with introductory reading, i.e. view the text, highlighting its structural units. During introductory reading, bookmarks mark those pages that require more careful study.

Depending on the results of the introductory reading, a further method of working with the source is selected. If solving the problem requires studying some fragments of the text, then the selective reading method is used. If the book does not have a detailed table of contents, the student should pay attention to the subject and name indexes.

Selected fragments or the entire text (if it is entirely relevant to the topic) require thoughtful, leisurely reading with "mental elaboration" of the material. Such reading involves highlighting: 1) the main thing in the text; 2) main arguments; 3) conclusions. Particular attention should be paid to whether the thesis follows from the arguments or not.

It is also necessary to analyze which of the author's statements are problematic, hypothetical, and to grasp hidden issues.

It is clear that the ability to work with text in this way does not come immediately. The best way to learn to highlight the main points in a text, to grasp the problematic nature of statements, and to evaluate the author's position is comparative reading, during which you get acquainted with different opinions on the same issue, compare the weight and evidence of the parties' arguments and draw a conclusion about the greatest persuasiveness of a particular position.

If in the literature there are different points of view on a particular issue due to the complexity of past events and legal phenomena, they cannot be rejected without understanding them. If there are discrepancies between the authors, it is necessary to find a rational grain in each of them, which will allow a deeper understanding of the subject of study and a more critical assessment of the issues being studied. Getting acquainted with the special positions of the authors, you need to identify their similar judgments, arguments, conclusions, and then compare them with each other and apply the one that is more convincing.

The next stage of working with literature is to prepare notes recording the principal arguments and theses. Notes may be organized by topic on separate sheets or in thematic notebooks. Major monographs are best summarized in separate notebooks. Notes should be written on one side of the page, with margins and sufficient line spacing for editing. Quotations must cite the source, including author, title, publication details, and page number. The notes may later support a written report or other assignment.

7. Evaluation materials

Assessment materials for the discipline for ongoing monitoring of progress and intermediate certification of students include examples of assessment tools (Appendix A to the work program of the discipline), procedure and assessment criteria.

8. List of educational literature and Internet resources necessary for mastering the discipline

8.1. Educational literature:

1. Litvitsky P. F. Pathophysiology: textbook in 2 vols. Vol. 1. 5th revised and expanded ed. Moscow: GEOTAR-Media, 2016. 623 p. ISBN 978-5-9704-3836-7.
Pathophysiology. In 2 vols. Vol. 1 [electronic resource]: textbook / P. F. Litvitsky. 5th revised and expanded ed. Moscow: GEOTAR-Media, 2016.
http://www.studmedlib.ru/book/ISBN9785970438374.html
2. Litvitsky P. F. Pathophysiology: textbook in 2 vols. Vol. 2. 5th revised and expanded ed. Moscow: GEOTAR-Media, 2016. 791 p. ISBN 978-5-9704-3836-7.
Pathophysiology. In 2 vols. Vol. 2 [electronic resource]: textbook / P. F. Litvitsky. 5th revised and expanded ed. Moscow: GEOTAR-Media, 2016.
http://www.studmedlib.ru/book/ISBN9785970438381.html
3. Clinical Pathophysiology: study guide / ed. by Prof. V. I. Nikolaev. St. Petersburg: North-Western State Medical University named after I. I. Mechnikov, 2016. 216 p.
4. Clinical Pathophysiology: Concise Lectures, Tests, Cases: study guide / P. F. Litvitsky, S. V. Pirozhkov, E. B. Tezikov. 3rd revised and expanded ed. Moscow: GEOTAR-Media, 2019. 432 p. ISBN 978-5-9704-4992-9. Electronic text, Student Consultant.
https://www.studentlibrary.ru/book/ISBN9785970449929.html

Teaching materials:

1. Pathophysiology of the Leukon: teaching guide / N. P. Denisenko, E. A. Belogurova, I. V. Budnikova. St. Petersburg: North-Western State Medical University named after I. I. Mechnikov, 2018. 64 p.
2. Pathophysiology of the Hemostatic System: teaching guide / E. A. Belogurova, I. V. Budnikova, A. G. Apresyan, T. S. Gorziy. St. Petersburg: North-Western State Medical University named after I. I. Mechnikov, 2020. 56 p.

8.2. Resources of the Internet information and telecommunications network:

Name of Internet resource	Email address of the resource
Russian medical portal	http://www.rosmedportal.com

9. List of information technologies used to master the discipline, including a list of software, professional databases and information reference systems

9.1. List of information technologies used in the educational process:

item no.	Name of discipline section	Information technology
1	Clinical pathophysiology of typical pathological processes and disorders of metabolism and regulation	Educational materials in the electronic educational environment of North-Western State Medical University named after I. I. Mechnikov, Ministry of Health of Russia: https://moodle.szgmu.ru/course/view.php?id=72
2	Clinical pathophysiology of organs and systems	Educational materials in the electronic educational environment of North-Western State Medical University named after I. I. Mechnikov, Ministry of Health of Russia: https://moodle.szgmu.ru/course/view.php?id=72

9.2. List of software used in the educational process (licensed and freely distributed software, including domestically produced):

item no.	Software product name	License validity period	Documents confirming right to use software products
licensed software			
1.	ESET NOD 32	1 year	Government contract № 07/2020
2.	MS Windows 8 MS Windows 8.1 MS Windows 10 MS Windows Server 2012 Datacenter - 2 Proc MS Windows Server 2012 R2 Datacenter - 2 Proc MS Windows Server 2016 Datacenter Core	Unlimited	State contract No. 30/2013-O; Government contract No. 399/2013-OA; Government contract No. 07/2017-EA.
3.	MS Office 2010 MS Office 2013	Unlimited	Government contract No. 30/2013-OA;

			Government contract No. 399/2013-OA.
4.	Academic LabVIEW Premium Suite (1 User)	Unlimited	Government contract № 02/2015
licensed software of domestic production			
1.	Anti-plagiarism	1 year	Government contract № 2409
2.	“WEBINAR (WEBINAR)” VERSION 3.0	1 year	Contract No. 347/2020-M
3.	"3KL e-learning environment"	1 year	Contract No. 348/2020-M
4.	TrueConf Enterprise	1 year	Contract No. 396/2020-EA
free software			
1.	Google Chrome	Unlimited	Open License Agreement GNU GeneralPublicLicense
2.	NVDA	Unlimited	Open License Agreement GNU GeneralPublicLicense
freely distributed software of domestic production			
1.	Moodle	Unlimited	Open License Agreement GNU GeneralPublicLicense

9.3. List of professional databases and information reference systems:

item no.	Name software product	License validity period	Documents confirming right to use software products	Mode access for disabled students and persons with limited health capabilities
1.	Consultant Plus	1 year	Agreement No. 655/2020-EA	-
2.	EBS “Student Consultant”	1 year	Contract No. 307/2020-EA	http://www.studmedlib.ru/
3.	EMB “Doctor Consultant”	1 year	Contract No. 281/2020-EA	http://www.rosmedlib.ru/
4.	EBS "Ibooks.ru/ibooks.ru"	1 year	Contract № 06/2020	https://ibooks.ru
5.	EBS “IPRBooks”	1 year	Contract No. 08/2020-ZK	http://www.iprbookshop.ru/special
6.	Electronic library system “Bukap”	1 year	Contract № 05/2020	https://www.books-up.ru/
7.	EBS "Lan Publishing House"	1 year	Contract No. 395/2020-EA	https://e.lanbook.com/

10. Material and technical support of discipline

Lecture classrooms, group and individual consultation rooms, ongoing-assessment and interim-certification rooms at 47 Piskarevsky Prospekt, Building A3 (Building 33), St. Petersburg, equipped with teaching equipment and technical aids:
Equipment: chalkboard; instructor’s desk and chair; student desks and chairs.
Technical teaching aids: multimedia projector, teacher’s laptop, system unit, monitor.

Special technical training aids (specify if necessary): Roger Pen (Roger personal wireless transmitter in the form of a pen), Roger MyLink (Roger Pen system signal receiver) (for students with hearing impairments); IntelliKeys (wired keyboard with Russian Braille with a matte black finish), (St. Petersburg, Piskarevsky Prospekt, 47, lit. R (building 9), room No. 18.19, Federal State Budgetary Educational Institution of Higher Education North-Western State Medical University named after I.I. Mechnikov of the Ministry of Health of the Russian Federation).

Seminar-type classrooms, group and individual consultation rooms, ongoing-assessment and interim-certification rooms 1, 2, 3, 4, and 6, Building A3 (Building 33), 47 Piskarevsky Prospekt, St. Petersburg, equipped with teaching equipment and technical aids:
Equipment: chalkboard; instructor's desk and chair; student desks and chairs.
Technical teaching aids: multimedia projector, teacher's laptop, system unit, monitor.
Special assistive technology: Roger Pen wireless transmitter and Roger MyLink receiver for students with hearing impairment; IntelliKeys wired keyboard with Russian Braille lettering and matte black finish; rooms 18–19, Building R (Building 9), 47 Piskarevsky Prospekt, St. Petersburg.

Rooms for students' independent work, equipped with Internet-enabled computers and access to the University's electronic educational environment: room 1, Pavilion 32, and rooms 18–19, Building R (Building 9).

Appendix A

Ministry of Health of the Russian Federation

federal state budgetary educational institution
higher education
"North-Western State Medical University
named after I.I. Mechnikov"
Ministry of Health of the Russian Federation

(Federal State Budgetary Educational Institution of Higher Education North-Western State Medical University named after I.I. Mechnikov of the Ministry of Health of the Russian Federation)

EVALUATION MATERIALS

(for ongoing monitoring of progress and intermediate certification of students)

Specialty:	31.05.01 General medicine
Direction:	Organization and provision of primary health care to the adult population in medical organizations
Name of discipline:	Clinical Pathophysiology

St. Petersburg – 2021

1. List of planned learning outcomes in the discipline

Competency achievement indicator code	Learning outcomes (assessment indicators)	Evaluation tools
ID-1 UK-1.1.	**knows the principal concepts of general nosology and general and systemic pathophysiology**	test questions, test tasks, situational tasks
	is able to establish causal relationships and analyze a problem situation as a system by identifying its components and interconnections; analyze issues of general pathology and current theoretical concepts and trends in medicine	
ID-2 UK-1.2.	**Knows the core terminology of general and systemic pathophysiology; methods for analyzing problems in nosology and systemic pathophysiology; and professionally appropriate styles of written and spoken language.**	test questions, test tasks, situational tasks
	Is able to identify information gaps required to solve a problem situation; perform pathophysiological analysis of professional and model clinical situations; and use educational and scientific literature.	
ID-3 UK-1.3.	**Knows the core terminology of general and systemic pathophysiology and methods for analyzing problems in nosology and systemic pathophysiology.**	test questions, test tasks, situational tasks
	Is able to assess the reliability of information sources, work with conflicting information, and formulate and present an independent viewpoint based on problem analysis and logical reasoning.	
ID-4 UK-1.4.	**Knows methods for analyzing problems in nosology and systemic pathophysiology and the principal ways to solve problem situations using systems and interdisciplinary approaches.**	test questions, test tasks, situational tasks
	Is able to substantively support a problem-solving strategy, establish causal relationships, use educational, scientific, and popular-science literature and Internet resources professionally, and defend a viewpoint.	
ID-5 UK-1.5.	**Knows the general patterns and specific mechanisms underlying the onset, development, and outcomes of pathological processes, individual diseases, and disease states.**	test questions, test tasks, situational tasks
	Is able to analyze issues of general pathology and current theoretical concepts and trends in medicine and determine and assess the practical consequences of potential decisions and tasks.	
ID-1 GPC-5.1.	**Knows the etiopathogenetic rationale for diagnostic and therapeutic measures in first aid for urgent and life-threatening conditions, and the principles of diagnosis, pathogenetic therapy, and prevention of typical pathological processes and organ-system lesions.**	test questions, test tasks, situational tasks
	Is able to identify the leading signs, symptoms, and syndromes of pathological processes and nosological	

	entities and assess the patient's functional activity and independence in self-care, mobility, and communication.	
ID-2 GPC-5.2.	**Knows the fundamentals of terminology and classification of typical pathological processes, syndromes, and diseases;** - general patterns and specific mechanisms underlying the onset, development, and outcomes of pathological processes, diseases, and disease states; - pathogenetic foundations and diagnostic principles for the principal forms of dysfunction; **Is able to determine and interpret the patient's vital signs during follow-up.**	test questions, test tasks, clinical cases,
ID-3 GPC-5.3.	**Knows the functional systems of the human body and their regulation and self-regulation in interaction with the environment in health and disease, and the structural and functional basis of diseases and pathological processes.** **Is able to determine the principal indicators of a patient's physical development and functional status, taking into account age-related anatomical and physiological characteristics.**	test questions, test tasks, clinical cases,
ID-1 OPK-10.1.	**Knows the most common functional and laboratory diagnostic methods used to identify disease.** **Is able to apply fundamental physicochemical concepts and research methods to professional tasks, use current information technology, and search for information on the Internet.**	test questions, test tasks, clinical cases,
ID-1 PC-2.1.	**Knows the principal terminology and classification of typical pathological processes, syndromes, and diseases;** - causes and principal mechanisms underlying the development and outcomes of typical pathological processes and organ-system dysfunction; **Is able to correlate the morphological and clinical manifestations of diseases.** - is able to identify the leading signs, symptoms, and syndromes of pathological processes and nosological entities;	test questions, test tasks, clinical cases,
ID-2 PC-2.2.	**Knows the most important diagnostic methods in general and systemic pathology;** - algorithm for establishing a preliminary diagnosis; - pathogenetic foundations of diagnostic and therapeutic measures in first aid for urgent and life-threatening conditions; **Is able to interpret the results of common functional diagnostic methods and correlate morphological and clinical manifestations of diseases.**	test questions, test tasks, clinical cases,
ID-3 PC-2.3.	**Knows the etiopathogenetic rationale for diagnostic and therapeutic measures and the principal pathogenetic diagnostic principles for typical pathological processes and organ-system lesions.**	test questions, test tasks, clinical cases,

	Is able to substantiate the principles of pathogenetic therapy for the most common diseases.	

2. Examples of assessment tools and assessment criteria for ongoing monitoring

2.1. Examples of incoming control

Question name: Question No. 1

ANEMIA WITH REDUCED ERYTHROCYTE HEMOGLOBIN AND LOW SERUM IRON IS:

1) iron-deficiency anemia

2) vitamin B12-deficiency anemia

3) aplastic anemia

4) autoimmune hemolytic anemia

Question name: Question No. 2

THE PRINCIPAL CLINICAL SIGN OF NEPHROTIC SYNDROME IS:

1) edema

2) elevated blood pressure

3) dysuria

4) palpitations

Evaluation criteria, grading scale pass/fail

Rating	Description
"passed"	Demonstrates a thorough understanding of the problem. All requirements for the task have been met
"not accepted"	Demonstrates a lack of understanding of the problem. Many requirements for the assignment have not been met. No answer. There was no attempt to solve the problem

2.2. Examples of test tasks:

ID-1 UC-1.1, ID-2 UC-1.2, ID-3 UC-1.3, ID-4 UC-1.4, ID-5 UC-1.5

Question name: Question No. 1

A LATE COMPLICATION OF MYOCARDIAL INFARCTION IS:

1) left ventricular aneurysm

2) rupture of the left ventricular wall

3) cardiogenic shock

4) ventricular fibrillation

ID-1 GPC-5.1, ID-2 GPC-5.2, ID-3 GPC-5.3, ID-1 GPC-10.1, ID-1 PC-2.1, ID-2 PC-2.2, ID-3 PC-2.3.

Question name: Question No. 2

A SIGN OF HEMOLYTIC ANEMIA IS:

1) high reticulocyte count
2) thrombocytopenia
3) leukocytosis
4) increased transaminase activity

Evaluation criteria, grading scale for test tasks

Rating	Description

Rating		Description
"excellent"	5	Completed in full – 90%-100%
"good"	4	Not fully implemented – 80%-89%
"satisfactory"	3	Completed with deviation – 70%-79%
"unsatisfactory"	2	Partially completed – 69% or less correct answers

2.3. Examples of review questions

ID-1 UC-1.1, ID-2 UC-1.2, ID-3 UC-1.3, ID-4 UC-1.4, ID-5 UC-1.5

1. Secondary immunodeficiency disorders: etiology, pathogenesis, and consequences.

ID-1 GPC-5.1, ID-2 GPC-5.2, ID-3 GPC-5.3, ID-1 GPC-10.1

2. Pathogenetic principles of clinical and laboratory diagnosis of agranulocytosis.
3. Pathogenetic rationale for differential diagnosis of hemorrhagic diatheses.

ID-1 PC-2.1, ID-2 PC-2.2, ID-3 PC-2.3.

4. Mechanisms of hemorrhagic syndrome in angiopathies, platelet disorders, and coagulopathies.

Assessment criteria and grading scale for oral responses to review questions

Rating		Description
excellent	5	Awarded when the student has comprehensive knowledge and a firm understanding of all program material, provides correct, deliberate, and confident answers within the syllabus, independently applies knowledge to practical tasks, uses correct standard language in oral and written work, and makes no errors.
good	4	Awarded when the student knows, understands, and has firmly mastered all required material, answers questions without difficulty, applies knowledge to practical tasks, uses standard language without major errors in oral answers, and makes only minor errors in written work.
satisfactory	3	Awarded when the student demonstrates knowledge of the core material but experiences some difficulty applying it and requires limited instructor assistance. Oral and written responses contain errors in content or expression.
unsatisfactory	2	Awarded when the student does not know a substantial portion of the material, generally answers only leading questions and lacks confidence, and makes frequent major errors in written work.

2.4. Examples of clinical cases

ID-1 UC-1.1, ID-2 UC-1.2, ID-3 UC-1.3, ID-4 UC-1.4, ID-5 UC-1.5,

Case

Patient K., aged 25 years, was admitted to a trauma unit with concussion accompanied by uncontrollable vomiting, dyspnea, and intermittent seizures. BP 90/50 mmHg; pulse 110/min and weak. Skin and mucous membranes are dry and skin turgor is reduced. There is no thirst. Plasma osmolality is 278 mOsm/kg H_2O. Acid-base findings: pH 7.55, pCO_2 30 mmHg, HCO_3^- 30 mmol/L.

1. Classify the acid-base and fluid-electrolyte disorders.

2. Explain the pathogenesis of the disorders and the mechanism of the symptoms.

3. What should the patient's buffer-base, standard-bicarbonate, and base-excess values be?

4. How is water exchange between the intracellular and extracellular compartments altered in this case?

5. What accounts for the absence of thirst and the presence of seizures?

ID-1 GPC-5.1, ID-2 GPC-5.2, ID-3 GPC-5.3, ID-1 GPC-10.1, ID-1 PC-2.1, ID-2 PC-2.2, ID-3 PC-2.3.

Case

Seven months after surgical removal of gastric carcinoma followed by chemotherapy, a patient developed enlargement of a left supraclavicular lymph node. Biopsy revealed cancer cells, including cells morphologically similar to those of the removed tumor.

1. Is there a basis for considering the cancer cells in the lymph node a manifestation of tumor progression? Justify the answer and describe the mechanisms and biological significance of this phenomenon.
2. Can the cancer cells in the lymph node be regarded as a gastric-cancer metastasis, primary multiple (polyfocal) tumor growth, recurrence of gastric carcinoma, or a new independent tumor?
3. Which factors of anticellular antitumor defense were ineffective in this case?
4. What are the possible mechanisms suppressing these factors?

Assessment criteria and grading scale for clinical cases

Rating		Description
excellent	5	Demonstrates a complete understanding of the problem. All task requirements are met.
good	4	Demonstrates substantial understanding of the problem. All task requirements are met.
satisfactory	3	Demonstrates partial understanding of the problem. Most task requirements are met.
unsatisfactory	2	Demonstrates no understanding of the problem. Many requirements are not met. No answer or attempt to solve the case is provided.

3. Current control procedure

Ongoing assessment in the discipline is conducted through test items, clinical cases, and answers to review questions.

4. Examples of assessment tools and assessment criteria for intermediate certification

4.1. An approximate list of checklists to prepare for the test:

ID-1 UC-1.1, ID-2 UC-1.2, ID-3 UC-1.3, ID-4 UC-1.4, ID-5 UC-1.5

Features of the general signs of inflammation in pneumonias caused by different etiological agents.

ID-1 GPC-5.1, ID-2 GPC-5.2, ID-3 GPC-5.3, ID-1 GPC-10.1

Causes and mechanisms of edematous-ascitic syndrome in various liver diseases.

ID-1 PC-2.1, ID-2 PC-2.2, ID-3 PC-2.3.

Etiopathogenesis of mineral-metabolism disorders in different endocrinopathies.

Evaluation criteria, assessment scale for control questions

Rating		Description
"excellent"	5	Knows all the educational material, understands it perfectly and has thoroughly mastered it. Gives correct, conscious and confident answers to questions (within the program). In oral answers he uses literary correct language and does not make mistakes.
"good"	4	Knows all the required educational material, understands it well and has mastered it firmly. Answers questions (within the program) without difficulty. In oral answers he uses literary language and does not make gross mistakes
"satisfactory"	3	Knows basic educational material. Answers questions (within the limits of the program) with difficulty. In oral answers, he makes mistakes when presenting the material and in constructing his speech.
"unsatisfactory"	2	Does not know most of the educational material, answers, as a rule, only to the teacher's leading questions, hesitantly. Makes frequent and serious mistakes in oral answers

4.2. Examples of clinical cases:

ID-1 UC-1.1, ID-2 UC-1.2, ID-3 UC-1.3, ID-4 UC-1.4, ID-5 UC-1.5,

Case

Patient Sh., a 48-year-old nurse in a tuberculosis hospital, had one week of general weakness, muscle and joint pain, pruritus, nausea with one episode of vomiting, and reduced appetite. For four days her temperature was 37.5–37.8°C. She took an over-the-counter cold remedy on medical advice. She was admitted to a hepatology center after jaundice developed, in moderately severe condition. Persistent pruritus, poor sleep, and headache were added to the earlier complaints. Examination: marked jaundice of the skin, sclerae, and mucous membranes; isolated skin hemorrhages; tongue with white coating; liver 3 cm below the costal margin, soft and tender to palpation and percussion; spleen not enlarged.

Blood tests: Hb 120 g/L, RBC 4.5×10^12/L, WBC 4.7×10^9/L, ESR 27 mm/h. ALT activity was four times normal and alkaline phosphatase was elevated. Total bilirubin 156.9 μmol/L; bilirubin index 81%. HBsAg was detected and IgG was increased. Prothrombin index 73% (normal 95–105%); proaccelerin and proconvertin were decreased; albumin-to-globulin ratio was decreased. Fasting glucose ranged from 2 to 4.5 mmol/L. Jaundice and pruritus persisted for about 45 days. She was discharged after two months with ALT twice the upper limit of normal.

1. What type of jaundice is present? Justify the answer.
2. Explain the mechanisms of the clinical symptoms.
3. Explain the mechanisms underlying the laboratory abnormalities.
4. Which syndromes are present?
5. What urinary abnormalities may be detected?

ID-1 GPC-5.1, ID-2 GPC-5.2, ID-3 GPC-5.3, ID-1 GPC-10.1

Case

Patient K., aged 32 years, underwent repeated operations over five years for recurrent liposarcoma of the right thigh. At follow-up he reported increasing abdominal girth. A huge, firm, spherical tumor occupied almost the entire right half of the abdomen and extended beyond the midline. It was considered inoperable because of its size and limited mobility. Trial tele-gamma therapy was prescribed. Two months later the tumor had decreased by half and become mobile, and surgery was performed.

1. Was the tumor benign or malignant? Justify the answer.

2. What explains the beneficial effect of tele-gamma therapy?

ID-1 PC-2.1, ID-2 PC-2.2, ID-3 PC-2.3.

Case

Seven months after surgical removal of gastric carcinoma followed by chemotherapy, a patient developed enlargement of a left supraclavicular lymph node. Biopsy revealed cancer cells, including cells morphologically similar to those of the removed tumor.

1. Is there a basis for considering the cancer cells in the lymph node a manifestation of tumor progression? Justify the answer and describe the mechanisms and biological significance of this phenomenon.
2. Can the cancer cells in the lymph node be regarded as a gastric-cancer metastasis, primary multiple (polyfocal) tumor growth, recurrence of gastric carcinoma, or a new independent tumor?
3. Which factors of anticellular antitumor defense were ineffective in this case?
4. What are the possible mechanisms suppressing these factors?

Assessment criteria and grading scale for clinical cases

Rating		**Description**
"excellent"	5	The solution is explained in detail, consistently, and accurately, with theoretical justification, the necessary diagrams and visual demonstrations, and correct, fluent use of terminology. Answers to additional questions are correct and clear.
"good"	4	The solution is detailed but not sufficiently logical, with isolated errors in detail and some difficulty with theoretical justification, diagrams, and visual demonstrations. Answers to additional questions are correct but insufficiently clear.
"satisfactory"	3	The explanation is incomplete and inconsistent, contains errors, and has weak theoretical justification. There are significant difficulties and errors in diagrams and visual demonstrations. Answers to additional questions are insufficiently clear and contain errors in detail.
"unsatisfactory"	2	The explanation is incomplete and inconsistent, contains major errors, and lacks theoretical justification. The student is unable to provide diagrams and visual demonstrations, or makes numerous errors. Answers to additional questions are incorrect or absent.

Evaluation criteria, grading scale pass/fail

Rating	**Description**
"passed"	Demonstrates a thorough understanding of the problem. Knows the basic concepts within the framework of the issue under discussion, methods of study and their relationship with each other, practical problems and has an idea of promising directions for developing the issue under consideration
"failed"	Demonstrates a lack of understanding of the problem. Does not know the basic concepts, methods of study, within the framework of the issue being discussed, has no idea about the main practical problems

5. Intermediate assessment procedure

Intermediate assessment is conducted as a pass/fail assessment and includes an oral response to review questions and solution of a clinical case.