

Ministry of Science and Higher Education of the Russian Federation
Federal State Autonomous Institution of Higher Education
“National Research Nuclear University “MEPhI”

INSTITUTE OF ENGINEERING PHYSICS FOR BIOMEDICINE

DEPARTMENT OF FUNDAMENTAL MEDICINE

APPROVED HTC ИФИБ

Protocol No. 3.1

dated 30.08.2024

ACADEMIC COURSE OUTLINE

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Educational program track (speciality) [1] 31.05.01 General Medicine

Semester	Labour input, credits	Total course academic, hours	Lectures, hrs.	Practical sessions, hrs.	Laboratory sessions, hrs.	In the form of practical studies, hrs.	Independent studies, hrs.	Independent studies monitoring, hrs.	Course progress, Exam/Pass-fail exam/Term
12	3	108	16	40	0		52	0	PFE
Total	3	108	16	40	0	40	52	0	

ABSTRACT

1. ACADEMIC COURSE GOALS AND OBJECTIVES

2. PLACE OF THE ACADEMIC COURSE IN THE MAIN HIGHER EDUCATION CURRICULUM

3. DEVELOPED COMPETENCIES AND INTENDED LEARNING OUTCOMES

Universal and/or general professional competencies:

Competency code and title	Code and title of competency-based rubrics
ОПК-4 [1] – Capable of using medical devices stipulated by the medical care procedures, as well as conducting patient examination for diagnosis establishment.	3-ОПК-4 [1] – Know: - modern diagnostic instrumental examination methods for patients, including functional, radiological, ultrasound, radionuclide diagnostics, and endoscopy; - diagnostic capabilities of instrumental examination methods; - medical devices stipulated by the procedure for providing medical care to the adult population in the "Therapy" specialty, and the equipment standard for a therapeutic room; - main medical devices stipulated by the procedures for providing medical care to the adult population in major surgical specialties, obstetrics, and gynecology; - indications for referring patients for instrumental examinations and functional diagnostics; - techniques for physical examination of patients using medical devices stipulated by procedures and considering medical care standards У-ОПК-4 [1] – Be able to: - use medical devices stipulated by the medical care procedure; - determine the required volume and content of instrumental and functional diagnostics to establish a diagnosis; - interpret results of the most common functional and instrumental diagnostic methods В-ОПК-4 [1] – Possess skills in: - using basic medical devices (stethoscope, blood pressure monitor, sphygmomanometer, pulse oximeter, height-weight scale, measuring tape, neurological hammer, scalpel, forceps, and other devices); - operating electrocardiographs and devices for measuring external respiratory function; - interpreting results of the most common functional and instrumental diagnostic methods
ОПК-6 [1] – Capable of organizing general nursing, providing primary medical care, ensuring the organization of work	3-ОПК-6 [1] – Know: - a set of measures for general nursing with diseases of various organs and systems; Signs of clinical and biological death; - indications for patient hospitalization for the most common diseases with typical progression.

and making professional decisions in emergencies at the pre-hospital stage, in emergency situations, epidemics and in areas of mass destruction	Y-OPIK-6 [1] – Be able to: - organize care for patient when providing medical care in an outpatient setting; - determine the need for patient hospitalization; - ensure the organization of work in emergency situations, epidemics, and in mass casualty zones. B-OPIK-6 [1] – Possess skills in: - general care of a patient (general nursing); - providing first aid; - making medical decisions in emergencies at the prehospital stage, including in emergency situations, epidemics, and in mass casualty zones.
OPIK-7 [1] – Capable of prescribing treatment and monitoring its effectiveness and safety.	3-OPIK-7 [1] – Know: - pharmacological groups of medicinal drugs and their intended purposes; - mechanisms of action of pharmacological and non-pharmacological treatments, indications and contraindications for their use, side effects, and complications caused by their application; - methods for monitoring the effectiveness and safety of various treatment approaches. Y-OPIK-7 [1] – Be able to: - make rational choices for pharmacological and non-pharmacological treatments based on clinical guidelines and in accordance with medical care standards; - develop a treatment plan for a disease or condition considering the diagnosis, age, disease course characteristics, and comorbidities, based on clinical guidelines and medical care standards; - prescribe medications, medical devices, and therapeutic nutrition considering the diagnosis, age, disease course characteristics, and comorbidities, based on clinical guidelines and medical care standards; - justify prescribed pharmacological and non-pharmacological treatments; - evaluate the effectiveness and safety of medications, medical devices, therapeutic nutrition, and other treatment methods. B-OPIK-7 [1] – Possess skills in: - administering medications through various routes of administration; - developing treatment plans for diseases or conditions considering diagnosis, age, disease course characteristics, and comorbidities; - assessing the effectiveness and safety of prescribed treatments.

Professional competencies in compliance with the goals and professional knowledge areas:

Professional activity goal	Professional activity knowledge area	Professional competency code and title; Based on the professional standard, experience analysis	Code and title of competency-based rubrics
medical			
Diagnostics of diseases and pathological conditions of the patients.	Individuals (patients); the population; the set of means and technologies aimed at creating conditions for preserving and strengthening the	IIK-3.2 [1] - Capable of conducting patient examinations to establish a diagnosis <i>The base:</i> Professional standard:	3-IIK-3.2[1] - Know: - clinical diagnosis establishment algorithm; - patient history-taking and physical examination methodology; - laboratory and instrumental research

	health of the adult population	02.009	methods for health assessment to establish a diagnosis; - semiotics of diseases of different organs and systems; - structure, principles of the current International Statistical Classification of Diseases and Related Health Problems (hereinafter - ICD).; Y-IIK-3.2[1] - Be able to: - conduct patient history-taking and physical examination; - interpret history, physical examination data, laboratory and instrumental results to recognize a condition or establish the presence/absence of a disease, establish a diagnosis; - distinguish and recognize in each specific case tissue damage, the reaction to it, and the form of adaptability; - develop a patient examination plan, justify the necessity and scope of laboratory and instrumental examination; - identify main pathological conditions, symptoms and syndromes, nosological forms in the patient according to the current ICD.; B-IIK-3.2[1] - Possess skills in: - patient history-taking and physical examination; Formulating a preliminary diagnosis; - developing a patient examination plan; Interpreting laboratory and instrumental results; - establishing a diagnosis considering the current ICD
Providing primary medical care in outpatient settings and	Individuals (patients); the population; the set of means and	IIK-3.3 [1] - Able to provide primary medical care in an	3-IIK-3.3[1] - Know: - general issues of organizing medical care for

day hospital settings.	technologies aimed at creating conditions for preserving and strengthening the health of the adult population	outpatient setting <i>The base:</i> Professional standard: 02.009	the population and organizing medical care for the adult population in outpatient settings, including at home; - features of medical care using telemedicine technologies; - Clinical picture, differential diagnosis, features of the course of the disease, complications and outcomes of internal diseases; - diagnostic criteria for the most common diseases of internal organs and systems; - indications for referring patients for specialist consultations according to clinical guidelines and considering relevant medical care standards; - indications for referring patients for specialized medical care in inpatient settings and day hospitals according to clinical guidelines and considering relevant medical care standards; - features of managing and treating elderly patients in outpatient settings. ; Y-IIK-3.3[1] - Be able to: - perform differential diagnosis of internal diseases; - monitor the course of physiological pregnancy; - justify the need for referring patients to specialist consultations; - recognize the main and concomitant diseases; - assess disease or condition severity - the degree of organ and/or system damage or functional impairment due to the disease/condition or its complications; - determine management, examination
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			and treatment tactics for patients with specific diseases (nosological units) depending on disease severity and condition, according to clinical guidelines and considering relevant medical care standards.; B-IIK-3.3[1] - Possess skills in: - conducting differential diagnosis with other diseases/conditions, including emergencies; - interpreting data obtained from patient consultations with specialists; - prescribing additional tests to clarify the diagnosis; - formulating a clinical diagnosis; - prescribing treatment according to clinical guidelines and considering relevant medical care standards.
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4. PEDAGOGIC POTENTIAL OF THE COURSE

Pedagogic tracks/objectives	Pedagogic goals (code)
Professional education	Establishing conditions for: formation of responsibility for professional choice, professional development and professional decisions (B18)
Professional education	Establishing conditions for: formation of motivation to improve the quality of medical care to the population and the desire to follow the rules and norms of interaction between the doctor, colleagues and the patient, contributing to the creation of the most favorable environment for the patient's recovery (B34)

5. ACADEMIC COURSE STRUCTURE AND CONTENT

Academic course sections, their scope, terms of study and assessment:

No.	Academic course section name	Weeks	Lectures/ Practical (seminars)/ Laboratory sessions, hrs.	Compulsory current assessment (form*, week)	Maximum grade per section**	Section assessment (form*, week)	Competency-based rubrics
	<i>12 Semester</i>						
1	Unit	1-8	8/20/0	T-4 (10), T-5 (15)	25	T-8	3-ОПК-4, У-ОПК-4, В-ОПК-4, 3-ОПК-6, У-ОПК-6, В-ОПК-6, 3-ОПК-7, У-ОПК-7, В-ОПК-7, 3-ПК-3.2, У-ПК-3.2, В-ПК-3.2, 3-ПК-3.3, У-ПК-3.3, В-ПК-3.3
2	Unit	9-15	8/20/0	T-10 (15), T-12 (10)	25	T-15	3-ОПК-4, У-ОПК-4, В-ОПК-4, 3-ОПК-6, У-ОПК-6, В-ОПК-6, 3-ОПК-7, У-ОПК-7, В-ОПК-7, 3-ПК-3.2, У-ПК-3.2, В-ПК-3.2, 3-ПК-3.3, У-ПК-3.3, В-ПК-3.3
	<i>Totals for 12 Semester</i>		16/40/0		50		
	Assessment events for 12 Semester				50	PFE	3-ОПК-4, У-ОПК-4, В-ОПК-4, 3-ОПК-6, У-ОПК-6, В-ОПК-6, 3-ОПК-7, У-ОПК-7, В-ОПК-7, 3-ПК-3.2, У-ПК-3.2, В-ПК-3.2

							3-ПК-3.3, У-ПК-3.3, В-ПК-3.3
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* – abbreviated name of assessment

** – 100 maximum points per semester including a pass/fail exam and (or) an exam

Abbreviated current assessment forms and section assessment

Abbreviation	Full name
T	Testing
PFE	Pass/fail examination

SYLLABUS

Weeks	Topics / Content	Lect., hrs.	Pr./sem., hrs.	Lab., hrs.
	<i>12 Semester</i>	16	40	0
1-8	Unit	8	20	0
1 - 2	Введение в предмет.	All		
		2	5	0
		Online		
		0	0	0
3 - 4	Мочекаменная болезнь.	All		
		2	5	0
		Online		
		0	0	0
5 - 6	Аномалии почек и мочевых органов.	All		
		2	5	0
		Online		
		0	0	0
7 - 8	Заболевания предстательной железы. ДГПЖ.	All		
		2	5	0
		Online		
		0	0	0
9-15	Unit	8	20	0
9 - 10	Рак простаты.	All		
		2	5	0
		Online		
		0	0	0
11 - 12	Опухоли почки, почечной лоханки и мочеточника.	All		
		2	5	0
		Online		
		0	0	0
13 - 14	Опухоли мочевого пузыря.	All		
		2	5	0
		Online		
		0	0	0
15	Опухоли яичек и полового члена.	All		
		2	5	0

		Online		
		0	0	0

Abbreviated names of online options:

Abbreviation	Full name
EC	E-course
FtM	Full-text material
FtL	Full-text lectures
VM	Video materials
AM	Audio materials
Prs	Presentations
T	Tests
ERM	E-reference materials
IS	Interactive site

PRACTICAL SESSIONS TOPICS

Weeks	Topics / Content
	<i>12 Semester</i>
1	Симптоматология и семиотика урологических заболеваний.
2	Инструментальные методы обследования урологических больных.
3	Доброкачественная гиперплазия простаты.
4	Инфекция мочеполовой системы. Пиелонефрит. Туберкулез мочевой системы.
5	Мочекаменная болезнь.
6	Гидронефроз и аномалии почек и мочевых путей.
7	Неотложная урология. Почечная колика. Острая задержка мочи. Гематурия. Анурия. Острая почечная недостаточность.
8	Травмы органов мочеполовой системы. Травма почек, мочеточников, мочевого пузыря, уретры. Повреждения полового члена и органов мошонки.
9 - 10	Рак простаты.
11 - 12	Опухоли почки, почечной лоханки и мочеточника.
13 - 14	Опухоли мочевого пузыря.
15	Опухоли яичек и полового члена.

6. EDUCATIONAL TECHNOLOGIES

7. ASSESSMENT TOOLKIT

The assessment toolkit ensures verification of the intended learning outcomes achievement (competency-based rubrics) using current, midterm and interim assessment of the course.

The link between developed competencies and their assessment is presented in the following table:

Competency	Achievement rubrics	Assessment activity (Syl 1)
ОПК-4	З-ОПК-4	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	У-ОПК-4	PFE, T-8, T-15, T-5, T-4, T-10,

		T-12
	В-ОПК-4	PFE, T-8, T-15, T-5, T-10, T-12
ОПК-6	З-ОПК-6	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	У-ОПК-6	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	В-ОПК-6	PFE, T-8, T-15, T-5, T-4, T-10, T-12
ОПК-7	З-ОПК-7	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	У-ОПК-7	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	В-ОПК-7	PFE, T-8, T-15, T-5, T-10, T-12
ПК-3.2	З-ПК-3.2	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	У-ПК-3.2	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	В-ПК-3.2	PFE, T-8, T-15, T-5, T-4, T-10, T-12
ПК-3.3	З-ПК-3.3	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	У-ПК-3.3	PFE, T-8, T-15, T-5, T-4, T-10, T-12
	В-ПК-3.3	PFE, T-8, T-15, T-5, T-4, T-10, T-12

Educational achievement rubrics scales

The scale of each assessment activity varies from 0 to the maximum established point, inclusive. The final assessment of the course is performed on a 100-point scale and represents the sum of the points earned by the student in the section assessments, framework of current and interim assessment.

Sections and interim assessments are considered passed when the student achieves a minimum score equal to 60% of the maximum. The final grade is assigned only upon passing all sections and the interim assessment.

The final grade is assigned in accordance with the following scale:

Total score	Rating on a 4-point scale	Pass/fail examination	ECTS assessment
90-100	5 – « <i>excellent</i> »	« <i>pass</i> »	A
85-89	4 – « <i>good</i> »		B
75-84			C
70-74			D
65-69	3 – « <i>satisfactory</i> »		E
60-64			F
below 60	2 – « <i>fail</i> »	« <i>fail</i> »	

An “excellent” grade indicates a deep and solid mastery of the program material by a student who presents their answers consistently, clearly, and logically, is able to closely link theory with practice, and uses materials from monographic literature in their answers.

A “good” grade corresponds to a student’s solid knowledge of the material, who presents their answers competently and to the point, without any significant inaccuracies.

A “satisfactory” grade corresponds to the basic level of mastery of the material by the student, in which the main material has been mastered, but its details have not been assimilated, the answers contain inaccuracies, insufficiently correct wording and logical inconsistencies.

A grade “pass” corresponds to at least a basic level of mastery of the program material, in which the student possesses the necessary knowledge, skills, and abilities, and is able to apply theoretical principles to solve typical practical problems.

A grade “fail” is given to a student who lacks a significant understanding of the curriculum material, makes significant errors in their answers, or fails all required assignments. These students are generally unable to continue their studies without additional classes.

8. ACADEMIC COURSE EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT

CORE READING:

1. ЭИ К63 Урология : учебник, Комяков Б.К., Москва: ГЭОТАР-Медиа, 2022
2. ЭИ Г 55 Урология. От симптомов к диагнозу и лечению. Иллюстрированное руководство : учебное пособие, Аляев Ю.Г., Газимиев М.А., Глыбочко П.В., Москва: ГЭОТАР-Медиа, 2021
3. ЭИ К 75 Факультетская хирургия : учебник для вузов, Мовчан К. Н. [и др.], Москва: Юрайт, 2024
4. ЭИ Х 50 Хирургические болезни : , , Москва: ГЭОТАР-Медиа, 2022

FURTHER READING:

1. ЭИ Н99 Interventional Urology : , , Cham: Springer International Publishing, 2016
2. ЭИ Р90 Practical Functional Urology : , , Cham: Springer International Publishing, 2016
3. ЭИ R67 Robotic Urology : , , Berlin, Heidelberg: Springer Berlin Heidelberg, 2008
4. ЭИ У74 Клинические нормы. Нефрология : справочник, Гуранова Н.Н., Усанова А.А., Москва: ГЭОТАР-Медиа, 2020
5. ЭИ У 71 Урология. Стандарты медицинской помощи : Серия "Стандарты медицинской помощи", , Москва: ГЭОТАР-Медиа, 2016

SOFTWARE:

No special softwares is required

LMS AND ONLINE RESOURCES

<https://online.mephi.ru/>

<http://library.mephi.ru/>

9. LOGISTICAL SUPPORT

1. Демонстрационные модели мечеполовой системы (64-403)
2. Фантом мужской промежности для катетеризации мочевого пузыря (64-301)
3. Фантом женской промежности для катетеризации мочевого пузыря (64-301)
4. Катетеры Фолея и Нелатона (64-301)
5. Персональный компьютер: Процессор CPU Intel Core i7-8700 (3.2GHz/12MB/6 cores)
Материнская плата Gig (Клиническая база)
6. Мышь, клавиатура (Клиническая база)
7. Проектор SMART P109 (Клиническая база)
8. Кушетка медицинская (Клиническая база)
9. Иное оснащение, предусмотренное порядками оказания медицинской помощи по соответствующему профилю (Клиническая база)

10. EDUCATIONAL AND METHODOLOGICAL RECOMMENDATIONS FOR TEACHERS

Градация и критерии тестовых работ, контрольных работ с развернутым ответом, выполнения домашнего задания и финального теста:

- 1) - Тестовые работы оцениваются по схеме 1 балл – 1 правильный ответ. Студент не приступал к работе – (-1) балл
- 2) - Контрольные работы с развернутым ответом оцениваются по схеме: полный ответ – 2 балла, неполный ответ – 1 балл, нет ответа – 0 баллов, студент не приступал к работе – (-2) балла.
- 3) – Домашнее задание должно быть выполнено всеми студентами для допуска к финальной аттестации. За не вовремя сданную работу следует вычит из финального балла (-1) балл.
- 4) - Критерии оценивания доклада-презентации. Перерасчет со 100-бальной на 10 (5)-бальную систему
- 5) - Критерии оценивания реферата. Максимум 10 баллов. Возможен перерастёт на 5-бальную систему

10 баллов выставляются, если выполнены все требования к написанию реферата: обозначена проблема и обоснована ее актуальность, сделан краткий анализ рассматриваемой проблемы и логично изложена собственная позиция, сформулированы выводы, статья проанализирована полностью, выдержан объем, соблюдены требования к оформлению.

9 баллов выставляются, если выполнены следующие требования к написанию реферата: обозначена проблема и обоснована ее актуальность, сделан краткий анализ рассматриваемой проблемы и логично изложена собственная позиция, сформулированы выводы, статья проанализирована полностью, но не выдержан объем и не соблюдены требования к оформлению.

8 баллов – основные требования к реферату выполнены, но при этом допущены недочеты. В частности, имеются неточности в изложении материала; отсутствует логическая последовательность в суждениях; не выдержан объем реферата; имеются упущения в оформлении.

7 баллов – основные требования к реферату выполнены, но при этом допущены следующие недочеты: имеются неточности в изложении материала; отсутствует логическая последовательность в суждениях; не сформулированы выводы, не выдержан объем реферата; имеются упущения в оформлении

6 баллов – имеются существенные отступления от требований к реферированию; тема освещена лишь частично; допущены фактические ошибки в содержании реферата, отсутствуют выводы и личная точка зрения по проблеме.

5 баллов – имеются существенные отступления от требований к реферату: тема освещена лишь частично; допущены фактические ошибки в изложении материалов и методов, отсутствуют выводы и личная точка зрения по проблеме, формат не выдержан.

4 балла – имеются существенные отступления от требований к реферату: актуальность темы не раскрыта; допущены фактические ошибки в изложении материалов и методов, отсутствуют выводы и личная точка зрения по проблеме, формат не выдержан

3 балла – отсутствует анализ актуальности темы исследования, используемых подходов и методов, при этом формально соблюден объем реферата.

2 балла – тема реферата не раскрыта, обнаруживается существенное непонимание проблемы. При этом объем реферата и формальные требования выполнены.

1 балл – тема реферата не раскрыта, обнаруживается существенное непонимание проблемы.

0 баллов – реферат студентом не представлен.

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Валерьевич /