

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
7	3	108	0	72	0		36	0	PFE
Total	3	108	0	72	0	0	36	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
OPIK-11 [1] – Capable of preparing and applying scientific, research-production, project-related, organizational-managerial, and regulatory documentation within the healthcare system.	3-OPIK-11 [1] – Know: - the purpose of various types of documentation in medicine and healthcare; Y-OPIK-11 [1] – Be able to: - search for and select scientific, project-related, organizational-managerial, and regulatory documentation in accordance with assigned tasks in professional activities; - analyze and apply scientific, project-related, organizational-managerial, and regulatory documentation to solve professional tasks; B-OPIK-11 [1] – Possess skills in: - preparing work plans and activity reports according to specified formats; - drafting organizational-administrative documents and preparing proposals for amendments to regulatory legal documents in the field of healthcare and medical sciences, as well as local regulatory acts of healthcare organizations
YK-2 [1] – Capable of managing a project at all stages of its life cycle	3-YK-2 [1] – Know: project life cycle stages; project development and implementation stages; project development and management methods Y-YK-2 [1] – Be able to: develop projects considering analysis of alternative implementation options, define target stages and main work directions; explain goals and formulate tasks related to project preparation and implementation; manage projects at all stages of their life cycle B-YK-2 [1] – Possess: project development and management methodologies; methods for assessing resource requirements and effectiveness

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

Professional activity goal	Professional activity knowledge area	Professional competency code and	Code and title of competency-based
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		title; Based on the professional standard, experience analysis	rubrics
research			
Analysis of scientific literature and official statistical reviews, participation in statistical analysis and public presentation of the results obtained.	Individuals (patients); the population; the set of means and technologies aimed at creating conditions for preserving and strengthening the health of the adult population	IIK-3.6 [1] - Able to analyze and publicly present medical research information <i>The base:</i> Professional standard: 02.019	3-IIK-3.6[1] - Know: - essence of research activities in medicine and healthcare, stages of medical research, design options; - types of scientific information sources, requirements for scientific text formatting and numerical data presentation; - main methods of statistical analysis.; Y-IIK-3.6[1] - Be able to: - plan medical research and create databases for subsequent statistical processing; - search, select and analyze scientific information according to research objectives.; B-IIK-3.6[1] - Possess skills in: - preparing informational and analytical materials, including for public presentation of research results (presentation, report, abstract, article); - analyzing research results, their generalization and critical evaluation.
Solution of certain scientific research problems and scientific and applied tasks in the field of healthcare related to diagnosis, treatment, medical rehabilitation, and prevention.	Individuals (patients); the population; the set of means and technologies aimed at creating conditions for preserving and strengthening the health of the adult population	IIK-3.7 [1] - Able to participate in implementing research results into practical healthcare activities regarding diagnosis, treatment, medical rehabilitation and prevention. <i>The base:</i>	3-IIK-3.7[1] - Know: - main provisions of regulatory framework for research activities in healthcare; - principles of evidence-based medicine.; Y-IIK-3.7[1] - Be able to: - apply results of medical research for patient benefit based on

		Professional standard: 02.019	evidence-based medicine.; B-ПІК-3.7[1] - Possess skills in: - using research results in practical healthcare activities regarding diagnosis, treatment, medical rehabilitation and prevention.
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4. PEDAGOGIC POTENTIAL OF THE COURSE

Pedagogic tracks/objectives	Pedagogic goals (code)
Intellectual education	Establishing conditions for: formation of culture of intellectual work (B11)
Intellectual education	Establishing conditions for: understanding the socio-cultural and interdisciplinary context of the development of various scientific fields (B12)
Professional education	Establishing conditions for: formation of a sense of personal responsibility for Russia's scientific and technological development, for the results of research and their consequences (B17)
Professional education	Establishing conditions for: formation of a scientific worldview, a culture of searching for non-standard scientific, technical/practical solutions, and a critical attitude toward pseudoscientific research (B19)
Professional education	Establishing conditions for: development of communication, teamwork and leadership skills (B20)
Professional education	Establishing conditions for: formation of creative engineering/professional thinking, skills of organizing collective project activities (B22)

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>7 Semester</i>						
1	Unit	1-8	0/36/0	T-5 (25)	25	T-8	У-ОПІК-11, 3-ПІК-3.6, У-ПІК-3.6, В-ПІК-3.6,

							3-ПК-3.7, У-ПК-3.7, В-ПК-3.7, 3-УК-2, У-УК-2, В-УК-2
2	Unit	9-15	0/36/0	Rep-15 (25)	25	Rep-15	У-ОПК-11, 3-ПК-3.6, У-ПК-3.6, В-ПК-3.6, 3-ПК-3.7, У-ПК-3.7, В-ПК-3.7, 3-УК-2, У-УК-2, В-УК-2
	<i>Totals for 7 Semester</i>		0/72/0		50		
	Assessment events for 7 Semester				50	PFE	У-ОПК-11, 3-ПК-3.6, У-ПК-3.6, В-ПК-3.6, 3-ПК-3.7, У-ПК-3.7, В-ПК-3.7, 3-УК-2, У-УК-2, В-УК-2

* – 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
Rep	Report
T	Testing
PFE	Pass/fail examination

SYLLABUS

Weeks	Topics / Content	Lect., hrs.	Pr./sem., hrs.	Lab., hrs.
	<i>7 Semester</i>	0	72	0
1-8	Unit	0	36	0
1 - 2	Организация, структура и методология научных исследований	All		
		0	9	0
		Online		
		0	0	0
3 - 4	Статистическая обработка результатов научных исследований	All		
		0	9	0
		Online		

		0	0	0
5 - 6	Моделирование и прогнозирование в научных исследованиях.	All		
		0	9	0
		Online		
		0	0	0
7 - 8	Предоставление результатов научных исследований	All		
		0	9	0
		Online		
		0	0	0
9-15	Unit	0	36	0
9 - 11	Моделирование и прогнозирование в научных исследованиях	All		
		0	4	0
		Online		
		0	0	0
12 - 15	Учебно-исследовательская работа.	All		
		0	32	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>7 Semester</i>
1 - 3	Заболеваемость и распространенность. Методы определения и расчета.
4 - 5	Чувствительность и специфичность
6 - 7	Основные показатели биостатистики
7 - 8	Ошибки при проведение научного исследования.
9 - 11	Этические комитеты.
12 - 13	Клинические терапевтические испытания.
14 - 15	Правила оформления и принципы работ над научным докладом.
15 - 16	Представление докладов.

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-11	3-ОПК-11	T-5, Отч-15
	У-ОПК-11	PFE, T-8, Rep-15, T-5, Отч-15
	В-ОПК-11	T-5, Отч-15
ПК-3.6	3-ПК-3.6	PFE, T-8, Rep-15
	У-ПК-3.6	PFE, T-8, Rep-15
	В-ПК-3.6	PFE, T-8, Rep-15
ПК-3.7	3-ПК-3.7	PFE, T-8, Rep-15
	У-ПК-3.7	PFE, T-8, Rep-15
	В-ПК-3.7	PFE, T-8, Rep-15
УК-2	3-УК-2	PFE, T-8, Rep-15, T-5, Отч-15
	У-УК-2	PFE, T-8, Rep-15, T-5, Отч-15
	В-УК-2	PFE, T-8, Rep-15, T-5, Отч-15

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 М 42 Математическая статистика в медицине в 2 т. Том 1 : учебное пособие для вузов, Медик В. А., Токмачев М. С., Москва: Юрайт, 2024
2. ЭИ Ш 67 Управление рисками проекта : учебник для вузов, Гребенкин А. В., Шкурко В. Е., Москва: Юрайт, 2024

FURTHER READING:

1. ЭИ 3-55 Основы проектной деятельности : , Земсков Ю. П., Асмолова Е. В., Санкт-Петербург: Лань, 2022
2. 61 О-57 Практикум по медицинской информатике : Учеб. пособие для вузов, Демидова А.А., Омельченко В.П., Ростов-на-Дону: Феникс, 2001
3. ЭИ В 19 Система контроля версий. Основы командной разработки : учебное пособие для вузов, Васильева М. А., Филиппченко К. М., Санкт-Петербург: Лань, 2022

SOFTWARE:

1. Microsoft Office 2016+ ()
2. Microsoft Word (K64-303)
3. Windows Media Player ()

LMS AND ONLINE RESOURCES

1. <https://e.lanbook.com/> ()
2. www.book.ru ()

3. www.studentlibrary.ru ()

4. www.iprbooks.ru ()

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

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

9. LOGISTICAL SUPPORT

1. Аппарат для электрофизиологических исследований MP35 (Biopac Student Lab, полная комплектация для PC (64-306)
2. Compact MRT 09500-99 с набором образцов (64-306)
3. Персональный компьютер: Моноблок Lenovo V540-24IWL All-In-One 23,8" i3-8145U 8Gb 256GB_SSD_M.2 Intel (64-305)
4. Мышь, клавиатура (64-305)
5. Интерактивная доска SMART SBM 685 (64-305)
6. Проектор SMART P109 (64-305)
7. Электрокардиограф ЭК12Т-01-Р-Д/141 (64-301)
8. Спирограф СМП21-01РД (64-301)
9. Бинокулярные микроскопы Levenhuk MED 10B (64-305)
10. Лаборатория морфологии (64-205)
11. Лаборатория молекулярно-клеточных исследований (64-209)
12. Лаборатория in vivo исследований (64-209)
13. Аппарат холтеровского мониторирования ЭКГ (64-301)
14. Аппарат суточного мониторирования АД (СМАД) (64-301)
15. Электроэнцефалограф многоканальный "Нейровизор БММ-52" (64-301)

10. EDUCATIONAL AND METHODOLOGICAL RECOMMENDATIONS FOR TEACHERS

Структура практического занятия по дисциплине "Научно-исследовательская работа":

1. Определение темы и цели занятия – 10 минут;
2. Обсуждение вопросов, вызвавших трудности при подготовке к практическому занятию – 10 мин.
3. Контроль теоретических знаний посредством тестирования – 25 мин.
4. Обсуждение теоретических вопросов (Вопросы для обсуждения) – 45 мин.

Предусмотрено преподавание дисциплины "Научно-исследовательская работа" с использованием ДОТ:

- проведение дистанционных занятий с помощью Skype, Zoom;
- учебные и методические материалы, необходимые для обучения размещаются в системе дистанционного обучения университета Образовательный портал (ОП) НИЯУ «МИФИ».
- проверка знаний с помощью тестов проводится на Образовательном портале НИЯУ МИФИ и OnlineTestPad.

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