

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,<br>credits | Total course<br>academic, hours | Lectures, hrs. | Practical sessions,<br>hrs. | Laboratory<br>sessions, hrs. | In the form of<br>practical studies,<br>hrs. | Independent<br>studies, hrs. | Independent<br>studies monitoring,<br>hrs. | Course progress,<br>Exam/Pass-fail<br>exam/Term |
|----------|--------------------------|---------------------------------|----------------|-----------------------------|------------------------------|----------------------------------------------|------------------------------|--------------------------------------------|-------------------------------------------------|
| 12       | 3                        | 108                             | 16             | 44                          | 0                            |                                              | 48                           | 0                                          | PFE                                             |
| Total    | 3                        | 108                             | 16             | 44                          | 0                            | 44                                           | 48                           | 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| ОПК-2 [1] – Capable of conducting and monitoring the effectiveness of measures for prevention, healthy lifestyle promotion, and sanitary-hygienic education of the population | <p>3-ОПК-2 [1] – Know: - regulatory foundations for conducting preventive medical examinations and health check-ups; - rules for implementing sanitary and anti-epidemic measures; - forms and methods of health education work; - sanitary rules and regulations; - national immunization schedule; - main hazardous and harmful occupational factors.</p> <p>У-ОПК-2 [1] – Be able to: - determine medical indications for imposing restrictive measures (quarantine) and conduct anti-epidemic measures in case of an infection outbreak; - conduct preventive medical examinations and health check-ups in accordance with current regulatory legal acts and other documents; - monitor the effectiveness of measures for disease prevention, health promotion, and sanitary-hygienic education of the population; - develop and implement health promotion programs aimed at eliminating harmful effects of environmental factors on human health; - establish cause-effect relationships between changes in health status and exposure to environmental factors.</p> <p>В-ОПК-2 [1] – Possess skills in: - organizing and conducting preventive medical examinations and health check-ups for the adult population to prevent the occurrence and/or spread of diseases and identify risk factors; - preparation (formation) and sending to the territorial office of the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing an emergency notification upon detection of an infectious or occupational disease; -educating patients and their relatives on methods of self-monitoring key physiological indicators.</p> |
| ОПК-4 [1] – Capable of using medical devices stipulated by the                                                                                                                | 3-ОПК-4 [1] – Know: - modern diagnostic instrumental examination methods for patients, including functional,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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| medical care procedures, as well as conducting patient examination for diagnosis establishment.                                                                                                                                                                       | <p>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</p> <p>Y-OPIK-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</p> <p>B-OPIK-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</p> |
| OPIK-6 [1] – Capable of organizing general nursing, providing primary medical care, ensuring the organization of work and making professional decisions in emergencies at the pre-hospital stage, in emergency situations, epidemics and in areas of mass destruction | <p>3-OPIK-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.</p> <p>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.</p> <p>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.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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

| Professional activity goal                                 | Professional activity knowledge area                                               | Professional competency code and title;<br>Based on the professional standard, experience analysis | Code and title of competency-based rubrics                                                      |
|------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| medical                                                    |                                                                                    |                                                                                                    |                                                                                                 |
| Diagnostics of diseases and pathological conditions of the | Individuals (patients); the population; the set of means and technologies aimed at | IIK-3.2 [1] - Capable of conducting patient examinations to establish a diagnosis                  | 3-IIK-3.2[1] - Know: - clinical diagnosis establishment algorithm; - patient history-taking and |

|           |                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| patients. | creating conditions for preserving and strengthening the health of the adult population | <p><i>The base:</i><br/>Professional standard: 02.009</p> <p>physical examination methodology; - laboratory and instrumental research 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).;</p> <p>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.;</p> <p>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</p> |
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|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Providing primary medical care in outpatient settings and day hospital settings. | Individuals (patients); the population; the set of means and technologies aimed at creating conditions for preserving and strengthening the health of the adult population | <p>IIK-3.3 [1] - Able to provide primary medical care in an outpatient setting</p> <p><i>The base:</i><br/>Professional standard: 02.009</p> | <p>3-IIK-3.3[1] - Know: - general issues of organizing medical care for 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. ;</p> <p>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</p> |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|  |  |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |  | <p>disease/condition or its complications; - determine management, examination 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.;</p> <p>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.</p> |
|--|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 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   | 8/22/0                                                    |                                             | 25                          | S-8                              | 3-ОПК-2,<br>У-ОПК-2,<br>В-ОПК-2,<br>3-ОПК-4,<br>У-ОПК-4,<br>В-ОПК-4,<br>3-ОПК-6,<br>У-ОПК-6,<br>В-ОПК-6,<br>3-ПК-3.2,<br>У-ПК-3.2,<br>В-ПК-3.2,<br>3-ПК-3.3,<br>У-ПК-3.3,<br>В-ПК-3.3 |
| 2   | Unit                                     | 9-15  | 8/22/0                                                    |                                             | 25                          | Task-14                          | 3-ОПК-2,<br>У-ОПК-2,<br>В-ОПК-2,<br>3-ОПК-4,<br>У-ОПК-4,<br>В-ОПК-4,<br>3-ОПК-6,<br>У-ОПК-6,<br>В-ОПК-6,<br>3-ПК-3.2,<br>У-ПК-3.2,<br>В-ПК-3.2,<br>3-ПК-3.3,<br>У-ПК-3.3,<br>В-ПК-3.3 |
|     | <i>Totals for 12 Semester</i>            |       | 16/44/0                                                   |                                             | 50                          |                                  |                                                                                                                                                                                       |
|     | <b>Assessment events for 12 Semester</b> |       |                                                           |                                             | 50                          | PFE                              | 3-ОПК-2,<br>У-ОПК-2,<br>В-ОПК-2,<br>3-ОПК-4,<br>У-ОПК-4,<br>В-ОПК-4,<br>3-ОПК-6,<br>У-ОПК-6,<br>В-ОПК-6,<br>3-ПК-3.2,<br>У-ПК-3.2,<br>В-ПК-3.2,                                       |

|  |  |  |  |  |  |  |                                    |
|--|--|--|--|--|--|--|------------------------------------|
|  |  |  |  |  |  |  | 3-ПК-3.3,<br>У-ПК-3.3,<br>В-ПК-3.3 |
|--|--|--|--|--|--|--|------------------------------------|

\* – 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             |
|--------------|-----------------------|
| S            | Summary               |
| Task         | Task                  |
| PFE          | Pass/fail examination |

## SYLLABUS

| Weeks       | Topics / Content                                           | Lect.,<br>hrs. | Pr./sem.,<br>hrs. | Lab.,<br>hrs. |
|-------------|------------------------------------------------------------|----------------|-------------------|---------------|
|             | <i>12 Semester</i>                                         | 16             | 44                | 0             |
| <b>1-8</b>  | <b>Unit</b>                                                | 8              | 22                | 0             |
| 1 - 4       | Эпидемиология туберкулеза, методы выявления и профилактика | All            |                   |               |
|             |                                                            | 4              | 10                | 0             |
|             |                                                            | Online         |                   |               |
|             |                                                            | 0              | 0                 | 0             |
| 5 - 8       | Клинические формы туберкулеза                              | All            |                   |               |
|             |                                                            | 4              | 12                | 0             |
|             |                                                            | Online         |                   |               |
|             |                                                            | 0              | 0                 | 0             |
| <b>9-15</b> | <b>Unit</b>                                                | 8              | 22                | 0             |
| 9 - 12      | Лечение туберкулеза. Неотложные состояния при туберкулезе  | All            |                   |               |
|             |                                                            | 4              | 12                | 0             |
|             |                                                            | Online         |                   |               |
|             |                                                            | 0              | 0                 | 0             |
| 13 - 15     | Дифференциальная диагностика туберкулеза                   | All            |                   |               |
|             |                                                            | 4              | 10                | 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 - 4  | Эпидемиология , методы выявления и профилактика туберкулеза |
| 5 - 8  | Клинические формы туберкулеза и его лечение                 |
| 9 - 15 | Дифференциальная диагностика туберкулеза органов дыхания    |

## 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-2      | 3-ОПК-2             | PFE, S-8, Task-14           |
|            | У-ОПК-2             | PFE, S-8, Task-14           |
|            | В-ОПК-2             | PFE, S-8, Task-14           |
| ОПК-4      | 3-ОПК-4             | PFE, S-8, Task-14           |
|            | У-ОПК-4             | PFE, S-8, Task-14           |
|            | В-ОПК-4             | PFE, S-8, Task-14           |
| ОПК-6      | 3-ОПК-6             | PFE, S-8, Task-14           |
|            | У-ОПК-6             | PFE, S-8, Task-14           |
|            | В-ОПК-6             | PFE, S-8, Task-14           |
| ПК-3.2     | 3-ПК-3.2            | PFE, S-8, Task-14           |
|            | У-ПК-3.2            | PFE, S-8, Task-14           |
|            | В-ПК-3.2            | PFE, S-8, Task-14           |
| ПК-3.3     | 3-ПК-3.3            | PFE, S-8, Task-14           |
|            | У-ПК-3.3            | PFE, S-8, Task-14           |
|            | В-ПК-3.3            | PFE, S-8, Task-14           |

### 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 К76 Phthisiatry : учебник, Koshechkin V.A., Москва: ГЭОТАР-Медиа, 2017
2. ЭИ Ф93 Фтизиатрия : учебник, Гиллер Д.Б., Мишин В.Ю., Москва: ГЭОТАР-Медиа, 2024

### FURTHER READING:

1. ЭИ Б83 Лучевая диагностика туберкулеза легких : учебное пособие, Бородулина Е.А., Кузнецова А.Н., Бородулин Б.Е., Москва: ГЭОТАР-Медиа, 2021
2. ЭИ П83 Противотуберкулезный диспансер: эффективная междисциплинарная концепция : руководство : практическое руководство, , Москва: ГЭОТАР-Медиа, 2023
3. ЭИ М 64 Туберкулез : учебное пособие для вузов, Мирошина Ю. Д., Мирошин Г. Ф., Москва: Юрайт, 2024

4. ЭИ П 27 Фтизиатрия : практическое руководство, Перельман М.И. [и др.], Москва: ГЭОТАР-Медиа, 2010

5. ЭИ Б 87 Фтизиатрия : учебник для вузов, Браженко О. Н., Москва: Юрайт, 2024

6. ЭИ М71 Фтизиатрия. Схема написания истории болезни : учебно-методическое пособие, Мишин В.Ю., Мишина А.В., Москва: ГЭОТАР-Медиа, 2024

#### SOFTWARE:

No special softwares is required

#### LMS AND ONLINE RESOURCES

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

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

### 9. LOGISTICAL SUPPORT

1. Мышь, клавиатура (Клиническая база)

2. Проектор SMART P109 (Клиническая база)

3. Монитор (Клиническая база)

4. Медицинское оборудование для практической подготовки обучающихся, предусмотренное договором (Клиническая база)

5. Иное оснащение, предусмотренное порядками оказания медицинской помощи по соответствующему профилю (Клиническая база)

6. Персональный компьютер (База клиническая)

### 10. EDUCATIONAL AND METHODOLOGICAL RECOMMENDATIONS FOR TEACHERS

В процессе организации и проведения учебного процесса преподавателя необходимо уметь планировать и организовывать свое время, что позволяет распределить учебную нагрузку и является важным условием успешного преподавания дисциплины.

Преподаватель должен активно непосредственно участвовать в учебном процессе и проводить подготовку к нему. Необходимость постоянной подготовки к лекциям, семинарским и практическим занятиям обусловлена потребностью отражать современные подходы, взгляды, данные по темам и разделам. Проводя подготовку к учебному процессу необходимо изучать современные методические рекомендации, результаты научных исследований, новые технологии и т.д.

Целью работы преподавателя должно быть эффективное восприятие материала слушателями. В процессе преподавания реализуются следующие виды учебных работ: лекция, семинарское и практическое занятие, самостоятельная работа. При реализации различных видов учебной работы преподаватель должен использовать образовательные технологии

(создание интерактивных презентаций, обучающие компьютерные программы, технологии развития мышления (эффективная лекция, таблицы, работа в группах и т.д.)

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