Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University

Academy of engineering
(educational division (faculty/institute/academy) as programme developer)

Department of Subsoil Use and Oil and Gas Engineering
(department realizing the PhD program)

COURSE SYLLABUS

Geology, prospecting, exploration and exploitation of oil and gas fields
(course title)

Scientific specialty:
1.6.11. Geology, prospecting, exploration and exploitation of oil and gas fields
(scientific speciality code and title)

The course instruction is implemented within the PhD programmes:
Geology, prospecting, exploration and exploitation of oil and gas fields
(PhD program title)

2025 г.

1. DISCIPLINE (MODULE) GOAL

The objective of mastering the discipline «Geology, prospecting, exploration and exploitation of oil and gas fields» is to prepare for surrender candidate exams, and same the acquisition of knowledge, skills and experience in the research field, characterizing the stages of the formation of competencies and ensuring the achievement of the planned results of the development of the educational program.

The main objectives of the discipline are to provide graduate students with knowledge of the theoretical bases of oil and gas prospecting and exploration, as well as practical skills in substantiating the most promising areas for laying new prospecting and exploration wells, setting up additional seismic and other types of work on the study of the geological structure of the study area of subsoil.

2. REQUIREMENTS TO PHD-STUDENTS ON FINISHING THE COURSE

Mastering the discipline "Geology, prospecting, exploration and exploitation of oil and gas fields" is aimed at preparing for the candidate's examinations, as well as mastering the following competencies:

- know the conditions of formation of mineral deposits
- be able on the basis of geological, geophysical and geochemical methods to forecast and assess the prospects of their industrial development
- perform geological and economic evaluation of deposits, using the methods of mathematical modelling
- be able to read and draw structural maps and geological sections, calculate and analyze basic geostatistical data, describe oil and gas deposits geologically correctly, analyze oilfield data, data of exploratory drilling and downhole geophysics
- master the skills of working with spreadsheets, text and graphics editors, skills of geological engineering graphics design (maps, sections).

3. WORKLOAD OF THE DISCIPLINE AND TYPES OF ACTIVITIES

The overall workload of the discipline «Geology, prospecting, exploration and exploitation of oil and gas fields» is 3 credit units (108 academic hours).

Types of activities		**Total ac. hrs.**	**Semesters**
			3
Classroom activities (total), including:		60	60
в том числе:			
Lectures (LC)		30	30
Laboratory activities (LA)		–	–
Practical lessons/Seminars (PC)		30	30
Independent work		48	48
Intermediate certification (test with assessment/exam)		36	36
Overall workload	ac. hrs.	108	108
	credits	3	3

4. CONTENT OF THE DISCIPLINE

Name of the discipline section	**Contents of the section (topic)**	**Type of study work**
Section 1: Fundamentals of oil and gas prospecting and exploration	Topic 1.1. Introduction. History of the theoretical foundations of oil and gas prospecting and exploration Topic 1.2. The role of Russian and foreign geologists in developing the theoretical foundations of oil and gas prospecting and exploration Topic 1.3. Development of the oil and gas industry. The prospects of the oil and gas industry and geology.	LC, PC

Section 2: Methods of oil and gas prospecting and exploration.	Topic 2.1. Global patterns of oil and gas field location. Topic 2.2. Global patterns of reservoir distribution by reserves, depth, stratigraphic complexes, and major geostructural elements. Topic 2.3. Phase zoning of hydrocarbon distribution.	LC, PC
Section 3: Geological factors controlling the formation and location of hydrocarbon accumulations.	Topic 3.1. Stratigraphic criteria controlling hydrocarbon accumulations. Topic 3.2. Tectonic criteria controlling hydrocarbon accumulations. Topic 3.3. Lithologic and paleogeographic criteria of oil and gas content	LC, PC
Section 4. Geochemical criteria of oil and gas bearing capacity	Topic 4.1. Processes of reservoir formation, generation, migration and accumulation Topic 4.2. Organic matter, its transformation. Biomarkers Topic 4.3. Inorganic origin of hydrocarbons. Sources, migration, localization	LC, PC
Section 5: Stages of Oil and Gas Exploration	Topic 5.1. Geological mapping and geological exploration Topic 5.2. Prospecting works. Objects of regional forecasting. Prediction maps Topic 5.3. Complexes of geological, geophysical and geochemical methods	LC, PC
Section 6: Search and Evaluation of Oil and Gas Fields	Topic 6.1. Remote prospecting methods. Reference and parametric drilling. Transects . Topic 6.2. Traps and their prediction based on a set of geological and geophysical features. Physical and geological models of oil and gas deposits. Topic 6.3. Forecast resources and their classification. The purpose and methods of calculating predicted resources	LC, PC
Section 7: Oil and Gas Exploration	Topic 7.1. Exploration sub-stages. The purpose of exploration and categories of hydrocarbon reserves. Topic 7.2. Additional in-mine exploration. Pilot operation. Role of geologists and geophysicists.	LC, PC
Section 8. Geological and geophysical methods of control over oil and gas field development	Topic 8.1. Logging methods (GIS) Topic 8.2. Vertical seismic profiling Topic 8.3 Nuclear Magnetic Resonance methods	LC, PC

5. EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Room Type	Room Equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline
Class for Seminars	Room for seminar-type classes, equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets	Not necessary
Self-Work Class	Room for self-working (can be used for lecture and seminars activities), equipped with a set of specialized furniture, board (screen) and technical / multimedia gadgets and computers with an access to EIPES	Not necessary

6. METHODOLOGICAL SUPPORT AND LEARNING MATERIALS

Main readings:

1. Bakirova A.A., Gabrielyants G.A. et al. Theoretical bases of oil and gas prospecting and exploration. In 2 books. 2012 Book 1: Theoretical bases of forecasting oil and gas subsurface.

2. Bakirova AA, Gabrielyants GA et al. Theoretical bases of oil and gas prospecting and exploration. In 2 books. 2012 Book 2: Methods of Search and Exploration of Oil and Gas.

Additional readings:

1. Mstislavskaya LP, Filippov VP Geology, Prospecting and Exploration of Oil and Gas / Text /: Study Guide for University Students. Gubkin Russian State University of Oil and Gas. - Moscow: CenterLitNefteGas, 2005. - 200c.

Internet sourses:

ELS RUDN University and third party EBS, to which university students have accessbased signed contracts:

- RUDN Electronic Library System, http://lib.rudn.ru/MegaPro/Web ;
- ELS University Library Online, http://www.biblioclub.ru ;
- EBS Urayt, http://www.biblio-online.ru ;
- ELS Student Consultant, http://www.studentlibrary.ru ;
- EBS Lan, http://e.lanbook.com ;
- EBS Trinity Bridge http://www.trmost.ru

Databases and search engines:

- Electronic fund of legal and normative-technical documentation, http://docs.cntd.ru ;
- Yandex search system https:// www .yandex.ru ;
- Google search system https://www.google.com ;
- Reference database Scopus , http://www.elsevierscience.ru/products/scopus

Educational and methodological materials for students' self-work studying the discipline / module:

A course of lectures on the discipline «Geology, prospecting, exploration and exploitation of oil and gas fields».

7. ASSESSMENT TOOLKIT AND GRADING SYSTEM FOR MIDTERM ATTESTATION OF STUDENTS IN THE DISCIPLINE (MODULE)

Assessment toolkit and a grading system to evaluate the level of competences (competences in part) formation as the course results are specified on the TUIS platform.

DEVELOPERS:
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