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 program developer)

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

COURSE SYLLABUS

Geology, prospecting, and exploration of solid minerals, minerageny
(course title)

Scientific specialty:
1.6.10. Geology, prospecting, and exploration of solid minerals, minerageny
(scientific speciality code and title)

The course instruction is implemented within the PhD programmes:
Geology, prospecting, and exploration of solid minerals, minerageny
(PhD program title)

2026 г.

1. DISCIPLINE (MODULE) GOAL

The objective of mastering the discipline «Geology, prospecting, and exploration of solid minerals, minerageny» 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:

- deep understanding of the current state of science in the field of geology of mineral resources and their prospecting and exploration;
- acquiring knowledge of modern theories and ways of development of various scientific directions in the geology of mineral resources and their prospecting and exploration;
- gaining skills of analyzing extensive and diverse geological information and skills of its systematization for decision making in prospecting and exploration of mineral resources.

2. REQUIREMENTS TO PHD-STUDENTS ON FINISHING THE COURSE

Mastering the discipline "Geology, prospecting, and exploration of solid minerals, minerageny" is aimed at preparing for the candidate's examinations, as well as mastering the following competencies:

Know:

- basic criteria and signs of location of mineral resources in the Earth's crust and methods of their prospecting and exploration;
- the methodology of carrying out and geological and economic evaluation of exploration objects at different stages and in different natural conditions of any type of solid minerals;
- the requirements of the industry to the quality of mineral raw materials by type of minerals and grouping of deposits by industrial type;

Be able to:

- formulate goals and objectives of prospecting, exploration and research work for various geological objects;
- on the basis of various methods (mineralogical, geological, geophysical and geochemical, etc.) to forecast and assess the prospects of industrial development of mineral deposits;
- identify promising areas and sites for prospecting and evaluation of various types of minerals;
- organize rational geological exploration work as part of a team;
- conduct geological and economic evaluation of deposits, using methods of mathematical modeling;
- prepare design and estimate documentation for exploration work;
- choose a scheme of opening and preparation of a deposit for development.

Master

- the methods of system analysis of geological materials;
- methods of summarizing and processing information using computer technology;
- skills of complex geological-genetic, prognostic, and geological-industrial models of mineral deposits of various types and choose rational methods of solving exploration and prospecting tasks.

3. WORKLOAD OF THE DISCIPLINE AND TYPES OF ACTIVITIES

The overall workload of the discipline «Geology, prospecting, and exploration of solid minerals, minerageny» 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: General information about the discipline. Search criteria and indicators.	Topic 1.1. The main goals and objectives of the discipline. History of the development of science of search and exploration of mineral deposits. Topic 1.2. Geological and industrial classification of mineral resources. Topic 1.3 Stages of geological prospecting. Topic 1.4 Searching geological criteria (prerequisites) and indicators.	LC, PC
Section 2: Prospecting for mineral deposits. Forecasting and evaluation of ore occurrences.	Topic 2.1. Classification of searches according to the conditions and methods of work. Topic 2.2. Mineralogical, geochemical and geophysical prospecting methods. Searching for hidden deposits. Theme 2.3 Principles of predicting and evaluating mineral deposits. Methods of geological prospecting and deposit evaluation. Theme 2.4. Evaluation and tracing of mineral resource outcrops. Theme 2.5. Technical means of revealing ore bodies	LC, PC
Section 3. Sampling of solid minerals	Topic 3.1. The choice of sampling method; types of sampling by purpose and sampling conditions. Topic 3.2. Sample processing. Testing of samples. Theme 3. 3 Controlling the sampling process.	LC, PC
Section 4. General issues of exploration of mineral deposits. Technical means and systems of exploration.	Topic 4.1 Main tasks, principles and methods of exploration. Topic 4.2. Exploration process stages. Topic 4.3. Exploration networks and their density. Documentation. Topic 4.4. Geological and economic characteristics of the field. Topic 4.5. Classifying reserves of solid mineral deposits. Topic 4.6. Main exploration systems and technical facilities.	LC, PC
Section 5. Ore reserve calculation of mineral reserves. Features of the exploration of mineral deposits of different industrial-genetic types, categories and groups of complexity.	Topic 5.1. Tracking and delineation of ore bodies and deposits. Blocking of reserves. Theme 5.2. Calculating reserves. Determining the major parameters for calculating reserves. Accuracy of reserves estimation. Topic 5.3. Exploration of ore deposits and non-metallic minerals. Topic 5.4. Exploration of caustobioliths.	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. Korobeinikov A. F. Geology. Prognostication and search for mineral deposits: textbook for undergraduate and graduate studies / A. F. Korobeinikov. - 2nd ed. amended and supplemented - Moscow: Publishing house Yurait, 2019. - 254 c. - (Series : Universities of Russia). - ISBN 978-5-534-00747-3. - Text: electronic// EBS Yurite [website]. - URL: https://biblio-online.ru/bcode/433940

2. Porotov G.S. "Mathematical Methods of Modeling in Geology", St. Petersburg, 2006.

3. Porotov G.S. Exploration and geological and economic evaluation of mineral deposits, St. Petersburg, GGI (TU), 2004, textbook.

4. Kaputin Yu.E. Mining computer technology and geostatistics. SPb: Nedra, 2002. - 424 c.

5. Milutin A. G. Exploration and geological and economic evaluation of mineral deposits. Electronic edition. MOSCOW STATE UNIVERSITY. 74 c. 2004.

6. GKZ Methodological Recommendations on Application of Classification of Reserves of Deposits and Inferred Resources of Hard Mineral Reserves. Developed by the Federal State Institution "State Commission on Mineral Reserves" (FSI GKZ) by order of the Ministry of Natural Resources of the Russian Federation and at the expense of the federal budget. Approved by decree of the Ministry of Natural Resources of the Russian Federation of 05.06.2008.

7. N.N.Trofimov, V.V.Dyakonov, V.E.Markov, E.V.Karelina. Training Manual for Laboratory Work on the course "Prospecting and Exploration of Mineral Deposits Section Geological and Mineralogical Prospecting Methods. Moscow, Publishing house of the PFUR, 2009.

8. V. Dyakonov, V. Abramov, Markov, E. Karelina. Abramov, Markov, E., Karelina. training manuals for laboratory work on the course "Prognosis and Prospecting for Deposits of Mineral Resources," Section "Geophysical Methods of Prospecting. Moscow, Publishing house of PFUR, 2015.

9. N.N. Trofimov, V.V. Diakonov. Training exercises for laboratory work on the course "Prognosis and Prospecting for Mineral Deposits" Section Testing. Moscow, PFUR, 2006 15.

10. Dyakonov V., Markov V., Karelina E. Assignments for execution of laboratory works on the course "Exploration and geological and economic evaluation of mineral deposits" section "geological documentation of prospecting workings. For students in the IV course "Applied geology" specialization: Geological Surveying, Prospecting and Exploration of Solid Mineral Deposits. M. Publishing house RUDN, 18p. 2016.

Additional readings:

1. Barannikov A.G., Ugryumov A.N., Dvornik G.P. Laboratory Workshop with the basics of theory (Prognosis and prospecting of mineral deposits), Yekat, U LSU, 2004.

2. Shevelev VV. Exploration and geological and economic evaluation of deposits of solid minerals, Irkutsk, IrgSTU, 2004.

3. Mineral raw materials (by type of minerals), Handbook, Moscow, CJSC Geoinformmark, 1997-2003.

5. Jackie Coombs (translated by Oleg Kazakov). The Art and Science of Reserve Estimation. A practical guide for geologists and mining engineers. Perth. Coombes Capability. 2008. 231 c.

6. Snowden DV, Resource Estimation. Professional Development Courses. www.snowdengroup.com. pp.184. 2009

7. N.N. Trofimov, A.I. Rychkov, Iodine and bromine geochemical indicators of deep ore deposits, Denver, Colorado mountain publishing house, 2004.

Internet sources:

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, and exploration of solid minerals, minerageny».

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:
Associate Professor of the
Department of Subsoil Use
and Oil and Gas Engineering — E.V. Karelina

HEAD OF THE DEPARTMENT
Associate Professor of the
Department of Subsoil Use
and Oil and Gas Engineering — A.E.Kotelnikov