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**Federal State Autonomous Educational Institution for Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
(RUDN University)**

Academy of Engineering

(name of the educational division - developer of the HEP HE)

COURSE SYLLABUS

Mining geology

(Subject / Course title)

Recommended by the Didactic Council for the Education Field of:

05.04.01 Geology

(code and name of the Higher Education Field)

The development of the discipline is carried out within the framework of the implementation of the Higher Education Programme of Higher Education (HEP HE):

Mining Geology

(name (profile/specialization) of the Higher Education Program)

1. AIMS AND OBJECTIVES

The purpose of mastering the discipline “Mining geology” is:

- acquiring knowledge, skills and experience in the field of modern methods of obtaining, analyzing and managing geological data within the framework of an existing mining enterprise, characterizing the stages of competence formation and ensuring the achievement of the planned results of the educational programme.

The main objectives of the discipline are:

- study of geological methods and means of studying rock massifs and managing their condition;
- acquisition of skills in the field of management of reserves and quality of mined mineral raw materials at all stages of the development of mineral deposits to improve the efficiency and safety of mining operations;
- formation of skills in the field of design and implementation of activities for operational exploration;
- study of modern requirements in the field of protection and rational use of solid minerals

2. REQUIREMENTS TO LEARNING OUTCOMES

Mastering the discipline “Mining geology” is aimed at developing the following competencies (parts of competencies) among students:

Table 2.1. The list of competencies formed by students in the course of mastering the discipline (the results of mastering the discipline)

Code	Competence	Competence Formation Indicators (within this discipline)
GC-6	Able to identify and implement the priorities of their own activities and ways to improve it based on self-assessment.	GC-6.1 Controls the amount of time spent on specific activities;
		GC-6.2. develops time management tools and methods for accomplishing specific tasks, projects, and goals;
		GC-6.3 Analyze one's resources and their limits (personal, situational, time, etc.) to successfully complete the assigned task.
GPK-1	Capable of using the theoretical foundations of special and new sections of geological sciences to solve professional activity problems.	GPK-1.1. Knowledge of the basics of special and new sections of geological sciences;
		GPK-1.2. Selects a method or technique to solve a professional problem;
		GPK-1.3. Knows how to select a method or method of solving a professional problem.
SPC-2	Capable of justifying the need, choosing the best methodology, planning, implementing, interpreting results, and supervising geophysical work at various	PC-2.1. Know the theoretical basics of geophysical research;
		PC-2.2 Know how to select the best methodology, design, implement, interpret the results of geophysical works;

Code	Competence	Competence Formation Indicators (within this discipline)
	stages of mineral site development.	
SPC-3	Capable of projecting, implementing, and managing a hydrogeological study of the territory during the exploration and development of a mineral deposit.	PC-3.1 Know the theoretical foundations and methods of hydrogeological study of the territory at the stage of exploration and development of mineral deposits; PC-3.2 Be able to apply methodological solutions in the design, implementation and management of hydrogeological study of the territory at the stage of exploration and development of mineral deposits; PC-3.3 Be able to apply the knowledge and skills obtained in the design, implementation and management of the hydrogeological study of the territory at the stage of exploration and development of mineral deposits.
SPC-4	Capable of designing, assisting with, and supervising a geologic study of a subsoil area at various stages of development.	PC-4.1 Know the theoretical basis and methods of geological study of the subsoil area at various stages of its development; PC-4.2 Be able to apply methodological solutions in the design and implementation of the geological study of a subsoil area at various stages of its development; PC-4.3 Be able to apply the acquired knowledge and skills in the design, support and management of the geological study of a subsoil area at various stages of its development.

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF HEP HE

Discipline “Mining geology” refers to the Variable Component of block B1 of the HEP HE.

As part of the HEP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline “Mining geology”.

Table 3.1. The list of components of the HEP HE that contribute to the achievement of the planned results of the development of the discipline

Code	Competence	Previous Disciplines (Modules)*	Subsequent Disciplines (Modules)*
GC-6	Able to identify and implement the priorities of their own activities and ways to improve it based on self-assessment.		Geological and Geophysical Basics of Mineral Prospecting and Exploration; Modelling of Mineral Deposits; Introduction Practical Training; Final state attestation
GPK-1	Capable of using the theoretical foundations of special and new sections of geological sciences to		Hydrogeology; Mining Hydrogeology; Geological and Geophysical Basics of Mineral Prospecting and

Code	Competence	Previous Disciplines (Modules)*	Subsequent Disciplines (Modules)*
	solve professional activity problems.		Exploration; Research Work (Mining Geology). Part 1; Research Work (Geological and Geophysical Survey). Part 1; Research Work (Mining Geology). Part 2; Research Work (Geological and Geophysical Survey). Part 2; Final state attestation
SPC-2	Capable of justifying the need, choosing the best methodology, planning, implementing, interpreting results, and supervising geophysical work at various stages of mineral site development.		Research Work (Geological and Geophysical Survey). Part 1; Research Work (Mining Geology). Part 1; Research Work (Geological and Geophysical Survey). Part 2; Research Work (Mining Geology). Part 2; Introduction Practical Training; Pre-graduation Practical Training; Mining Hydrogeology; Modelling of Mineral Deposits; Geological and Geophysical Basics of Mineral Prospecting and Exploration; Final state attestation
SPC-3	Capable of projecting, implementing, and managing a hydrogeological study of the territory during the exploration and development of a mineral deposit.		Pre-graduation Practical Training; Research Work (Mining Geology). Part 1; Research Work (Mining Geology). Part 2; Mineralogy; Applied Groundwater Modeling; Mining Hydrogeology; Groundwater Dynamics; Final state attestation
SPC-4	Capable of designing, assisting with, and supervising a geologic study of a subsoil area at various stages of development.		Mining Hydrogeology; Modelling of Mineral Deposits; Geological and Geophysical Basics of Mineral Prospecting and Exploration; Research Work (Mining Geology). Part 2; Introduction Practical Training; Pre-graduation Practical Training; Research Work (Geological and Geophysical Survey). Part 1; Research Work (Mining Geology). Part 1; Research

Code	Competence	Previous Disciplines (Modules)*	Subsequent Disciplines (Modules)*
			Work (Geological and Geophysical Survey). Part 2; Final state attestation

* - filled in in accordance with the matrix of competencies and academic curriculum of HEP HE

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

Course workload “Mining geology” is 5 credit units.

Table 4.1. Types of academic activities during the period of the HE programme mastering

Type of academic activities	TOTAL, ac. hrs.	Semester
		1
<i>Contact academic hours</i>	54	54
Lectures	18	18
Lab work	-	-
Seminars (workshops/tutorials)	36	36
<i>Self-study (ies), academic hours</i>	108	108
<i>Evaluation and assessment (exam or pass/fail grading)</i>	18	18 <i>Exam</i>
Course workload	academic hours	180
	credits	5

5. COURSE MODULES AND CONTENTS

Table 5.1. Course Modules and Contents by types of academic activities

Modules	Topics	Type of academic activities*
Section 1. Fundamentals of mining geology:	1.1.subject, object, areas of application, goals and objectives of mining geology; 1.2.mining and geological objects and factors of development of mineral deposits; 1.3.volumetric and qualitative indicators of minerals; 1.4.hydrogeological indicators and factors of field development; 1.5.engineering-geological factors and indicators of field development; 1.6.purpose and principles of geological exploration; 1.7.stages of geological study of the subsoil; 1.8.compilation of geological documentation: geological maps, sections, stratigraphic columns and symbols; 1.9.methods for estimating mineral reserves.	Lec, Sem

Modules	Topics	Type of academic activities*
Section 2. Methods for obtaining and interpreting geological information:	2.1.geological materials used in the design; 2.2.reliability of geological information and methods for its evaluation; 2.3.geological support of operating mining enterprises; 2.4.geological and geophysical work at an operating mining enterprise; 2.5.hydrogeological and engineering-geological studies at existing mining enterprises 2.6.assessment of the state of the rock mass; 2.7.accounting of the state and movement of mineral reserves at mining enterprises; 2.8.calculation of reserves, losses and dilution, accounting of the state and movement of reserves; 2.9.geological support for management of reserves and quality of minerals; 2.10. management of geological data at an operating enterprise; 2.11. construction of complex resource block models.	Lec, Sem
Section 3. International methods of reserves estimation:	3.1.modern reserves accounting codes; 3.2.JORC Code : features, scope	Lec, Sem

* - Lec – Lectures; Lab – Lab work; Sem – Seminars (workshops/tutorials).

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom Equipment and Technology Support Requirements

Classroom for Academic Activity Type	Classroom Equipment	Specialized educational / laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	Auditorium for lecture-type classes, equipped with a set of specialized furniture; blackboard (screen) and technical a set of specialized furniture, a board (screen), and technical means of multimedia presentations.	
Computer Lab	Computer lab for conducting	Specialized software:

	classes, group and individual consultations, current control and intermediate attestation, equipped with personal computers (21 pcs. computer class equipped with 21 personal computers, a blackboard (screen) and multimedia devices. technical means of multimedia presentations.	<ul style="list-style-type: none"> • MS Office licensed software package, • Micromine, • GIS GEOMIX, • QGIS.
Seminars	Auditorium for classes seminars, group and individual consultations, current control and intermediate attestation, equipped with a set of a set of specialized furniture and technical means of multimedia presentations.	Subject audience of the basics of geology (stationary multimedia computer 1 piece, a collection of minerals (300 samples), a collection of rocks (300 samples), a collection of minerals (200 samples), a set of demonstration equipment, a multimedia projector, a projection screen, a teaching board, a set of educational furniture for 30 seats.
Self-studies	Auditorium for independent work (can be used for seminars and consultations), equipped with a set of a set of specialized furniture and computers with access to the EITS of the university.	

7. RECOMMENDED SOURCES FOR COURSE STUDIES

Main reading(sources):

1. Marat Abzalov. "Applied Mining Geology". Springer Cham, 2016 - <https://doi.org/10.1007/978-3-319-39264-6>
2. Paul Alexandre. "Novel Methods and Applications for Mineral Exploration". Mdpi AG, 2020 - https://www.google.ru/books/edition/Novel_Methods_and_Applications_for_Mineral/FsvlDwAAQBAJ?hl=ru&gbpv=1&pg=PR1&printsec=frontcover
3. Lisle R.J. "Geological structures and maps. A practical guide". Elsevier, 2004 r - <https://www.geokniga.org/books/23418>

Additional (optional) reading (sources):

1. G.S. Roonwal. "Mineral Exploration: Practical Application". Springer Singapore, 2017 - <https://doi.org/10.1007/978-981-10-5604-8>
2. Govind Singh Bhardwaj. "Practical Guide Book for Mining Geology". College of Technology and Engineering Udaipur, 2014 - https://www.researchgate.net/publication/266078320_Practical_Guide_Book_for_Mining

Geology

3. Peter T. Bobrowsky, Brian Marker. "Encyclopedia of Engineering Geology". Springer Cham, 2018 - <https://doi.org/10.1007/978-3-319-73568-9>

Internet-(based) sources:

1. Electronic libraries with access for RUDN students:

- RUDN Electronic Library System – RUDN ELS <http://lib.rudn.ru/MegaPro/Web>
- ELS “University Library Online” <http://www.biblioclub.ru>
- ELS Yurayt <http://www.biblio-online.ru>
- ELS “Student Consultant” www.studentlibrary.ru
- ELS “Lan” <http://e.lanbook.com/>
- ELS “Trinity Bridge” <http://www.trmost.ru>

2. Databases and search engines:

- Electronic Fund of Legal and Normative-technical Documentation <http://docs.cntd.ru/>
- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

*Learning toolkits for self- studies in the RUDN LMS TUIS *:*

1. Guidelines for students on the development of the subject “Mining geology”.
2. Course of lectures on the subject “Mining geology”.

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of the subject in LMS TUIS!

8. ASSESSMENT AND EVALUATION TOOLKIT AND GRADING CRITERIA

Assessment and Evaluation Toolkit (AET), Grading System (GS)* for assessing the level of competence (part of competence) for the subject “Mining geology” are presented in the Appendix to the Course Syllabus of the subject.

* - AET and GS are formed on the basis of the requirements of the relevant local normative act of the RUDN University.

DEVELOPERS:

Associate Professor, Geology and Survey Department		V. Cheskidov
Position, Department	Signature	Full name
Senior Lecturer, Geology and Survey Department		A. Lipina
Position, Department	Signature	Full name

HEAD of Department:

**Director of the Department of
Subsoil Use and Oil&Gas
Engineering**

Name of Department



Signature

A. Kotelnikov

Full name

HEAD OF HEP HE:

**Director of the Department of
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