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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 Hydrogeology**

(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 Hydrogeology” is acquiring knowledge, skills and experience in the field of methods and techniques for studying hydrogeological conditions of mineral deposits to prevent their negative impact in the process of development and exploitation, characterizing the stages of competence formation and ensuring the achievement of the planned results of the educational programme.

## 2. REQUIREMENTS TO LEARNING OUTCOMES

Mastering the discipline “Mining Hydrogeology” 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)*

<b>Code</b>	<b>Competence</b>	<b>Competence Formation Indicators (within this discipline)</b>
GPC-1.	Capable of using the theoretical foundations of special and new sections of geological sciences to solve professional activity problems.	GPC-1.1. Knowledge of the basics of special and new sections of geological sciences; GPC-1.2. Selects a method or technique to solve a professional problem; GPC-1.3. Knows how to select a method or method of solving a professional problem.
PC-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.	PC-2.1. Know the theoretical basics of geophysical research PC-2.2 Know how to select the best methodology, design, implement.
PC-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.
PC-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.

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

Discipline “Mining Hydrogeology” refers to the University Disciplines Module 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 Hydrogeology”.

*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*

<b>Code</b>	<b>Competence</b>	<b>Previous Disciplines (Modules)*</b>	<b>Subsequent Disciplines (Modules)*</b>
GPC-1.	Capable of using the theoretical foundations of special and new sections of geological sciences to solve professional activity problems.	Mining Geology; Engineering and Geological Support of Subsoil Use; Geological and Geophysical Basics of Mineral Prospecting and Exploration	Research Work (Mining Geology). Part 2; Research Work (Geological and Geophysical Survey). Part 2; Final State Attestation
PC-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.	Introduction Practical Training; Modelling of Mineral Deposits; Mining Geology; Geological and Geophysical Basics of Mineral Prospecting and Exploration; Regional Geology. Geology of Central and Southern Africa	Research Work (Geological and Geophysical Survey). Part 2; Research Work (Mining Geology). Part 2; Pre-graduation Practical Training; Final State Attestation
PC-3	Capable of projecting, implementing, and managing a hydrogeological study of the territory during the exploration and development of a mineral deposit.	Mineralogy; Mining Geology	Research Work (Mining Geology). Part 2; Pre-graduation Practical Training; Final State Attestation
PC-4.	Capable of designing, assisting with, and supervising a geologic study of a subsoil area at various stages of development.	Modelling of Mineral Deposits; Mining Geology; Geological and Geophysical Basics of Mineral Prospecting and Exploration; Regional Geology. Geology of Central and Southern Africa; Introduction Practical Training	Research Work (Geological and Geophysical Survey). Part 2; Pre-graduation Practical Training; Research Work (Mining Geology). 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 Hydrogeology” 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
		3
Contact academic hours	54	54
Lectures	18	18
Lab work	-	-
Seminars (workshops/tutorials)	36	36
Self-study (ies), academic hours	90	90
Evaluation and assessment (exam or pass/fail grading)	36	36 Exam
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*
Module 1. Hydrogeological conditions at different stages of the mining life cycle	Topic 1.1. Hydrogeological works at the stage of preparation for exploitation.	Lec
	Topic 1.2. Hydrogeological works at the stage of exploitation.	Lec
	Topic 1.3. Hydrogeological works at the stage of development and liquidation	Lec, Sem
Module 2. Hydrogeological investigations during the MD development by underground leaching	Topic 2.1 Hydrogeological investigations in the MD development by geotechnological methods (underground leaching of ore deposits).	Lec, Sem
	Topic 2.2. Hydrodynamic calculations in the development of ore deposits by underground leaching	Lec, Sem
Module 3. Hydrogeological investigations during the MD development by the open method	Topic 3.1 Methods of MD drainage. Drainage systems and drainage facilities for the MD development.	Lec, Sem
	Topic 3.2 Methods of hydrogeological calculations of water inflows to open and underground mine workings under various geological and hydrogeological conditions	Lec, Sem
	Topic 3.3. Prediction of water inflows to mine workings.	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.	
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.	
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. Kovalevsky V.S., Kruseman G.P., Rushton K.R. Groundwater studies. Paris, 2004 г., 430 стр., ISBN: 92-9220-005-4 <https://www.geokniga.org/>
2. Fetter C.W. Applied hydrogeology. Waveland Press, 2018 г., 621 стр., ISBN: 1-4786-3709-9 <https://www.geokniga.org/>
3. Hiscock K.M. Hydrogeology. Principles and practice. Blackwell science Ltd, 2005 г., 404 стр., ISBN: 0-632-05763-7 <https://www.geokniga.org/>

### *Additional (optional) reading (sources):*

1. Sanderson D.J., Zhang X. Numerical modelling and analysis of fluid flow and deformation of fractured rock masses. Elsevier, 2002 г., 300 стр., ISBN: 0-08-043931-4 <https://www.geokniga.org/>
2. Kirsch R. Groundwater geophysics. A tool for hydrogeology. Springer, 2006 г., 499 стр., ISBN: 978-3-540-29383-5 <https://www.geokniga.org/>
3. Di M.F., Ghosh S.K., Saha P.D. Recent Trends in Waste Water Treatment and Water Resource Management. Springer, 2020 г., 256 стр., ISBN: 978-981-15-0705- <https://www.geokniga.org/>

### *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](http://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 Hydrogeology”.

2. Course of lectures on the subject “Mining Hydrogeology”.

\* - 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 Hydrogeology” 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:

**Professor, Department of  
Geology, School of Earth Sciences  
and Engineering, TPU**

Position, Department

Signature

**N. Guseva**

Full name

**Researcher in the Department of  
Geology, School of Earth Sciences  
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Position, Department

Signature

**D. Purgina**

Full name

### HEAD of Department:

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

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**A. Kotelnikov**

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### HEAD OF HEP HE:

**Director of the Department of  
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