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

Academy of Engineering

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

Sustainable Mining

course title

Recommended by the Didactic Council for the Education Field of:

05.04.01 Geology

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

Mining Geology

higher education programme profile/specialisation title

2025

1. COURSE GOAL(s)

The goal of the course "Sustainable Mining" is to acquire knowledge, skills and experience in the field of designing all stages of the life cycle of mining enterprises and extractive regions as a whole based on the principles of sustainable development. Additionally, it involves characterizing the stages of competence formation and ensuring the achievement of the planned results of the educational programme.

The main objectives of the course are:

- forming a system of knowledge among students essential for comprehending and interpreting the principles of sustainable development;

- studying the basics of reserve and bottleneck analysis in sustainable development at global, national, and regional levels;

- analyzing the characteristics of mining regions within the context of sustainable development.

2. REQUIREMENTS TO LEARNING OUTCOMES

The course implementation is aimed at the development of the following competences (competences in part):

Table 2.1. List of competences that students acquire during the course

Competence code	Competence descriptor	Competence formation indicators (within this course)
GC-3.	Able to organize and manage the work of the team, developing a team strategy to achieve the goal.	GC-3.1 Defines his/her role in the team based on a collaborative strategy to achieve the goal; GC-3.2 Exchanges information, knowledge, and experience with team members; GC-3.3 Argues his/her point of view regarding the use of other team members' ideas to achieve the goal set.
GPC-3.	Accomplished of totally independent generalizing the results obtained while solving professional problems and developing recommendations for their practical application.	GPC-3.1 Knows the theoretical foundations of the generalization of results and development of recommendations; GPC-3.2. Knows how to summarize the results obtained in the process of solving professional tasks, develop recommendations for their practical use; GPC-3.3. Has the skills to summarize the results obtained in the process of solving professional tasks and develop recommendations for their practical use.
GPC-4.	Suitable of representing, protecting, and disseminating the outcomes of their professional activities.	GPC-4.1 Knows the main results of his/her scientific activity, methods of their presentation, protection and dissemination; GPC-4.2. Knows how to understand and analyze the results of professional activities, use own scientific achievements. discuss and disseminate the results of their professional activities; GPC-4.3. Has the skills to analyze, discuss and disseminate the results of professional activities.

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-5.	Proficient of conducting critical analysis and utilizing a systematic approach in the field of digital economy.	GPC-5.1. Knows the basics of digital economy, basic methods of critical analysis, principles of systems approach;
		GPC-5.2. Knows how to critically analyze information, understand the principles of systems approach;
		GPC-5.3. Knows how to critically analyze and apply systems approach to the digital economy.

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the variable component of (B1) block of the higher educational programme curriculum.

Within the higher education programme students also master other (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Competence code	Competence descriptor	Previous courses/modules	Subsequent courses/modules
GC-3.	Able to organize and manage the work of the team, developing a team strategy to achieve the goal.		Technologies of Development of Mineral Deposits; Management of Reserves and Quality of Mineral Raw Materials; Graduate Qualification Work
GPC-3.	Accomplished of totally independent generalizing the results obtained while solving professional problems and developing recommendations for their practical application.		Work Experience Internship; Research Work; Graduate Qualification Work
GPC-4.	Suitable of representing, protecting, and disseminating the outcomes of their professional activities.	Digital Technologies in Geology;	Work Experience Internship; Research Work; Graduate Qualification Work
GPC-5.	Proficient of conducting critical analysis and utilizing a systematic approach in the field of digital economy.		Graduate Qualification Work

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course "Sustainable Mining" is 3 credit units.

Table 4.1. Types of academic activities during the periods of higher education programme mastering

Type of academic activities	TOTAL, ac. hrs.	Semesters/ training modules
		2
Contact academic hours	*54*	*54*
Lectures (LC)	18	18
Lab work (LW)	-	-
Seminars (workshops/tutorials) (S)	36	36
Self-studies	*48*	*48*
Evaluation and assessment (exam/passing/failing grade)	*6*	*6* *Failing grade*
Course workload — academic hours	**108**	**108**
Course workload — credits	**3**	**3**

5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
Module 1. The concept of sustainable development	1.1. Formation of the concept of sustainable development. Global consequences of human influence on the biosphere. 1.2. Globalization of the world community and the role of international cooperation in achieving sustainable development. 1.3. United Nations Conference on Environment and Development. 1.4. Sustainable Development Goals. 1.5. The concept of Russia's transition to sustainable development.	LC, S
Module 2. Aspects of sustainable development	2.1. Industrial Safety. 2.2. Resources and waste. 2.3. Climate problems. 2.4. Forest conservation. 2.5. Problems of the world ocean. 2.6. Urbanization. 2.7. Conservation of biological diversity. 2.8. Economic and legal mechanisms.	LC, S
Module 3. Ensuring sustainable development of the enterprise.	3.1. Types of sustainability: market, production, financial and economic, organizational and managerial. 3.2. Ensuring environmental and social goals. 3.3. Ensuring innovative growth. 3.4. Technological solutions for sustainable development. 3.5. Green technologies.	LC, S

Course module title	Course module contents (topics)	Academic activities types
Module 4. ESG rating and evaluation criteria.	4.1. Social Criteria 4.2. Corporate Criteria 4.3. Environmental Criteria	LC, S

* LC - lectures; LW - lab work; S - seminars.

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialised furniture; board (screen) and technical means of multimedia presentations.	
Computer Lab	A classroom for conducting classes, group and individual consultations, current and mid-term assessment, equipped with personal computers (24 pcs.), a board (screen) and technical means of multimedia presentations.	
Seminar	A classroom for conducting seminars, group and individual consultations, current and mid-term assessment; equipped with a set of specialised furniture and technical means for multimedia presentations.	
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialised furniture and computers with access to the electronic information and educational environment.	

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main reading:

1.	Sustainable management of mining operations / edited by JA Botin., Society for Mining, Metallurgy, and Exploration, Inc. (SME) ISBN-13: 978-0-87335-267-3 https://zarmesh.com/wp-content/uploads/2020/01/Botin-J.A.-Eds.-Sustainable-Management-of-Mining-Operations-Society-for-Mining-Metallurgy-and-Exploration-SME-2009.pdf)

2.	MAKING MINING SUSTAINABLE: OVERVIEW OF PRIVATE AND PUBLIC RESPONSES, PETTER HOJEM, Luleå University of Technology, 2014 (https://www.ltu.se/cms_fs/1.124549!/file/rapport%20making%20mining%20sustainable_low.pdf)

3.   UNDP and UN Environment (2018). Managing mining for sustainable development: A sourcebook. Bangkok: United Nations Development Program. ISBN: 978-974-680-421-9   (https://www.undp.org/publications/managing-mining-sustainable-development)

Additional reading:
1.   A guide to leading practice sustainable development in mining, leading practice sustainable development program for the Mining Industry, Department of Resources, Energy and Tourism Australian Governance, 2011 ISBN 978-1-921812-49-1 (online PDF)
2.   United Nations Economic Commission for Africa. (2017). Impact of illicit financial flows on domestic resource mobilization: Optimizing revenues from the mineral sector in Africa. https://repository.uneca.org/handle/10855/23862
3.   United Nations Development Program, Columbia Center on Sustainable Investment, Sustainable Development Solutions Network, & World Economic Forum. (2016). Mapping mining to the Sustainable Development Goals: An atlas. https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/mappingmining-to-the-sdgs--an-atlas.html
4.   How to Advance Sustainable Mining Suzi Malan, Ph.D. October 2021, https://www.iisd.org/articles/deep-dive/how-advance-sustainable-mining
5.   Sustainable mining, local communities and environmental regulation Kai Kokko, Arild Buanes, Timo Koivurova, Vladimir Masloboev , Maria Pettersson | Pages 50–81, BARENTS STUDIES: Peoples, Economies and Politics VOL. 2 | ISSUE 1 | 2015
6.   https://lauda.ulapland.fi/bitstream/handle/10024/62260/Kokko%26Buanes%26Koivurova%26Masloboev%26Pettersson.pdf?sequence=2
7.   Salam, A. (2020) Internet of things for sustainable mining. In Internet of Things for Sustainable Community Development (pp. 243-271). Springer, Cham. https://doi.org/10.1007/978-3-030-35291-2_8

Internet sources:
1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:
- RUDN Electronic Library System (RUDN ELS) http://lib.rudn.ru/MegaPro/Web
- EL "University Library Online" http://www.biblioclub.ru
- EL "Yurayt" http://www.biblio-online.ru
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" http://e.lanbook.com/
- EL "Trinity Bridge" http://www.trmost.ru

2. Databases and search engines:
- electronic foundation of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https:// www .yandex.ru/
- Google search engine https://www.google.ru/
- Scopus abstract database http://www.elsevierscience.ru/products/scopus/

Training toolkit for self- studies to master the course *:

1. The set of lectures on the course "Sustainable Mining".
2. Guidelines for students on the development of the course "Sustainable Mining".
* The training toolkit for self- studies to master the course is placed   on the course page in the university telecommunication training and information system under the set procedure.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

The assessment toolkit and the grading system* to evaluate the competences formation level (competences in part) upon the course study completion are specified in the Appendix to the course syllabus.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPERS:

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