

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL TECHNICAL UNIVERSITY OF UKRAINE
"Igor Sikorsky Kyiv Polytechnic Institute"

APPROVED

by Academic Council

Igor Sikorsky Kyiv Polytechnic Institute
(protocol № 6 from 07.09.2020)

Head of Academic Council

_____ Mykhailo ILCHENKO

GEOENGINEERING

EDUCATIONAL AND SCIENTIFIC PROGRAM
third (educational and scientific) level of higher education

specialty	184 Mining
field of knowledge	18 Production and technology
qualification	PhD

Put into operation by the Rector's Order
Igor Sikorsky Kyiv Polytechnic Institute
from 17.09.2020 # 1/282

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PREAMBLE

DEVELOPED by the project group:

Project team leader

Viktor KRAVETS

Doctor of Technical Sciences, Professor, Professor of the Geoengineering department

Project team members:

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Candidate of Technical Sciences, Associate Professor of the Geoengineering department

Head of the Geoengineering department

Anatolii KRUCHKOV

Candidate of Technical Sciences, Associate Professor

AGREED:

Scientific and methodical commission of Igor Sikorsky Kyiv Polytechnic Institute, majoring in 184 Mining specialty

Chairman of the SMCU 184 _____ Viktor KRAVETS

(Protocol № 2 from 31.08.2020)

Igor Sikorsky Kyiv Polytechnic Institute Methodical Council

Chairman of the Methodical Council _____ Yuriy YAKYMENKO

(Protocol № 1 from 03.09.2020)

TAKEN INTO ACCOUNT:

Proposals of the academic community, namely: Institute of Geological Sciences of the NAS of Ukraine, Institute of Hydromechanics of the NAS of Ukraine and recommendations of employers in the field of urban underground and special construction, where graduates of the Department of Geoengineering work.

Reviews are attached.

1. PROFILE OF THE EDUCATIONAL PROGRAM in the specialty 184 Mining

1 – General information	
Full name of university and Institute/ Faculty	National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Institute of Energy Saving and Energy Management
Degree of higher education and title of qualification	Degree – Doctor of Philosophy Qualification – Doctor of Philosophy of Mining
The official name of the educational program (EP)	Geoengineering
Type of diploma and scope of EP	Doctor of Philosophy, <u>Educational component</u> of 40 ECTS credits, training period – 4 years. <u>The scientific component</u> involves conducting own research and arrangement of its results in the form of a dissertation.
Availability of accreditation	The program is not accredited, will be accredited for the first time
Cycle/level of HE	NQF of Ukraine – level 8 QF-EHEA – the third cycle EQF-LLL – level 8
Prerequisites	The presence of a master's degree
Language (s) of teaching	Ukrainian
Validity of the EP	Until the next accreditation
Internet address of the permanent placement of the educational program	Posted in public access on the site: http://geobud.kpi.ua , section "General information", "Educational programs" https://osvita.kpi.ua/ section "Educational programs"
2 – The purpose of the educational program	
Training of geoengineering professionals who can carry out and ensure professional interaction of representatives of the mining community, aimed at solving complex problems in the field of professional, as well as research and innovation activities, able to successfully compete in the labor market in terms of sustainable innovative scientific and technological development of society, as well as in terms of labor market transformation through interaction with employers and other stakeholders.	
3 – Characteristics of the educational program	
Subject area	<p>Objects of study: geoengineering of underground urban planning and mineral resources, a set of techniques and methods of scientific activity in the field of mining.</p> <p>Learning objectives: acquiring the ability to solve complex problems in the field of professional, research and innovation activity in the field of geoengineering, the creation of new holistic knowledge and professional practice.</p> <p>Theoretical content of the subject area: the theoretical foundations of fundamental and applied research, analysis, design, innovative approaches to solving complex problems in the field of mining technologies and construction of underground infrastructure of megacities.</p>

	<p>Methods, techniques and technologies: methods of physical and mathematical modeling, design, geoenvironment, operation of quarries, mines, processing and general mining systems and technologies (mining surveyor, cargo transportation, ventilation, drainage).</p> <p>Tools and equipment: mining machines and complexes, mining surveying, geo-building, energy-mechanical and transport equipment, equipment for concentrating of mineral and processing of natural materials, control and measuring devices necessary for research and innovation in the field of geoenvironment.</p>
Orientation of EP	Educational-scientific
The main focus of EP	<p>The program is based on well-known scientific principles, taking into account the current state of mining development, focuses on current specializations in which further professional and scientific careers are possible: geoenvironment of megalopolis / or / geoenvironment of mineral resources (general, theoretical and applied).</p> <p>Keywords: mining, geotechnologies, geotechnical construction, megalopolis, mineral resources, minerals, underground construction</p>
Features of EP	The implementation of the program involves the involvement of professionals in the classroom – scientists, practitioners, industry experts, employer’s representatives: some courses are taught in English.
4 – Suitability of graduates for employment and further study	
Suitability for employment	Professional titles of works (according to DK 003:2015), which can be performed by a graduate: junior researcher (mining), scientific employee (mining), research consultant (mining), researcher, teacher.
Further training	Continuing education in doctoral studies and / or participation in postdoctoral programs
5 – Teaching and assessment	
Teaching and learning	<p>The general style of study is creatively-oriented, aimed at developing the skills of generating new ideas and independent acquisition of in-depth knowledge.</p> <p><i>The educational process is carried out on the basis of acmeological, axiological, systemic, competency, personality-oriented and innovation-informative approach. A creative learning style is used, which stimulates creativity in cognitive activity and initiative.</i></p> <p><i>Teaching methods:</i> problem-searching, research, explanatory-demonstrative, partially-searching, communicative method with elements of business games, method of educational projects.</p> <p><i>Teaching is carried out in the form of:</i> lectures, seminars, practical classes, laboratory classes (presentations,</p>

	<p>discussions), independent work with the possibility of consultation with the teacher, individual classes, application of information and communication technologies (e-learning, online lectures, OCW, distance learning courses) by separate educational components.</p> <p>All participants of the educational process are provided with timely and understandable information on the goals, content and program learning outcomes, the procedure and evaluation criteria within the individual educational components.</p>
Evaluation	<p>Current control in the form of presentations, reports, written works and semester control in the form of tests, written and oral examinations are evaluated in accordance with the criteria of the Rating system. Interim control is carried out in the form of semester and annual reports according to the individual plan.</p> <p>The following is also provided: approbation of research results at scientific conferences; publication of research results in professional scientific journals; public defense of scientific achievements in the form of a dissertation in a specialized scientific council in accordance with the requirements of the legislation.</p>
6 – Program competencies	
Integral competence	Ability to solve complex problems in the field of professional and/or research-innovative activities in the field of mining, which involves a deep rethinking of existing and the creation of new holistic knowledge and/or professional practice.
General competencies (GC)	<p>GC01. Ability to abstract thinking, analysis and synthesis</p> <p>GC02. Ability to search, process and analyze information from various sources</p>
Special competencies (SC)	<p>SC01. Ability to perform original research, achieve scientific results that create new knowledge in mining and related interdisciplinary areas and can be published in leading scientific journals on production and technology and related fields.</p> <p>SC02. Ability to orally and in written form present and discuss the results of research and/or innovative developments in Ukrainian and English, a deep understanding of English scientific texts in the field of research.</p> <p>SC03. Ability to identify, pose and decide research problems in the field of mining, evaluate and assure the quality of research.</p> <p>SC04. Ability to adhere to the ethics of scientific research and the rules of academic integrity in scientific research and scientific and pedagogical activities.</p> <p>SC05. Ability to apply modern information technologies for geomonitoring and research of array properties.</p>

7 – Program learning outcomes

LO01. Have advanced conceptual and methodological knowledge in mining and at the boundaries of subject areas; research skills sufficient to conduct scientific and applied research at the level of the latest world achievements in the relevant field; gain new knowledge and/or create innovations.

LO02. Freely present and discuss with specialists and non-specialists the results of research, scientific and applied problems of mining in state and foreign languages, be qualified to reflect the results of research in scientific publications in leading international scientific journals.

LO03. Plan and perform experimental and/or theoretical research in mining and related interdisciplinary areas using modern tools, critically analyze the results of own research and the results of other researchers in the context of the whole set of modern knowledge on the research problem.

LO04. Develop and implement scientific and/or innovative engineering projects that provide an opportunity to rethink existing and create new holistic knowledge and/or professional practice and solve significant scientific and technological problems of mining in compliance with the norms of academic ethics and taking into account social, economic, environmental and legal aspects.

LO05. Develop and research conceptual, mathematical and computer models of processes and systems, effectively use them to gain new knowledge and/or create innovative products in geoengineering.

LO06. Apply modern tools and technologies for searching, processing and analyzing information, information systems for geomonitoring and research of array properties.

8 – Resource support for program implementation

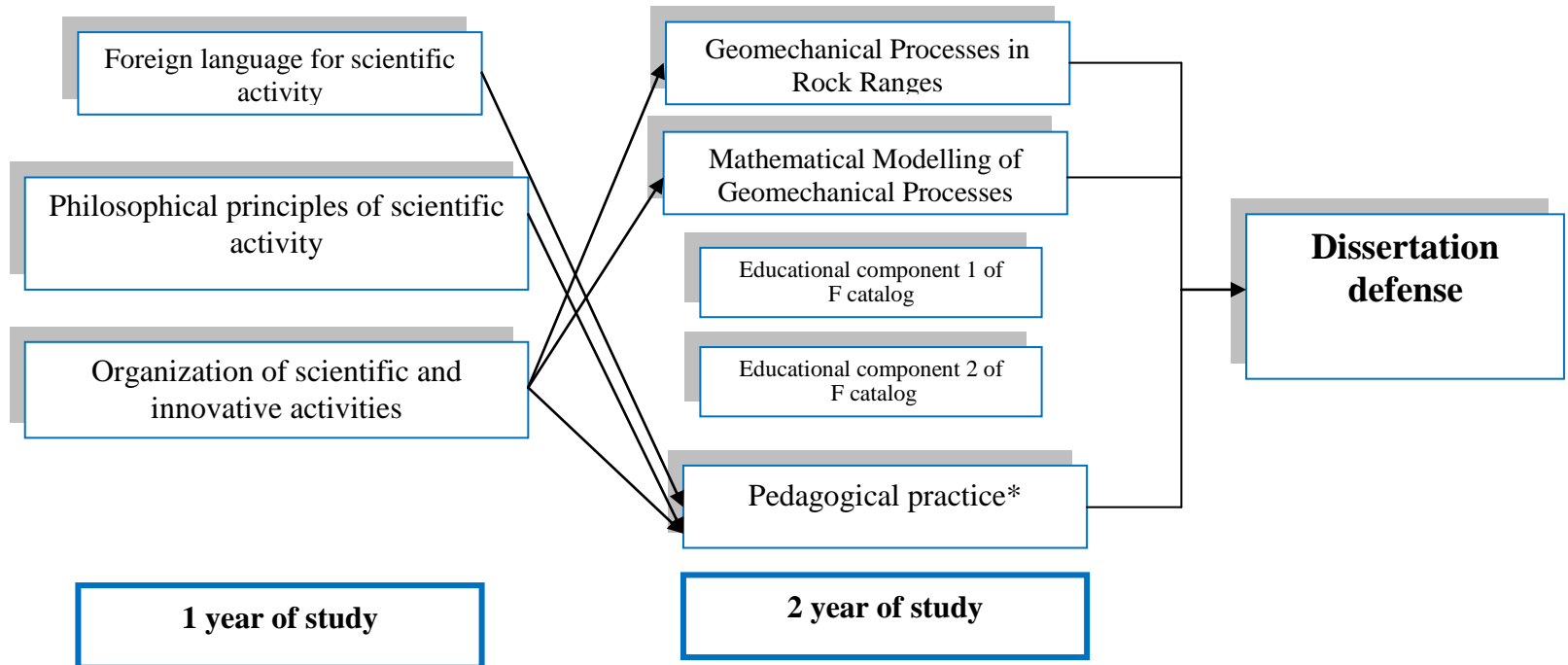
Staffing	In accordance with the staffing requirements to ensure the implementation of educational activities for the relevant level of HE (Annex 2 to the License Conditions), approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 with changes made in accordance with the Resolution of the Cabinet of Ministers of Ukraine № 347 dated 10.05.2018.
Logistics	In accordance with the technological requirements for material and technical support of educational activities of the appropriate level of HE (Annex 4 to the License Terms), approved by the Resolution of the Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 with changes made in accordance with the Resolution of the Cabinet of Ministers of Ukraine № 347 dated 10.05.2018. Use of equipment: training rooms with multimedia projectors, computer equipment with appropriate software, laboratory equipment for educational (teaching, research, scientific) activities.
Information and educational and methodical support	In accordance with the technological requirements for educational, methodological and informational support of educational activities of the relevant level of HE (Annex 5 to the License Conditions), approved by the Resolution of the

	Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 with changes made in accordance with the Resolution of the Cabinet of Ministers of Ukraine № 347 dated 10.05.2018. Use of the Scientific and Technical Library of Igor Sikorsky Kyiv Polytechnic Institute.
9 – Academic mobility	
National credit mobility	Possibility of academic mobility, etc.
International credit mobility	Possibility of international academic mobility (Erasmus + K1), long-term international projects that involve the inclusion of students, etc.
Training of foreign applicants	Education is conducted in English; Ukrainian is studied as a foreign language

2. LIST OF EDUCATIONAL COMPONENTS FOR EDUCATIONAL AND SCIENTIFIC PROGRAM

Code	Educational components (academic disciplines, course projects/works, practices)	ECTS Credits	Form of final control
Obligatory (normative) components of EP			
	General training cycle		
GO1	Philosophical principles of scientific activity	6	Exam
GO2	Foreign language for scientific activity	6	Exam
GO3	Geomechanical Processes in Rock Ranges	6	Exam
GO4	Mathematical Modeling of Geomechanical Processes	6	Exam
	Professional training cycle		
PO1	Organization of scientific and innovative activities	4	Exam
PO2	Pedagogical practice*	2	Credit
Elective components of EP			
E1	Educational component 1 of F catalog	5	Credit
E2	Educational component 2 of F catalog	5	Credit
Total volume of normative components :		30	
Total volume of elective components :		10	
TOTAL VOLUME OF THE EDUCATIONAL COMPONENTS OF THE PROGRAM		40	

3. STRUCTURAL AND LOGICAL SCHEME OF THE EDUCATIONAL PROGRAM



4. SCIENTIFIC COMPONENT

Year	The content of the student's scientific work	Forms of control
1st year	Choosing and justification of the topic of the scientific research, defining the content, deadlines and scope of the scientific work; selection and substantiation of the methodology for conducting the scientific research, observation and analysis of existing views and approaches that have developed in modern science in the chosen direction. Training and publication of at least 1 article (usually a review article) in scientific journals (national or foreign) on the research topic; participation in scientific and practical conferences (seminars) with the publication of abstracts.	Approval of the individual work plan of the graduate student at the academic council of the institute, reporting on the progress of the individual plan of the graduate student twice a year.
2nd year	Conducting the scientific research under the guidance of the supervisor that involves solving research problems through the use of a set of theoretical and empirical methods. Preparation and publication of at least 1 article in scientific professional journals (national or foreign) on the research topic; participation in scientific and practical conferences (seminars) with the publication of abstracts.	Report on the progress of the individual plan of the graduate student twice a year.
3rd year	Analysis and generalization of the obtained results of the scientific research; substantiation of scientific novelty of the obtained results, their theoretical and/or practical significance. Preparation and publication of at least 1 article in scientific professional journals on the research topic; participation in scientific and practical conferences (seminars) with the publication of abstracts.	Report on the progress of the individual plan of the graduate student twice a year.
4th year	Arrangement of scientific achievements in the form of the dissertation, summing up concerning completeness of coverage of results of dissertation in scientific articles according to the current requirements. Implementation of the obtained results and receiving approving documents. Submission of documents for preliminary examination of the dissertation. Preparation of a scientific report for final certification (dissertation defense).	Report on the progress of the individual plan of the graduate student twice a year. Providing a conclusion on the scientific novelty, theoretical and practical significance of the results of dissertation.

5. FORM OF GRADUATE CERTIFICATION OF HIGHER EDUCATION APPLICANTS

Graduate certification of applicants for higher education in the educational program Geoengineering specialty 184 Mining is carried out in the form of the public defense of the dissertation and ends with the issuance of a document of established sample of the degree of Doctor of Philosophy with the qualification: Doctor of Philosophy of Mining.

The dissertation is checked for plagiarism and after defense is placed in the depository of the university library for free access.

Graduate certification is carried out openly and publicly.

The dissertation must meet other requirements established by law.

6. MATRIX OF CONFORMITY OF PROGRAM COMPETENCES TO THE COMPONENTS OF THE EDUCATIONAL PROGRAM

	GO1	GO2	GO3	GO4	PO1	PO2	Scientific component
GC 1	+					+	+
GC 2				+			+
SC 1			+				+
SC 2		+			+		+
SC 3			+	+	+		+
SC 4						+	+
SC 5				+			+

7. MATRIX OF PROVIDING PROGRAM LEARNING OUTCOMES BY RELEVANT EDUCATIONAL COMPONENTS OF THE EDUCATIONAL PROGRAM

	GO1	GO2	GO3	GO4	PO1	PO2	Scientific component
LO 1	+					+	+
LO 2				+			+
LO 3			+				+
LO 4		+			+		+
LO 5			+	+	+		+
LO 6						+	+