

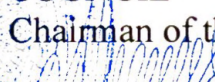
**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL UNIVERSITY
«YURI KONDRATYUK POLTAVA POLYTECHNIC»**

**EDUCATIONAL AND SCIENTIFIC PROGRAM
Oil and Gas Engineering and Technology**

**of the third (educational and scientific) level of higher education
in the specialty 185 «Oil and Gas Engineering and Technology»
of the field of knowledge 18 «Production and Technology»
Qualification: Doctor of Philosophy in Oil and Gas Engineering and
Technology**

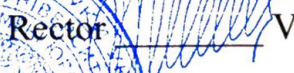


**CONFIRMED BY THE ACADEMIC
COUNCIL**

Chairman of the Academic Council
 Volodymyr ONYSHCHENKO
(Protocol № 13 dated June 7, 2022)

The educational and scientific program is
implemented from September 1, 2022

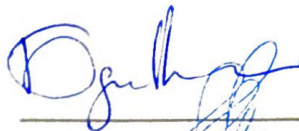


Rector  Volodymyr ONYSHCHENKO
(Order № 98a from 08.06.2022)

Poltava – 2022

**LETTER OF AGREEMENT
OF THE EDUCATIONAL AND SCIENTIFIC PROGRAM**

Vice-Rector for Scientific-
Pedagogical and Educational
Work



Bogdan KOROBKO

Vice-Rector for Scientific and
International Work



Svitlana SIVITSKA

Director of the Department of
Educational Process
Organization, Accreditation
and Licensing



Oleh MAKSYMENKO

Head of the Department of
Postgraduate Studies



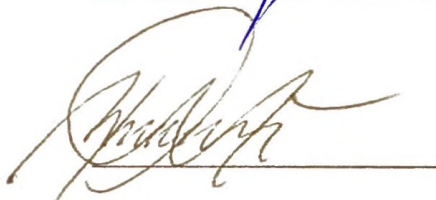
Nina HAKH

Acting Director of the
Educational and Research
Institute of Oil and Gas



Anatoliy KALIUZHNYI

Acting Director of the
Educational and Research
Institute of Oil and Gas



Branimir CVETKOVIC

PREFACE

Developed by the project team including:

Viktoriia Dmytrenko – head of the project group, Candidate of Technical Sciences (05.15.06 – Development of Oil and Gas Fields), Associate Professor, Associate Professor of the Department of Oil and Gas Engineering and Technology;

Branimir Cvetkovic – Doctor of Philosophy, majoring in Oil and Gas Simulation and Engineering (Norwegian University of Natural Sciences and Technology, Faculty of Oil and Gas, Institute of Oil and Gas Engineering and Geophysics, Trondheim), Professor of the Department of Oil and Gas Engineering and Technology;

Ivan Zezekalo – Doctor of Technical Sciences (05.15.06 – Development of Oil and Gas Fields), Professor, Professor of the Department of Oil and Gas Engineering and Technology;

Roman Yaremiichuk – Doctor of Technical Sciences (25.00.15 – Technology of Drilling and Development of Wells), Professor, Professor of the Department of Oil and Gas Engineering and Technology.

Martus Olena, a student of higher education of the third (educational and scientific) level in specialty 185 «Oil and gas engineering and technologies» participated in the development of the educational and scientific program.

Reviews of external stakeholders:

Ilia Fyk – Doctor of Technical Sciences, Professor, Head of the Department of Oil, Gas and Condensate Extraction of the National Technical University «Kharkiv Polytechnic Institute»;

Oleksandr Zolotous – chief engineer of PoltavaGasVydobuvannya Gas Production Division;

Oleh Holub – chief engineer of the State Enterprise «Ukrnaukageocenter» of the Nadra of Ukraine.

1. Profile of the educational and scientific program in the specialty № 185 «Oil and Gas Engineering and Technology»

1.1. General information	
Full name of the higher education institution and structural subdivision	National University «Yuri Kondratyuk Poltava Polytechnic», Department of Oil and Gas Engineering and Technology
Degree of higher education and the title of the qualification in the original language	The third (educational and scientific) Qualification: Doctor of Philosophy in Oil and Gas Engineering and Technology
Official name of the educational and scientific program	Oil and Gas Engineering and Technology
Type of diploma and scope of educational and scientific program	Diploma of Doctor of Philosophy, single, 45 ECTS credits, study period 4 years
Availability of accreditation	Accredited by NATIONAL AGENCY for HIGHER EDUCATION QUALITY ASSURANCE until September 30, 2022
Cycle/level	FQ-EHEA – third cycle EQF-LLL – level 8 The national qualification framework – level 8
Prerequisites	Having master's, specialist's degree
Language(s) of education	Ukrainian
The term of validity of the educational program	4 years
The Internet address of the permanent posting of the description of the educational and scientific program	https://nupp.edu.ua/uploads/files/0/main/page/asp-doc/specialities/aspirantura/185-ngit/onp.pdf

1.2. The purpose of the educational and scientific program
Training of specialists for the oil and gas industry, scientific and scientific-pedagogical workers capable of solving complex scientific and applied tasks and/or problems in the field of professional or research-innovative activities in the oil and gas field, which involves a deep rethinking of existing and creating of new integral knowledge and/ or professional practice.

1.3. Characteristics of the educational and scientific program	
Subject area (field of knowledge, specialty, specialization (if available))	Field of knowledge – 18 «Production and Technology», specialty – 185 «Oil and Gas Engineering and Technology»
Orientation of the educational and scientific program	<p>The program is focused on the acquisition of scientific competencies and skills with the goal of ultimately preparing and defending a dissertation on the priority directions of the development of science and technology in Ukraine. In this specialty, the program is focused on:</p> <ul style="list-style-type: none"> - acquiring the necessary research skills for a scientific career; - teaching special disciplines that cover modern problems of oil and gas science, engineering and technology; - commercialization of research results and technology transfer. <p>The implementation of this program for the training of doctors of philosophy in the specialty 185 «Oil and Gas Engineering and Technology» allows not only to acquire a range of educational and scientific competencies for the third (educational and scientific) level, but also to acquire an understanding of their pragmatism with a sufficient level of skills in their practical application.</p> <p>The content of the scientific component of the ESP is determined by the individual study plan of a graduate student.</p>
The main focus of the educational and scientific program and specialization	<p>Scientific research and scientific and technical (experimental) developments carried out with the aim of obtaining a scientific, scientific and technical (applied) result in the field of oil and gas engineering and technology.</p> <p><i>Key words:</i> field, oil, gas, development, research, arrangement, operation, equipment, oil and gas engineering, simulation, methods of oil recovery, intensification.</p>
Features of the educational and scientific program	<p>The program provides for the training of highly qualified and competitive on the national and international labor markets PhDs in the oil and gas industry, capable of independent scientific research, solving complex problems in the field of professional and/or research and innovation activities, integration of education, innovation and professional activities.</p> <p>Feature of the program:</p> <ul style="list-style-type: none"> - priority of theoretical and applied research (methods of increasing oil and gas extraction, development of hard-to-extract reserves and unconventional hydrocarbon deposits and simulation of development processes); - involvement of leading foreign and domestic experts in the field in the educational process, the opportunity to conduct research at the laboratory base of partner companies. <p>The program is unique, synthesizing the interdisciplinary aspects of similar domestic and foreign programs in the educational component.</p>

1.4. Graduates' suitability for employment and further education

Employability	Postdoctoral positions in research groups in universities and scientific laboratories, teaching positions in universities, relevant jobs in public and private oil production and service organizations, industrial and prospecting enterprises. (Positions according to the SC 003:2010 classification of professions: 2310.1 – associate professor; 2310.2 – teacher of HEI; 2147.2 (22257) – oil and gas production engineer; 2145.2 (22211) – design engineer; 2147.1 – junior researcher, researcher; 1229.4 – head of graduate school and others)
Further education	Further lifelong studying is possible for the purpose of improvement in other scientific fields and specialties. Further training at the doctoral level is possible. The program is also aimed at continuing education and obtaining a higher scientific level of higher education, which corresponds to the eighth qualification level of the National Qualifications Framework, with the award of a higher education degree – Doctor of Science.

1.5. Teaching and assessment

Teaching and studying	Scientific guidance, support by a scientific supervisor, support and consulting from other colleagues from the scientific group, including PhDs, more experienced graduate students and scientific and technical workers, Lifelong Learning, student-centered, acquisition of "Soft Skills" during studies at EP, problem-oriented and subject-subject learning, self-learning, research-based learning, pedagogical (research) practice, consultations, learning using modern information technology systems, experimental research work, publication of articles in the direction of the dissertation research, approval of the results of the dissertation research. Study of scientific methodology. Lecture courses, practical classes, seminars, consultations, independent training in the library and on the basis of Internet resources, project work and individual consultations. Conducting scientific research in specialized laboratories and at production facilities. Modeling of the processes of development and operation of hydrocarbon deposits.
Assessment	Written and combined (oral-written) exams, differentiated assessments, seminars and scientific reports with assessment of achievements, dissertation defense with the participation of scientists from other universities. A 100-point ECTS scale and a 4-point national scale are used.

1.6. Program competencies		
Integral competence	The ability to produce new ideas, solve complex problems in a certain field of professional and/or research and innovation activity in the field of oil and gas engineering and technology, apply the methodology of scientific and pedagogical activity, as well as conduct own scientific research, the results of which have scientific novelty, theoretical and practical meaning.	
General competences (GC)	GC 1	Ability to improve and develop one's own intellectual level
	GC 2	Ability to generate new ideas and make informed decisions to achieve goals
	GC 3	Ability to abstract thinking, analysis and synthesis
	GC 4	Ability to work autonomously while adhering to research ethics, academic integrity, and copyright
	GC 5	Ability to conduct theoretical and experimental research at the appropriate level
	GC 6	Ability to search, process and analyze information from various sources
	GC 7	Ability to work in an international context
	GC 8	Ability to communicate in the foreign language
	GC 9	Ability to develop and manage projects. Ability to lead
	GC 10	Desire to preserve the environment
Special competences of the specialty (SC)	SC 1	Ability to perform original research, achieve scientific results that create new knowledge and technologies in the oil and gas field and related interdisciplinary areas and can be published in leading scientific publications in oil and gas engineering and related fields
	SC 2	Ability to orally and in writing present and discuss the results of scientific research and/or innovative developments in Ukrainian and English, a deep understanding of scientific texts in the field of research
	SC 3	Ability to identify, pose and solve problems of a research nature in the oil and gas field, to evaluate and ensure the quality of performed research
	SC 4	Ability to improve known methods and implement new technological processes for extraction, preparation and transportation of oil, gas and condensate based on modern achievements of the oil and gas industry
	SC 5	Ability to choose effective methods of development and technologies for the exploitation of oil and gas fields, processing, transportation and storage of raw hydrocarbons
	SC 6	Ability to use modern information technologies, databases and other electronic resources, specialized software in scientific and educational activities
	SC 7	Ability to assess the environmental consequences of the operation of oil and gas drilling, extraction, transportation and storage facilities and to implement innovative technologies in order to reduce the negative impact on the environment
	SC 8	Ability to carry out scientific and pedagogical activities in higher education

1.7. Program learning outcomes (PLO)	
PLO 1	Have advanced conceptual and methodological knowledge in Oil and Gas Engineering and Technology and at the boundaries of subject areas, as well as research skills sufficient to conduct research at the level of the latest world achievements in the relevant field, obtain new knowledge and/or implement innovations
PLO 2	Freely present and discuss with specialists and non-specialists the results of research, scientific and applied problems of the oil and gas industry in Ukrainian and English, competently reflect the results of research in scientific publications in leading international scientific publications
PLO 3	Formulate and test hypotheses; use appropriate evidence to substantiate conclusions, in particular, the results of theoretical analysis, experimental studies and mathematical and/or computer modeling, available literature data
PLO 4	Develop and research conceptual, mathematical and computer models of oil and gas processes and systems, effectively use them to obtain new knowledge and/or create innovative products in the oil and gas industry and related interdisciplinary areas
PLO 5	Plan and carry out experimental and/or theoretical research using modern tools, critically analyze the results of own research and the results of other researchers in the context of the entire complex of modern knowledge regarding the problem under study
PLO 6	Develop and implement scientific projects that provide an opportunity to rethink the existing and create new integral knowledge and to solve actual scientific problems of the oil and gas industry in compliance with the norms of academic ethics and taking into account social, economic, environmental and legal aspects
PLO 7	Deeply understand the general principles and methods of oil and gas engineering, as well as the methodology of scientific research, apply them in own research in the oil and gas field and in teaching practice
PLO 8	Analyze, select and be fluent in system and application computer software
PLO 9	Demonstrate skills in evaluating the effectiveness of using innovative oil and gas technologies in the specific conditions of designing and operating an oil and gas facility
PLO 10	Demonstrate the skills of assessing the environmental consequences of the operation of well drilling facilities, extraction, transportation and storage of oil and gas and the development of innovative technologies that minimize the negative impact on the environment
PLO 11	Adhere to ethical norms, taking into account copyright and norms of academic integrity when carrying out scientific activities
PLO 12	Apply theoretical knowledge for the practical organization of the educational process of educational disciplines in higher education
PLO 13	Be able to work in a team, including an interdisciplinary one
PLO 14	Adhere to the norms of interpersonal communication in professional interaction

1.8. Resource support for program implementation	
Staff support	All scientific and pedagogical workers providing the educational and professional program by qualification correspond to the profile and direction of the taught disciplines, have the necessary teaching experience and experience in scientific and pedagogical activities. In the process of organizing the educational process, professionals with experience in research/management/innovation work and/or work in the specialty are involved.
Material and technical support	<p>Material and technical support allows to fully ensure the educational process throughout the entire cycle of training according to the educational program. The condition of the premises is certified by sanitary and technical passports that comply with existing regulations. The material and technical base for carrying out the educational and scientific process consists of the following laboratories and offices: Laboratory of Washing Fluids (110-L); Reservoir Physics Laboratories and the Oil and Gas Equipment Laboratory, which consist of several classrooms and contain appropriate equipment (405-F, 406-F); Laboratory Range; the Laboratory of 3D Modeling and Design in the Oil and Gas Industry and the Laboratory of 3D Visualization and Oil and Gas Engineering, which are equipped with computers equipped with licensed packages of Schlumberger programs: Petrel Geology & Modeling, Eclipse, Techlog and Pipesim (404-F); Petrex Integrated Modeling Laboratory: Petroleum Experts Software Package: Prosper, Resolve, Reveal, Gap, PVTp, MBAL (10, 2019) (404/1-F); Educational and Scientific Center of the Oil and Gas Industries of the Siemens company, which is equipped with modern equipment that allows to simulate the processes of automation of the development and operation of hydrocarbon deposits.</p> <p>In addition, the University operates a modern training center according to IWCF standards for training and certification of oil and gas specialists.</p> <p>A high level of practical training of specialists is ensured by developed international cooperation with the world's leading companies (Weatherford, Schlumberger, Symoil) and powerful domestic companies (UkrGasvydobuvannya, Ukrnafta, PrJSC Naftogasvydobuvannya, Ukrnaukageocentr, Naukanaftogas, etc.) in the scientific and educational spheres.</p>
Informational and educational and methodological support	<p>The volume, composition and quality of informational and educational and methodological support fully correspond to the Licensing conditions for conducting educational activities of educational institutions.</p> <p>Educational, teaching-methodical and library-informational resources of the university provide the educational process and guarantee the possibility of high-quality mastering of the educational program by the graduate student.</p>

1.9. Academic mobility

National credit mobility	National credit mobility for higher education institutions is ensured by cooperation with leading higher education institutions of Ukraine for the organization of mutual exchange of applicants, teachers and administrative staff in accordance with the cooperation agreement.
International credit mobility	International credit mobility for higher education institutions is provided by cooperation with European universities on international credit mobility projects.
Education of foreign students of higher education	Education of foreign students of higher education is expected to be conducted on general terms.

2. LIST OF EDUCATIONAL AND SCIENTIFIC PROGRAM COMPONENTS AND THEIR SEQUENCE

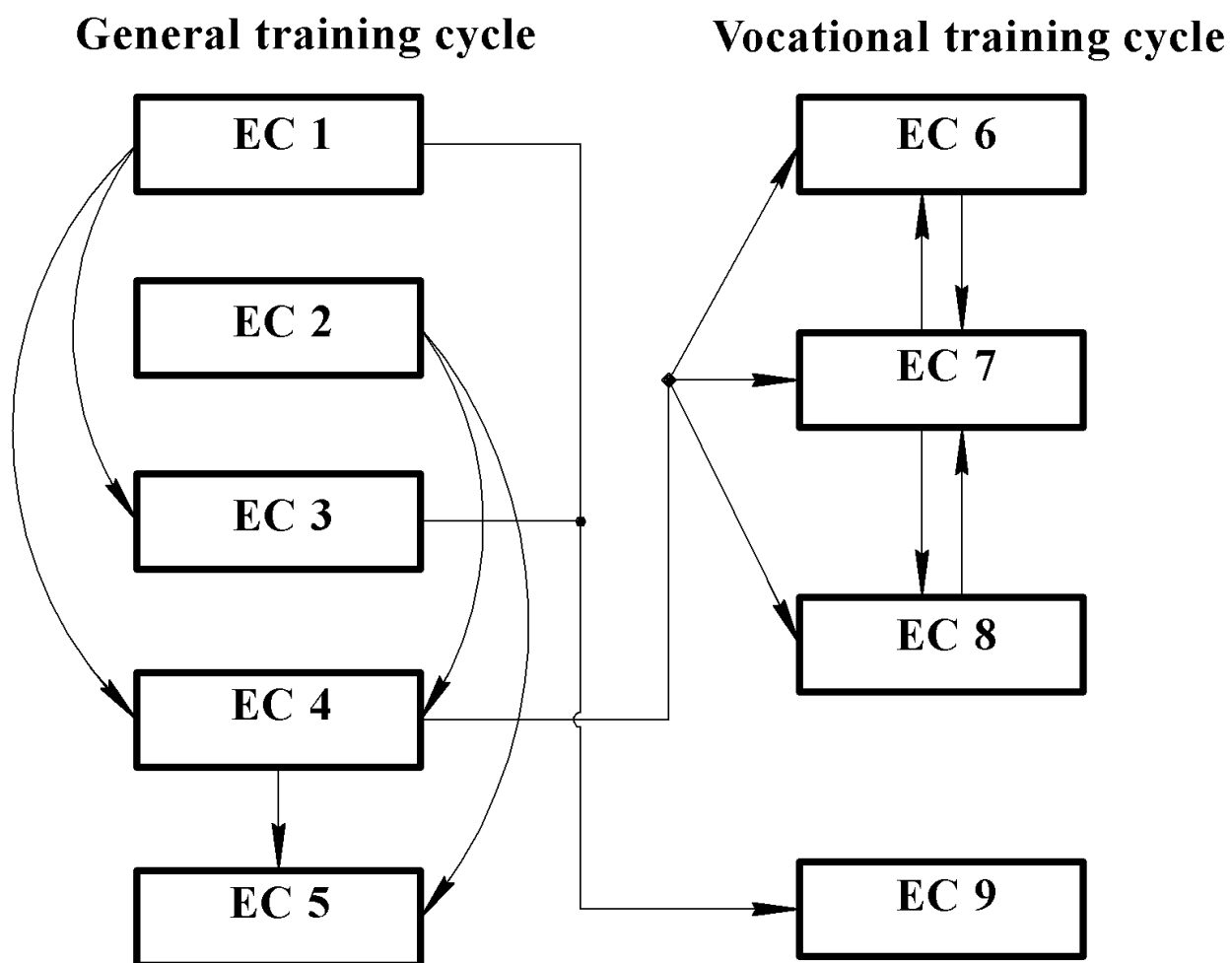
2.1. List of ESP components

E/d code	Components of the educational and scientific program (educational subjects, course projects/papers, practical trainings, qualification work)	Number of credits	Final control form
1	2	3	4
Mandatory components of ESP			
<i>General training cycle</i>			
EC 1	Foreign Language for Academic Purposes	6,0	exam
EC 2	Philosophy and Scientific Thinking	4,0	exam
EC 3	Modern Educational Technologies in Higher Education	3,0	exam
EC 4	Modern Information Technologies in Scientific Activity	3,0	exam
EC 5	Management of Scientific and Innovative Projects	3,0	exam
<i>Vocational training cycle</i>			
EC 6	Reservoir Engineering and Characterization Practice Methods	4,0	exam
EC 7	Reservoir Characterization and Volumetric with Pressure-Rate-Time Data Course Description	3,0	exam
EC 8	Reservoir Flow Modelling and Simulation in Porous Media	4,0	exam
EC 9	Pedagogical Practical Training	3,0	credit test
	Total scope of mandatory components:	33,0	
Selective ESP components*			
<i>General training cycle</i>			
UFM 1	Advanced Mathematics for Oil and Gas Engineering	3,0	credit test
UFM 2	Data and Information Analysis	3,0	credit test
UFM 3	Risk and Uncertainty Assessments in Petroleum Exploration and Production	3,0	credit test
<i>Vocational training cycle</i>			
IFM 1	Rock Mechanics for Drilling	3,0	credit test
IFM 2	Advanced Enhanced and Improved Oil Recovery (EOR&IOR) Methods	3,0	credit test
IFM 3	A Multifractured Horizontal Well Analytical and Numerical Modeling and Simulations	3,0	credit test
IFM 4	Advanced Well Testing Methods with Mathematical Modelling Techniques	3,0	credit test
IFM 5	Fluid Filtration Simulation by Using Computational Methods	3,0	credit test
IFM 6	Physical Chemistry of Hydrocarbon Production	3,0	credit test
IFM 7	Methods of In-Depth Core Research	3,0	credit test
IFM 8	Naturally Fractured Reservoirs Modelling and Simulations – Unconventional Reservoirs Practices	3,0	credit test
IFM 9	Modern Well Testing Methods and Interpretation	3,0	credit test
IFM 10	Advanced Methods of Enhanced Oil Recovery and	3,0	credit test

	Intensification		
IFM 11	Innovative Methods of Operating Wells in Difficult Conditions During Hydrocarbon Extraction	3,0	credit test
IFM 12	Processes and Apparatus of Hydrocarbon Collection and Preparation Systems	3,0	credit test
IFM 13	Offshore Field Developments and Production Techniques	3,0	credit test
IFM 14	Well Decommissioning, Carbon Capture and Storage Technologies, Geothermal Energy	3,0	credit test
IFM 15	New Technical Solutions and Calculation Methods for Oil and Gas Equipment	3,0	credit test
IFM 16	Innovative Methods of Unconventional Reservoirs Exploration and Development	3,0	credit test
	Total scope of selective components:	12,0	
	GENERAL SCOPE OF THE EDUCATIONAL PROGRAM	45,0	

Taking into account the topic of the dissertation, an applicant chooses from the given list the selective disciplines with a total volume of 12 ECTS credits (3 credits of selective components from the cycle of general training (UFM 1-3) and 9 credits of selective components from the cycle of vocational training (IFM 1-15)).

2.2. Structural and logical scheme of the ESP for training Doctors of Philosophy in the specialty 185 «Oil and Gas Engineering and Technology»



3. FORM OF ATTESTATION OF PhD STUDENTS

The final attestation of persons who obtain the degree of Doctor of Philosophy is carried out by a one-time specialized Academic Council of the higher education institution or scientific institution, accredited by the National Agency for Quality Assurance of Higher Education, on the basis of a public and open defense of scientific achievements in the form of a dissertation. The recipient of the Doctor of Philosophy degree has the right to choose a specialized Academic Council. After the defense of the dissertation, the recipient of the degree of Doctor of Philosophy is issued a document of the established model on awarding the degree of Doctor of Philosophy with the qualification: Doctor of Philosophy in specialty 185 «Oil and Gas Engineering and Technology».

The dissertation for obtaining the degree of Doctor of Philosophy is an independent study that offers a comprehensive solution to a scientific problem in the oil and gas field or on its border with other specialties, which involves a deep rethinking of the existing and the creation of new holistic knowledge and/or professional practice. The dissertation should be placed on 100-155 pages, which is from 4.5 to 7 author's sheets.

The dissertation should not contain academic plagiarism, falsification, or fabrication.

The dissertation must be published on the official website of the higher education institution or its subdivision, or in the repository of the higher education institution.

The dissertation must meet other requirements established by law.

The final attestation is preceded by an annual (interim) attestation of the graduate students based on the results of the implementation of the individual plan in the form of his reporting at the meetings of the Department or the Academic Council of the Educational and Research Institute of Oil and Gas. Documents confirming the intermediate attestation of a graduate student are an annual report, a printed version of the dissertation sections, copies of the publication and security documents, a certificate of taking exams and differentiated credits, an extract from the minutes of the meeting of the department or the Academic Council of the Educational and Research Institute of Oil and Gas, etc.

4. MATRIX OF CORRESPONDENCE OF PROGRAM COMPETENCES (GC AND SC) TO THE COMPONENTS OF THE EDUCATIONAL AND SCIENTIFIC PROGRAM

	EC 1	EC 2	EC 3	EC 4	EC 5	EC 6	EC 7	EC 8	EC 9
GC01	+	+		+	+				
GC02		+			+				
GC03		+	+						
GC04		+	+		+				
GC05					+	+	+	+	
GC06				+					
GC07	+								
GC08	+								
GC09					+				
GC10						+			
SC01	+				+	+	+	+	
SC02						+	+	+	
SC03						+	+	+	
SC04						+	+	+	
SC05						+		+	
SC06				+		+	+	+	
SC07						+			
SC08			+						+

**5. MATRIX OF PROVIDING PROGRAM LEARNING OUTCOMES (PLO) BY
RELEVANT COMPONENTS OF THE EDUCATIONAL AND SCIENTIFIC
PROGRAM**

	EC 1	EC 2	EC 3	EC 4	EC 5	EC 6	EC 7	EC 8	EC 9
PLO 01						+	+	+	
PLO 02	+			+	+				
PLO 03		+	+	+		+	+	+	
PLO 04		+		+		+			
PLO 05				+	+	+	+	+	
PLO 06					+				
PLO 07						+	+	+	
PLO 08				+					
PLO 09				+		+	+	+	
PLO 10						+			
PLO 11		+	+						
PLO 12			+						+
PLO 13			+		+				
PLO 14		+	+						

Head of the project group, guarantor of the program

Candidate of A Technical Sciences,

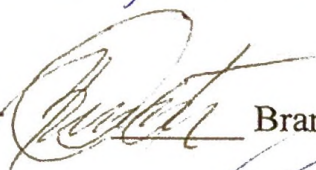
Associate Professor



Viktoriia DMYTRENKO

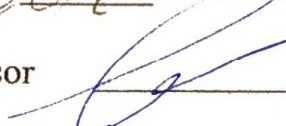
Members of the project team:

Doctor of Philosophy, Professor



Branimir CVETKOVIC

Doctor of Technical Sciences, Professor



Ivan ZEZEKALO

Doctor of Technical Sciences, Professor



Roman YAREMIICHUK