MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
NATIONAL TECHNICAL UNIVERSITY
«KHARKIV POLYTECHNIC INSTITUTE»

APPROVED
Rector of NTU "KhPI"
_____ Yevgen SOKOL
«_23_» _____June_____ 2021

EDUCATIONAL PROFESSIONAL PROGRAM
OIL AND GAS PRODUCTION

The first (bachelor's) level

by specialty	**185 Oil and gas engineering and technology**
field of knowledge	**18 Production and technology**
qualification	**Bachelor of Petroleum Engineering and Technology**

APPROVED
ACADEMIC COUNCIL OF NTU "KhPI"
Chairman of the Academic Council
_____ Leonid TOVAZHNIANSKYI
Protocol № _5_ from
«_28__» _May__2021

Kharkiv 2021

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LETTER OF APPROVAL
of educational and professional program

Level of higher education	First (bachelor's)
Field of knowledge	18 Production and technology
Specialty	185 Oil and gas engineering and technology
Qualification	Bachelor of Petroleum Engineering and Technology

DEVELOPED

Guarantor of the educational program "Oil and Gas Production"

_____ Illia FYK

« 14 » May 2021

RECOMMENDED

Methodical council of NTU "KhPI"
Chairman of the methodical council

_____ Yevgen SOKOL

« 26 » May 2021

AGREED

Head of the Department of Oil, gas and condensate Production

_____ Illia FYK

« 14 » May 2021

AGREED

Director of the Educational and Scientific Institute of Chemical technology and engineering

_____ Ihor RYSHCHENKO

« 24 » May 2021

AGREED

Ukrainian scientific-research institute of natural gases

Director

_____ Serhii Kryvulia

« 25 » May 2021

Chairman of the student government
student of group I-319 s

_____ Diana BIRIUKOVA

« 24 » May 2021

AGREED

PJSC "Ukrgazvydobutok"

Director

_____ Volodymyr MAKHNOVETS

« 25 » May 2021

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PREFACE

The educational and professional program "Oil and Gas Production" for bachelors in the specialty 185 Oil and Gas Engineering and Technology is a temporary normative document drawn up taking into account the requirements of the National Qualifications Framework of Ukraine.

Head of the quality assurance and support group of the educational program (guarantor of the educational program) - Fyk Illia Mykhailovych, Doctor of Technical Sciences, Professor, Head of the Department of Oil, Gas and Condensate Production

1. Biletsky Volodymyr Stefanovych, Doctor of Technical Sciences, Professor, Professor of the Department of Oil, Gas and Condensate Production.
2. Rymchuk Danylo Vasyliovych, PhD (Technical Sciences), Associate Professor of the Department of Oil, Gas and Condensate Production.

Reviews from external stakeholders:

From the academic community:

1. Karpenko Oleksiy Mykolayovych, Doctor of Geological Sciences, Professor, Head of the Department of Oil and Gas Geology, Taras Shevchenko Kyiv National University.

2. Chudyk Ihor Ivanovych, Doctor of Engineering Science, Professor, Pro-rector for Research of Ivano-Frankivsk National Technical University of Oil and Gas.

From employers:

1. Kryvulia Serhii Viktorovych, PhD (Geological Sciences), Director of Ukrainian Scientific-Research Institute of Natural Gases;
2. Vakhriv Andrii Petrovych, Chief Engineer of Shebelinkagazvydobuvannia;
3. Makhnovets Volodymyr Petrovych, Director of PJSC Ukrgazvydobutok.

From graduates of the program:

1. Skrylnyk Karyna Yuriyivna, Head of the Sector of Author's Supervision of Field Development of the Department of Gas and Gas Condensate Field Development of UkrNDIgaz
2. Khimchenko Serhii Andriyovych, Senior engineer at LLC “NTP Drilling Equipment”

C O N T E N T

1. PROFILE OF THE EDUCATIONAL PROFESSIONAL PROGRAM
Oil and gas production
majoring in 185 Oil and Gas Engineering and Technology

1 – General information	
Full name of the institution of higher education (IHE) and institute / faculty / department	National Technical University "Kharkiv Polytechnic Institute", Educational and Scientific Institute of Chemical Technologies and Engineering, Department of Oil, Gas and Condensate Production
Degree of higher education and title of qualification in the original language	Degree of higher education - bachelor Qualification - Bachelor of Petroleum Engineering and Technology
Official name of the educational program	Oil and gas production
Type of diploma and scope of educational program	Single, 240 ECTS credits, term of study 3 years 10 months
Availability of accre-?itation	repeated
Program cycle/level	FQ-EHEA – the first cycle, QF LLL – 6^{th} level, NRK of Ukraine – 6^{th} qualification level
Prerequisites	Complete general secondary or vocational education
Language (s) of teaching	Ukrainian/English
Term of the educational program	According to the validity of the accreditation certificate
Internet address of the permanent placement of the educational program	http://web.kpi.kharkov.ua/dngik/
2 – The purpose of educational program	
Provision of modern, high-quality training of specialists in development of oil and gas fields, oil and gas production, industrial collection, primary preparation, transportation and storage of hydrocarbons, drilling technologies, intensification of work and repair of oil and gas wells taking into account the needs of all stakeholders	
3 – Characteristics of the educational program	
Subject area (field of knowledge, specialty, program)	Field of knowledge: 18 Production and technologies Specialty: 185 Oil and gas engineering and technology Educational and professional program: Oil and gas production
Orientation of the educational program	Applied orientation The program is focused on training specialists to acquire professional knowledge in the development of oil and gas fields, oil and gas production, which provides employment and opportunities for further education and career growth.
The main focus of the educational program and specializations	Special education in field of knowledge 18 Production and technology in the specialty 185 Oil and Gas Engineering and Technology Keywords: oil, gas, production, development, fields, drilling, trans-?ortation, storage, technology, well, exploitation, geology, research, repair

Features of the program	A special feature of the program is the acquisition of knowledge on modern field development technologies, geophysical research of wells, oil and gas production, oil and gas preparation in the fields, transportation and storage of hydrocarbons. The emphasis of the educational and professional program is on the in-depth study of modern technologies for intensifying hydrocarbon production, since most of the deposits in the eastern region of Ukraine are at a late stage of operation (booster compressor stations, coiled tubing technologies, hydraulic fracturing, hydrosand-blast perforation using flexible pump-compressor tubing, snabbing technologies, low-temperature gas separation using turboexpanders, etc.), on the study of disciplines that take into account elements of innovation and modern engineering, the study of which uses elements of blogidactics, 3D-visualization, group educational VEB- chat rooms. The assimilation of modern software systems makes it possible to be competitive in the labor market of Ukraine and abroad.
4 – Suitability of graduates for employment and further study	
Suitability for employment	The graduate may hold the following primary positions in accordance with the "Handbook of qualification characteristics of employees' professions" (DK 003:2010): 3117 oil and gas production technicians; 3117 technicians for the preparation and transportation of oil and gas; 3117 technicians for operation of oil pipelines; 3117 technicians for operation of gas facilities equipment; 1222.2 master of oil, gas and condensate production; 1222.2 master of well research; 1222.2 master of development and repair of injection wells; 1222.2 master of gas preparation; master of oil preparation and stabilization; 1222.2 master of complex works in drilling (overhaul) of wells; 1222.2 master of wells repair (capital, underground); 1222.2 master of reservoir park; 1222.2 master of well testing; 1222.2 master of operation of gas facilities equipment.
Further study	Opportunity to continue education at the second (master's) level of higher education, obtaining postgraduate education in related specialties of higher education institutions in Ukraine and abroad.

5 – Teaching and assessment	
Teaching and learning	**Problem-oriented and practically oriented, with adherence to the principles of student-centeredness and individual-personal approach. Teaching** is carried out through lectures, seminars, practical and laboratory classes, organization of independent work of students, trainings for the development of creative thinking and ability to work in a team, research guidance, practical training and pre-graduation practice in scientific-research institutes and facilities of GPU “She-belynkagazvydobuvannya". **Learning** is carried out by attending lectures, seminars, practical and laboratory classes, working with educational and scientific sources in the library, carrying out the research, practicing skills during practical trainings, creating prese-?tations.
Assessment	Monitoring of students' knowledge and skills is carried out in the form of current and final control *Current control* is oral and written survey, assessment of work in small groups, testing, defense of individual tasks, defense of term papers (projects), reports of internships and undergraduate practice. *Final control* is carried out in the form of exams, tests and certi-?ication in the form of passing the certification exam.
6 – Program competencies	
Integral competence	Ability to solve complex specialized problems and practical problems in professional activities related to the oil and gas industry, or in the learning process, which involves the application of certain theories and methods of oil and gas mechanics and is characterized by complexity and uncertainty of conditions.
General competencies (GC)	
GC 1	Ability to abstract thinking, analysis and synthesis.
GC 2	Ability to communicate in the state language both orally and in writing.
GC 3	Ability to communicate in a foreign language.
GC 4	Ability to use information and communication technologies.
GC 5	Ability to learn and master modern knowledge.
GC 6	Ability to search, process and analyze information from various sources.
GC 7	Ability to work in a team.
GC 8	Ability to carry out safe activities.
GC 9	Ability to realize one's rights and responsibilities as a member of society; awareness of the value of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.

GC 10	Ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies, use different types and forms of physical activity for active recreation and a healthy lifestyle.
Special (professional) competencies (SC)	
SC 1	Ability to analyze public policy, historical stages and prospects for the development of petroleum industry.
SC 2	Ability to characterize geological processes, patterns and properties of rocks, including oil and gas deposits.
SC 3	Ability to use theories, principles, methods and concepts of basic and general engineering sciences for professional activities.
SC 4	Ability to analyze the processes of oil and gas movement in reservoirs, wells and pipelines.
SC 5	Ability to apply mathematical methods, models and modern digital technologies to solve complex problems of petroleum engineering.
SC 6	Ability to perform operational calculations of technological parameters in petroleum engineering.
SC 7	Ability to evaluate the performance of materials, structures and machines in operating conditions.
SC 8	Ability to design and operate components of systems and technologies of petroleum companies.
SC 9	Ability to solve production and technological problems in drilling wells, extraction, transportation and storage of oil and gas.
SC 10	Ability to analyze the operating modes of petroleum facility, to make the optimal choice of technological equipment, to optimize the operating mode according to certain criteria, including under conditions of uncertainty.
SC 11	Ability to carry out technological and technical and economic evaluation of the effectiveness of new oil and gas technologies and technical devices.
SC 12	Understanding the general principles of selection of control and automation of technological processes in petroleum industry.
SC 13	Ability to plan and organize the work of the structural unit of petroleum company.
7 – Program learning results (LR)	
LR 1	To know and understand the concepts, patterns and features of the development of civil society, human and civil rights and freedoms in Ukraine, as well as ethical and legal principles of professional activity, use different types and forms of physical activity for active recreation and a healthy lifestyle.
LR 2	Know the theories, principles, methods and concepts of oil and gas engineering, understand the current state and role of petroleum industry in ensuring energy security of Ukraine.
LR 3	Analyze and develop elements of technological schemes and technical devices of systems for drilling wells, extraction, transportation and storage of oil and gas.
LR 4	Fluent in state and foreign languages on professional issues orally and in writing, have the skills to work with foreign technical publications.
LR 5	Find the necessary information in the scientific and reference literature, databases, Internet and other sources, evaluate, interpret and apply this information.
LR 6	Analyze geological processes, basic patterns of formation and properties of rocks, including oil and gas deposits.

LR 7	Use modern digital technologies and specialized software to solve engineering and management problems related to the implementation of basic petroleum technologies for drilling wells, production, transportation and storage of oil and gas.
LR 8	Make effective decisions on professional issues in difficult-to-predict hazardous conditions, taking into account goals, deadlines, resource and legal constraints, environmental and ethical aspects.
LR 9	Apply basic concepts and methods of basic and applied sciences to solve specialized problems in petroleum engineering.
LR 10	Predict and analyze the physicochemical properties of oil and gas in the processes of their extraction, transportation and storage.
LR 11	Calculate the parameters of hydrogas-dynamic processes that accompany the movement of oil and gas and process fluids in the reservoir / wells / industrial and main pipelines using the laws of thermodynamics, hydraulics and gas dynamics and modern methods of calculation.
LR 12	Carry out calculations of technological parameters of oil and gas wells, oil and gas preparation systems, industrial and main gas and oil pipelines, gas and oil storages with the use of appropriate mathematical and engineering methods.
LR 13	To analyze the operating conditions of the components of oil and gas technical complexes, to make the optimal choice of technological equipment and to optimize the operating mode according to certain criteria, including under conditions of uncertainty.
LR 14	Analyze and evaluate the technical condition of the elements of technological equipment of petroleum facilities by means of technical diagnostics in industrial and laboratory conditions.
LR 15	Choose effective means of control and automation of technological processes in the oil and gas industry, taking into account the objectives and existing constraints.
LR 16	To plan and organize the work of structural subdivision of petroleum enterprise in accordance with the requirements of life safety, labor protection and environmental protection.
LR 17	Convey an information, ideas, problems, solutions, own experience and arguments on oil and gas engineering and related issues to specialists and non-specialists.
LR 18	Organize and manage the professional development of individuals and groups in the field of petroleum engineering.

8 – Resource support for program implementation	
Staffing	Meets the personnel requirements for ensuring the implementation of educational activities in the field of higher education for the first (bachelor's) level in accordance with the requirements of Annex 12 to the Licensing Conditions approved by the Cabinet of Ministers of Ukraine dated 30.12.2015 № 1187 as amended by the Cabinet of Ministers of Ukraine dated 24 March 2021 № 365.
Logistics support	Meets the technological requirements for material and technical support of educational activities in the field of higher education in accordance with current legislation of Ukraine (Resolution of Cabinet of Ministers of Ukraine "On approval of licensing conditions for educational activities of educational institutions" from 30.12.2015 № 1187 as amended, approved by the Resolution of the Cabinet of Ministers of Ukraine of March 24, 2021 № 365).
Information and educational and methodical support	Meets the technological requirements for educational and metho-?ological and informational support of educational activities in the field of higher education in accordance with current legislation of Ukraine (Resolution of the Cabinet of Ministers of Ukraine "On approval of licensing conditions for educational activities of educational insti-?utions" from 30.12.2015 № 1187 of amendments approved by the Resolution of the Cabinet of Ministers of Ukraine of March 24, 2021 № 365).
9 – Academic mobility	
National credit mobility	Documents containing provisions on academic mobility: a bilateral cooperation agreement with V. N. Karazin Kharkiv National University (agreement dated 25.12.2020)
International credit mobility	Agreements on international academic mobility (Erasmus+ K1) with universities: Istanbul Technical University (Republic of Turkey) Brandenburg University of Applied Sciences (Germany) Otto von Gerrike Magdeburg University (Germany). Within the framework of adopted agreements, cooperation is carried out in the following areas: cooperation in the recruitment and training of students and graduate students; mutual visits and exchange of staff for research and exchange of teaching experience; visits and exchanges of graduate and undergraduate students for study and research (long-term and short-term programs); mutual visits of the management of educational institutions.
Education of foreign applicants for higher education	Foreign students are taught in English in separate groups. A separate discipline "Ukrainian as a foreign language" was introduced into the curriculum.

2. LIST OF EDUCATIONAL COMPONENTS OF THE EDUCATIONAL PROFESSIONAL PROGRAM

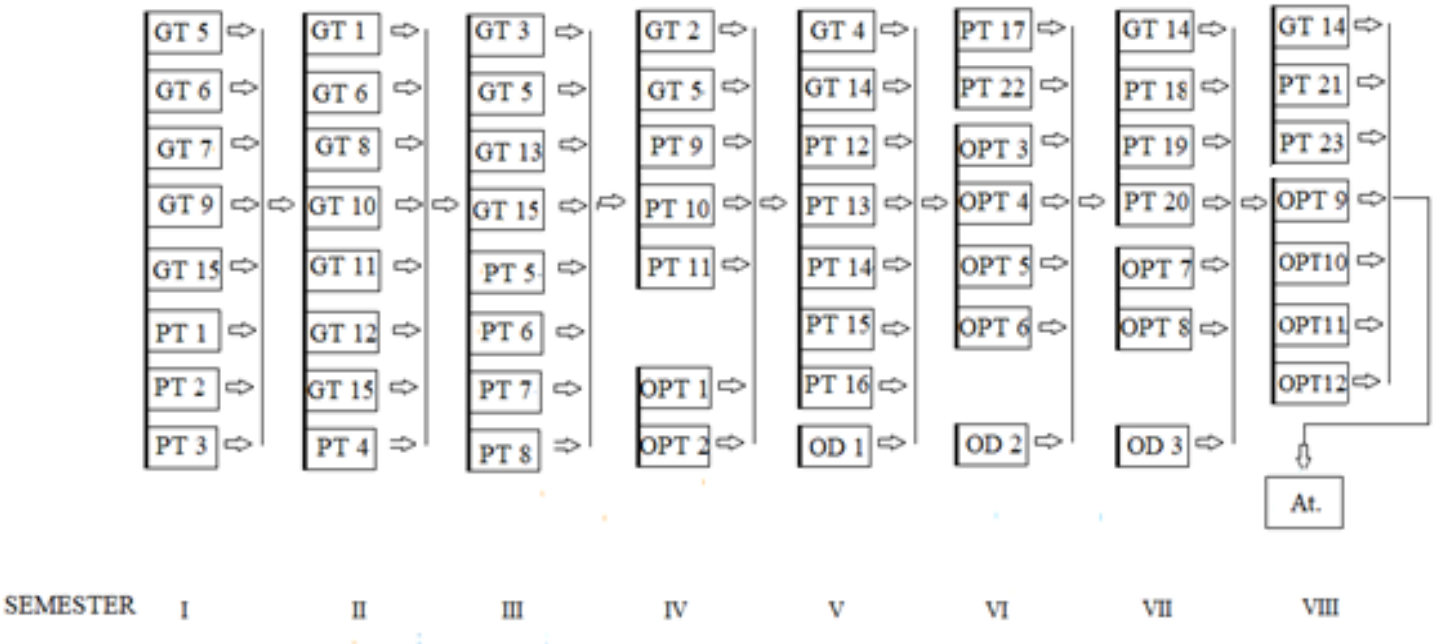
Code	Components of the educational program (academic disciplines, course projects/course works, practices, qualification work)	Number of credits	Form of final control
1	2	3	4
1. Obligatory educational components			
1.1 General training			
GT 1	History and Culture of Ukraine	4,0	Exam (2)
GT 2	Philosophy	3,0	Exam (4)
GT 3	Jurisprudence	3,0	Test (3)
GT 4	History of Science and Technology	3,0	Test (5)
GT 5	Ukrainian as a foreign language	8,0	Exam (4), Test (1,3)
GT 6	Professional language	5,0	Exam (2), Test (1)
GT 7	Higher mathematics part 1	4,0	Exam (1)
GT 8	Higher mathematics part 2	4,0	Exam (2)
GT 9	Physics part 1	4,0	Exam(1)
GT 10	Physics part 2	4,0	Exam (2)
GT 11	General and inorganic chemistry	6,0	Exam (2)
GT 12	Ecology	3,0	Test (2)
GT 13	Organic chemistry	5,0	Exam (3)
GT 14	English for professional purpose	6,0	Exam (8), Test (5,7)
GT 15	Physical education	6,0	Test (1,2,3)
1.2 Special (professional) training			
PT 1	Introduction to the specialty. Introductory practice	3,0	Test (1)
PT 2	Descriptive geometry, engineering and computer graphics	5,0	Exam (1)
PT 3	Computational mathematics and programming part 1	5,0	Exam (1)
PT 4	Computational mathematics and programming part 2	5,0	Exam (2)
PT 5	Physics and chemistry of disperses systems	5,0	Exam (3)
PT 6	Physics and chemistry of combustible minerals	6,0	Exam (3)
PT 7	Theoretical mechanics	4,0	Exam (3)
PT 8	Resistance of materials	3,0	Test (3)
PT 9	Petroleum geology	6,0	Exam (4)
PT 10	Applied mechanics	3,0	Test (4)
PT 11	Geotechnology system in petroleum industry	6,0	Exam (4)
PT 12	Physics of oil and gas reservoir	6,0	Exam (5)
PT 13	Fundamentals of oil and gas wells drilling engineering	4,0	Exam (5)
PT 14	Gashydromechanics	5,0	Exam (5)
PT 15	Fundamentals of electronic, electrical equipment	3,0	Test (5)
PT 16	Fundamentals of occupational safety and health	3,0	Test (5)

1	2	3	4
PT 17	Fundamentals of reservoir engineering and petroleum fields operation	5,0	Exam (6)
PT 18	Enterprise economics	3,0	Test (7)
PT 19	Oil and gas production technology	6,0	Exam (7)
PT 20	Intensification of oil and gas wells	5,0	Екзамен (7)
PT 21	Fundamentals of scientific-research work	3,0	Test (8)
PT 22	Practical Training	6,0	Test (6)
PT 23	Pre-graduation Practice	9,0	Test (8)
	Attestation	3,0	Certification exam (8)
2 Optional educational components			
2.1 Optional student disciplines of the profile training according to the list			
OPT 1	Discipline 1	5,0	Exam (4)
OPT 2	Discipline 2	4,0	Exam (6)
OPT 3	Discipline 3	4,0	Exam (6)
OPT 4	Discipline 4	4,0	Exam (6)
OPT 5	Discipline 5	4,0	Exam (6)
OPT 6	Discipline 6	5,0	Exam (7)
OPT 7	Discipline 7	5,0	Exam (7)
OPT 8	Discipline 8	5,0	Exam (7)
OPT 9	Discipline 9	4,0	Exam (8)
OPT 10	Discipline 10	3,0	Exam (8)
OPT 11	Discipline 11	3,0	Exam (8)
OPT 12	Discipline 12	3,0	Test (8)
2.2 Optional student disciplines from the general university catalog of disciplines			
OD 1	Discipline 1	4,0	Test (5)
OD 2	Discipline 2	3,0	Test (6)
OD 3	Discipline 3	4,0	Test (7)
Total amount of **obligatory educational components**:		**180,0**	
Total amount of **optional educational components:**		**60,0**	
TOTAL AMOUNT OF THE EDUCATIONAL PROGRAM		**240**	

2.2 Optional student disciplines of the profile training			
OPT 1	Thermodynamics	5,0	Exam (4)
OPT 2	Hydraulics	5,0	Exam (4)
OPT 3	Modern hypotheses of oil and gas origin	5,0	Exam (4)
OPT 4	Fundamentals of field geophysical research	5,0	Exam (4)
OPT 5	Technologies for gas and condensate collection and preparation	4,0	Exam (6)
OPT 6	Technologies for oil collection and preparation	4,0	Exam (6)
OPT 7	Prospecting and exploration of petroleum fields	4,0	Exam (6)
OPT 8	Well completion and well testing	4,0	Exam (6)
OPT 9	Machines and equipment for wells drilling, equipment for oil and gas production	4,0	Exam (6)
OPT 10	Fundamentals of petroleum engineering	4,0	Exam (6)
OPT 11	Measuring processes and instruments in petroleum industry	4,0	Exam (6)
OPT 12	Theory of automatic control of technological processes	4,0	Exam (6)

OPT 13	Constructing of pipelines	5,0	Exam (7)
OPT 14	Fundamentals of field geophysical researches of oil and gas wells	5,0	Exam (7)
OPT 15	Fundamentals of hydrocarbon transportation and underground storage	5,0	Exam (7)
OPT 16	Modeling of technological processes in petroleum industry	5,0	Exam (7)
OPT 17	Technology of directional and horizontal drilling	5,0	Exam (7)
OPT 18	Equipment for petroleum facilities	4,0	Exam (8)
OPT 19	Automated design systems in petroleum industry	3,0	Exam (8)
OPT 20	Offshore petroleum technologies	3,0	Exam (8)
OPT 21	Fountain fitting safety	4,0	Exam (8)
OPT 22	Modeling of petroleum fields operation	3,0	Exam (8)
OPT 23	Repairing of oil and gas wells	3,0	Exam (8)
OPT 24	Technology of increasing hydrocarbon recovery from reservoirs	3,0	Test (8)
OPT 25	Research of oil and gas wells	3,0	Test (8)

2. STRUCTURAL AND LOGICAL SCHEME OF THE EDUCATIONAL PROFESSIONAL PROGRAM "OIL AND GAS ENGINEERING AND TECHNOLOGIES"



4. HIGHER EDUCATION CERTIFICATION FORM

Certification of applicants for higher education under the educational program "Oil and Gas Production" specialty 185 Oil and gas engineering and technology is carried out in the form of an attestation exam and ends with the issuance of a document (diploma) of established sample on awarding him a bachelor's degree with the qualification: **bachelor of oil and gas engineering and technology**.

5. MATRIX OF COMPLIANCE OF PROGRAM COMPETENCIES WITH THE EDUCATIONAL COMPONENTS OF THE EDUCATIONAL PROFESSIONAL PROGRAM

	GT 1	GT 2	GT 3	GT 4	GT 5	GT 6	GT 7	GT 8	GT 9	GT 10	GT 11	GT 12	GT 13	GT 14	GT15	PT 1	PT 2	PT 3	PT 4	PT 5	PT 6	PT 7	PT 8	PT 9	PT 10	PT 11	PT 12	PT 13	PT 14	PT 15	PT 16	PT 17	PT 18	PT 19	PT 20	PT 21	PT 22	PT 23
GC 1		+					+	+	+	+	+		+				+			+	+																
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6. MATRIX OF PROVIDING PROGRAM LEARNING RESULTS BY RELEVANT EDUCATIONAL COMPONENTS OF THE EDUCATIONAL PROFESSIONAL PROGRAM

	GT 1	GT 2	GT 3	GT 4	GT 5	GT 6	GT 7	GT 8	GT 9	GT 10	GT 11	GT 12	GT 13	GT 14	GT 15	PT 1	PT 2	PT 3	PT 4	PT 5	PT 6	PT 7	PT 8	PT 9	PT 10	PT 11	PT 12	PT 13	PT 14	PT 15	PT 16	PT 17	PT 18	PT 19	PT 20	PT 21	PT 22	PT 23
LR 1	+	+	+	+											+																							
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