

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
STATE UNIVERSITY "NATIONAL MINING UNIVERSITY"

It has been reviewed and approved
Academic Council of the University
"26" 06 2017,
Protocol No 11.

HIGHER EDUCATION PROFESSIONAL PROGRAM
«Oil and Gas Engineering and Technology»

FIELD OF STUDY	18 Production and technologies
SUBJECT AREA PROGRAM	185 Oil and Gas Engineering and Technology
LEVEL OF HIGHER EDUCATION	first
DEGREE	Bachelor
EDUCATIONAL QUALIFICATION	Bachelor of Oil and Gas Engineering and Technology
PROFESSIONAL QUALIFICATION	3117.1 Technical specialist in the mining industry

Enacted by Order of the Rector of the University
by «26» june 2017, No 11-AC.

Dnipero
NMU
2017

ЛИСТ-ПОГОДЖЕННЯ

Центр моніторингу знань та тестування
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PREFACE

The composition of the working group that developed the educational program

Full Name project team leader and members	Job title (for part-timers - place of work, job title)	Name of the institu- tion graduated from the teacher (year of graduation, specialty, qualification accord- ing to the document about higher educa- tion)	Scientific degree, cipher and name of scientific specialty, disserta- tion topic, academic title, by which de- partment (specialty) is assigned	Experience of scientif- ic-pedagogical and / or scientific work	Information on scientific activity (major publications in the field, research work, participation in conferences and semi- nars, work with graduate and doctoral students, guidance of students' scientific work)	Enhancement information qualifications teacher (name of insti- tution, type document, top- ic,date of issue)
1	2	3	4	5	6	7
1 Korovyaka Eugene Anatolyevich (working group leader)	Associate Pro- fessor of the Department of Transport Sys- tems and Tech- nologies, chairman of the scientific and methodological commission of the special- ty185 «Oil and gas engineering and technolo- gies» State higher educa- tion institution "NSU"	State Mining Acad- emy of Ukraine, 1997 Specialty - "Under- ground mining". Qualification: Min- ing engineer.	<i>Candidate of Tech- nical Sciences</i> , 05.15.02 - Under- ground mining of mineral resources, DK №025921 of 13.10.2004, theme of the dissertation: "Substantiation of parameters of tech- nological schemes of development of thin- wire gold-bearing deposits of Ukraine"; Associate Professor of the De- partment of Trans- port Systems and Technologies, Cer- tificate 12DTS №017354 from	20 years	- Korovyaka EA Intensification of the method of surface degassing of gas- bearing coal seams / E.A. Korovyaka, V.S. Astakhov, ES Manukyan // Pro- ceedings of NSU. - D. NSU. - 2012. - № 38. - P. 42 - 47. - Korovyaka Ye. Perspectives of mine methane extraction in conditions of Do- nets'k gas-coal basin / Ye. Korovyaka, V. Astakhov, E. Manykian // "Progres- sive Technologies of Coal, Coalbed Methane, and Ores Mining". - Pub- lished by: SRC Press / Balkema, 2014. P. 311 - 316. - Korovyaka EA Regeneration of me- thane recovered by landfill landfills, and opportunities for its utili- zation in the Dnepropetrovsk region / EA Korovyaka, EA Vasilenko, ES Ma- nukyan // Geotechnical Mechanics: In- terspecies. Sat. of sciences. works / In-	Private univer- sity «Dniprope- trovsk Univer- sity named after Al- fred Nobel "from 10.10.2016 to 11.11.2016. Certificate No. 1109 dated 11/11/2016 Development of the project of educational program of training of ba- chelorers in the field of know- ledge 01 "Edu- cation" in the

1	2	3	4	5	6	7	
			21.06.2007		<p>stitute of geotechnical mechanics them. MS Polyakov NAS of Ukraine. - Dnepropetrovsk, 2014. - Vyp. 117 - pp. 215 - 224.</p> <p>- Higher education standard of the State University of Mining University / Designing the educational process. CBO-2016: introduction. by the decision of the Academic Council of the State Higher Institution "NSU" (protocol No. 15) of 15.11.2016 - D.: DVNZ "NSU", 2016. - 73 p. Access mode: http://www.nmu.org.ua/upload/iblock/508</p>	specialty 015.14 "Vocational education (Oil and gas business)"	
2	Kamyshatskiy Alexander (Member of the Working Group)	Associate Professor, Department of Mining Exploration	National Mining Academy of Ukraine, 2001. Specialty - Mining. Boring". Qualification - Mining engineer.	<i>Candidate of Technical Sciences</i> 05.15.10 - Well Drilling, DK №025848 dated December 22, 2014, topic of the dissertation - "Substantiation of parameters of the device for treatment of washing liquids during drilling of wells".	15 years	<p>- Davidenko AN Controlling the properties of washing liquids by means of a cavitation disperser / AN Davidenko, AF Kamyshatskiy / Mining Journal of Kazakhstan №4, 2013 - P. 5456.</p> <p>- New in technology of equipment of hydrogeological wells with gravel filters Mining Journal of Kazakhstan №1 2015. - P. 1014</p> <p>-Davidenko AN Innovative technology of preparation of washing liquids during drilling of wells / Davidenko AN, Kamyshatskiy AF / Science and innovations. 2015, 11 (5). Pp. 11 - 21.</p>	Ivano-Frankivsk National Technical University of Oil and Gas, PhD thesis, "Substantiation of parameters of the device for treatment of washing liquids during drilling of wells", 12/22/2014
3	Vladimir Salov (member of the working group)	Chairman of the Scientific and Methodological Sub-	Dnepropetrovsk Mining Institute, 1965 Specialty - Mining Machines	<i>Candidate of Technical Sciences</i> , 05.05.06 - Mining machines, diploma	51 years	- Doodle MA Underground gas storage processes: handy. / M.A. Dudlya, L.N. Shirin, V.O. Salov; Ministry of Education and Science of Ukraine, Nat. mines	Upgrading at the Inter-branch Institute of Continuing

1	2	3	4	5	6	7
	committee 184 «Mining» and 185 «Oil and gas engineering and technologies»	and Complexes. Qualification - Mining Mechanical Engineer.	MTN №082696 from 09.02.1973, theme of the dissertation - "Research of rail electromagnetic brakes of mine rolling stock"; Associate Professor of the Department of Mining Transport, Certificate of DC №018532 of 22.03.1978 Certificate UA 058 "International Teacher of Engineering Sciences ING PAED IGIP" (2004).		<p>Univ. - D.: NSU, 2014. - 422 p.</p> <p>- Salov VA Description of the system of quality assurance of higher education by specialty (layout of the section of accreditation) [Electronic resource] / V.O. Salov; NSU, Scientific Method. center. - D.: NSU, 2015. - 23 p. - Access mode: http://www.nmu.org.ua/met_centр.php.</p> <p>- Pivnyak GG Positioning of a mining university in the ratings of the Ministry of Education and Science of Ukraine [Electronic resource] / G.G. Pivnyak, VA Yamkovy, V.O. Salov // M-education and science of Ukraine, Nat. mines Univ., Scientific and Methodological Center. - D.: NSU, 2015. - P. 96-115. - Access mode: http://www.nmu.org.ua/en/content/infrastрucture/structural_divisions/science_met_centр.php (accessed: 06/17/2015). - The name from the screen.</p> <p>- Higher education standard of the State University of Mining University / Designing the educational process. CBO-2016: introduction. by the decision of the Academic Council of the State Higher Institution "NSU" (protocol No. 15) of 15.11.2016 - D.: DVNZ "NSU", 2016. - 73 p. Access mode: http://www.nmu.org.ua/upload/iblock/508</p> <p>- Salov VA Higher Education Design:</p>	Education, Institute of Humanitarian Problems of the State Mining University from 01.12.2012 to 30.05.2013. Certificate No. 023 of June 5, 2013

	1	2	3	4	5	6	7
						Prog. teach. diss. for masters of specialty 011 "Science of education" / V.O. Salov; Nat. mines Univ. - D.: NSU, 2016. - 11 p.	
4	Yuriy Kuzin (member of the working group)	Associate Professor, Department of Mining Exploration	Graduated in 1970 from the Dnepropetrovsk Mining Institute, majoring in Mining and Mining Technology, Mining Engineer	<i>Candidate of Technical Sciences</i> , 05.15.14 - "Technology and technology of geological prospecting" candidate's diploma TN № 106116, dissertation topic - "Investigation of diamond drilling modes and development of the method of their selection in relation to Donbass conditions" <i>Associate Professor, Department of Mining Exploration</i> , Certificate of DC № 003612	44 years	<ul style="list-style-type: none"> - Geological prospecting and safety: textbook / PPVirvinsky, Yu.L.Kuzin, VLKhomenko D.: National Mining University, 2010. - 368 p. - Kramarenko AA Technique and technology of drilling of geological prospecting wells on gas-methane at Donbass coal deposits: monograph [Text] / AA Kramarenko, AA Zakharov, AA Kozhevnikov, Yu. L. Kuzin and - D.: Donbass, 2011. - 182 p. - Kozhevnikov A.O. Theoretical studies of the influence of the amount of flushing liquid and the thickness of the wall of the drill pipe on the flow rate in the combined drill string / AA Kozhevnikov, Yu. L. Kuzin, OA Lexikov // Porodorazrushayuschy and metal-processing tool - technique and technology of its production and applications: Sat. scientific works. - 2015. - P. 151-156. 	KP "South Ukraine", 2015. Internship program and report on its implementation

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INTRODUCTION

The educational program was developed on the basis of the draft Higher Education Standard of Bachelor of Specialty 185 Oil and Gas Engineering and Technology.

Implementing a competent approach to higher education design by creating a unified link between planned competences (external higher education goals) and learning outcomes of disciplines, practices and individual tasks (goal realization) is a decisive factor in the quality of higher education at NSU and the creation of a real internal system for internal education. .

Transparent and understandable structure and content of the educational program are relevant for entrants, applicants, teachers, employers.

1 GENERAL INFORMATION

1.1 Purpose of the educational program

The educational program is used during:

- Licensing of specialty and accreditation of educational program;
- preparation of curricula and work (annual) curricula;
- formation of work programs of educational disciplines, practices, individual tasks;
- formation of individual curricula of students;
- development of diagnostic tools for higher education quality;
- certification of bachelors of specialty 185 Oil and gas engineering and technologies;
- determining the content of training in the system of retraining and advanced training;
- professional orientation of applicants for the profession;
- external quality control of training of specialists.

Users of the educational program:

- Higher education applicants studying at the State Higher Educational Institution "NSU";
- Teachers of the State Pedagogical University "NSU", who provide bachelors of specialty 185 Oil and gas engineering and technologies;
- specialty examination commission 185 Oil and gas engineering and technologies;
- admission committee of the State Pedagogical University "NSU".

The educational program extends to the departments of the University, which are involved in the preparation of Bachelor's Degree Specialty 185 Oil and Gas Engineering and Technology.

1.2 Regulatory references

The educational program is developed on the basis of the following normative documents:

- 1) The Law of Ukraine "On Higher Education" of 01.07.2014 // Verkhovna Rada of Ukraine. - 2014. - № 37, 38.
- 2) Occupational Classifier DK 003: 2010 [Electronic resource]. - Valid from 11/1/2010. - Access mode:<http://dovidnyk.in.ua/directories/profesii>.
- 3) Resolution of the Cabinet of Ministers of Ukraine of December 30, 2015 No. 1187 "Licensing Conditions for Carrying Out Educational Activities of Educational Institutions". <http://zakon5.rada.gov.ua/laws/show/1187-2015-n/page>.
- 4) Order of the Ministry of Education and Science of Ukraine dated 01.06.2016 for No. 600 "On Approval and Implementation of Methodological Recommendations for the Development of Higher Education Standards". <http://mon.gov.ua/activity/education/reforma-osviti/science-metodichna-rada-ministerstva/metodichni-rekomendaciyi.html>.
- 5) Order of the Ministry of Education and Science of Ukraine No. 1151 of 06.11.2015 "On the peculiarities of introducing the list of branches of knowledge and specialties by which higher education applicants are trained".

6) Order of the Ministry of Education and Science of Ukraine of October 15, 2015 No. 1085 “On Conditions for Admission to Study at Higher Educational Institutions of Ukraine in 2016”.

7) National Qualifications Framework. Supplement to the Resolution of the Cabinet of Ministers of Ukraine No. 1341 of November 23, 2011. <http://zakon3.rada.gov.ua/laws/show/1341-2011-n>.

8) Resolution of the Cabinet of Ministers of Ukraine dated 26.04.2015 No. 266 “List of branches of knowledge and specialties for which higher education applicants are trained”.

9) International Standard Classification of Education: Fields of Education and Training 2013 (ISCED-F 2013) - Detailed field descriptions. <http://www.uis.unesco.org/Library/Pages/DocumentMorePage.aspx?docIdValue=928&docIdFld=ID>.

10) Draft Higher Education Standard for Bachelor of Science in Specialty 185 Oil and Gas Engineering and Technology. CBO-2016: introduction. Ministry of Education and Science of Ukraine No. 375 of April 6, 2016 - K.: MES of Ukraine, 2016. - 20 p.

1.3 Terms and Definitions

The terms used in the program are as follows:

1) autonomy and responsibility - the ability to independently perform tasks, solve problems and be responsible for the results of their activities;

2) education of the level and scope of knowledge, skills and other competences in the requirements of higher education standards;

3) types of educational activity of the applicant - educational disciplines, practices, individual tasks;

4) higher education - a set of systematic knowledge, skills and practical skills, ways of thinking, professional, ideological and civic qualities, moral and ethical values, other competences acquired in a higher education institution in the relevant field of knowledge in a certain qualification at higher education levels, in complexity they are higher than the level of complete general secondary education;

5) the field of knowledge - the main subject area of education and science, including a group of related specialties for which vocational training is carried out;

6) European Credit Transfer and Accumulation System (ECTS) - the credit transfer and accumulation system used in the European Higher Education Area to provide, recognize, validate qualifications and educational components and promote the academic mobility of higher education applicants. The system is based on the determination of the academic load of the higher education applicant required to achieve the specified learning outcomes and is accounted for in ECTS credits;

7) diagnostic tools - documents, approved in the established order, and intended to establish the degree of achievement of the planned level of competence of the student during control measures;

8) knowledge - meaningful and learned by the subject scientific information, which is the basis of his conscious, purposeful activity. Knowledge is divided into empirical (factual) and theoretical (conceptual, methodological);

9) Integral competence - a generalized description of a qualification level that expresses the basic competence characteristics of the level in terms of training and / or professional activity;

10) informational support of the discipline - the means of education, which systematically sets out the basics of knowledge in a particular discipline at the level of modern achievements of science and culture, support for self-education and self-study (textbooks, textbooks, textbooks, textbooks, textbooks, crosswords dictionaries, encyclopedias, reference books, etc.);

11) qualification level - a structural unit of the National Qualifications Framework that is defined by a set of competences that are typical of the qualifications of that level;

12) qualification - the official result of an assessment and recognition that is obtained when the competent competent authority has determined that the person has attained competence (learning outcomes) to the set standards;

13) competence (s) (NQF) - the ability of a person to perform a certain activity, which is expressed through knowledge, understanding, skills, values, other personal qualities;

14) communication - the interconnection of subjects for the purpose of information transfer, coordination of actions, joint activities;

15) Credit of the European Credit Transfer and Accumulation System (hereinafter referred to as ECTS Credit) - a unit of measurement of the amount of higher education student's educational load required to achieve the defined (expected) learning outcomes. The volume of one ECTS loan is 30 hours. The load of one academic year for full-time study is usually 60 ECTS credits;

16) methodological support of the discipline - recommendations for the support of the student's educational activity for all types of educational activities, which contains, including information on the means and procedures of control measures, their form and content, methods of solving exercises, sources of information;

17) *discipline* - set of modules subject to final control;

18) object of diagnostics - competences, the acquisition of which is ensured by a certain type of educational activity of the applicant;

19) educational process is an intellectual, creative activity in the field of higher education and science, carried out in a higher educational institution (scientific institution) through a system of scientific-methodological and pedagogical measures and aimed at the transfer, assimilation, multiplication and use of knowledge, skills and other competences of students, as well as the formation of a harmoniously developed personality;

20) educational (vocational or educational) program - a system of educational components at the appropriate level of higher education within the specialty, which defines the requirements for the level of education of persons who can start training under this program, the list of educational disciplines and the logical sequence of their study, number ECTS credits required for the implementation of this program, as well as the expected learning outcomes (competences) to be acquired by an applicant for an appropriate higher education degree;

21) educational activity - the activity of higher education institutions, which is conducted with the purpose of securing higher education, postgraduate education and meeting other educational needs of higher education applicants and other persons;

22) final control - comprehensive assessment of the planned level of disciplinary competence;

23) discipline program - a normative document that determines the content of the discipline in accordance with the educational program, is developed by the department, which is fixed by the order of the rector for teaching the discipline;

24) learning outcomes - a set of knowledge, skills, other competences acquired by a person in the course of training in a particular educational, vocational, educational and scientific program that can be identified, quantified and measured;

25) work program of the discipline - a normative document, developed on the basis of the discipline program in accordance with the annual curriculum (contains the distribution of the total time for the acquisition of individual educational elements and modules by types of classes and forms of training);

26) specialty - a component of the field of knowledge for which professional training is carried out;

27) the standard of higher education is the set of requirements for the content and results of the educational activity of higher education institutions and scientific institutions at each level of higher education within each specialty;

28) ability - the ability to apply knowledge to accomplish tasks and solve problems and problems. Skills are divided into cognitive (intellectual-creative) and practical (based on skill using methods, materials, instructions and tools);

29) quality of higher education - the level of knowledge, skills, other competences acquired by a person, which reflects his / her competence in accordance with the standards of higher education.

1.4 Designation

HPK - National Qualifications Framework;
ZK - general competencies;
ZR - general learning outcomes;
PK - are professional competencies by specialty;
PR - professional learning outcomes;
PK1 - professional competencies of sampling blocks;
PR1 - professional results of training selective blocks;
H - the normative type of educational activity in the specialty;
Z - discipline of the general training cycle;
B - basic disciplines;
F - professional disciplines;
P - practical training;
B - discipline of sample blocks;
B - disciplines at the student's choice;
KP - course project;
KR - course work.

2 NORMATIVE COMPETENCIES OF THE BACHELOR

Integral competence Bachelor of Specialty 185 “Petroleum Engineering and Technology” ability to solve complex specialized problems and practical problems in professional activities related to the oil and gas industry or in the process of study, which involves the application of certain theories and methods of oil and gas mechanics and is characterized by complexity and unspecified conditions.

2.1 General competencies of the bachelor

General competencies of the bachelor in a specialty 185 Oil and Gas Engineering and Technology formulated as abilities and presented in Table 2.1.

Table 2.1 - General competencies of the bachelor

Code	Competencies
1	2
ZK1	Ability to abstract think, analyze and synthesize elements of technical systems for oil, gas extraction, transportation and storage.
ZK2	Knowledge and understanding of tasks of oil and gas engineering, understanding of peculiarities of professional activity in oil and gas industry.
ZK3	Ability to speak the state language both verbally and in writing in a professional activity.
ZK4	Ability to speak a foreign language in a professional activity.
ZK5	Skills of using information and communication technologies in oil and gas engineering.
ZK6	Ability to learn and acquire up-to-date knowledge related to the introduction of modern technologies for oil, gas extraction, transportation and storage.
ZK7	Ability to work as a team in the operation of oil and gas facilities.
ZK8	Skills for safe operation at oil and gas facilities.

2.2 Professional competencies of the bachelor

Generalized Object of Professional Activity - hydrocarbon production, transportation, transportation and storage technologies, equipment and equipment.

Professional competencies - the ability to carry out such professional responsibilities by types of activity that are presented in Table 2.2.

Table 2.2 - Bachelor's professional competencies specialty

Code	Competencies
1	2
PK ₁	Ability to characterize geological processes and patterns of rock formation, including oil and gas deposits.
PK ₂	Understanding of the general structure and interrelation of individual elements of the system of providing Ukraine with hydrocarbon energy.
PK ₃	Ability to apply knowledge of physics and chemistry to analyze the physicochemical properties of oil, condensate and natural gas.
PK ₄	Ability to apply knowledge of thermodynamics, hydraulics, and gas dynamics to analyze the processes of oil and gas movement in reservoirs, wells, industrial and main pipelines.
PK ₅	Ability to apply mathematical methods to the analysis of technological processes of extraction, drilling, transportation and storage of oil and gas.
PK ₆	Ability to use state-of-the-art software for the operational calculations of the technological parameters of the extraction, drilling, drilling, transportation and storage of oil and gas.
PK ₇	Ability to apply the basics of materials science, machine mechanics to assess the technical state of the elements of the technological equipment of the systems of extraction, drilling, transportation and storage of oil and gas.
PK ₈	Ability to apply the basic methods of analysis and assessment of the state of the elements of oil and gas systems by means of technical diagnostics in industrial and laboratory conditions.
PK ₉	<i>Ability to design elements of technical systems for the production, transportation and storage of oil and gas.</i>
PK ₁₀	Understanding the general principles for choosing the means of control and automation of technological processes in the oil and gas industry.
PK ₁₁	Ability to analyze the modes of operation of an oil and gas facility, make the optimal choice of technological equipment, perform optimization of the operating mode by a certain criterion.
PK ₁₂	Ability to carry out technological and technical and economic evaluation of the efficiency of using basic oil and gas technologies and technical devices.
PK ₁₃	Ability to plan and organize the work of a structural unit of an oil and gas company in accordance with the requirements of life safety and labor protection.

3 SELECTIVE COMPETENCES OF BACHELOR OF OIL AND GAS ENGINEERING AND TECHNOLOGY

3.1 Professional competencies of Bachelor of Oil and Gas Engineering and Technology under Unit 1 "Oil and Gas Well Construction"

Object of professional activity - drilling systems and technologies oil and gas wells.

Professional competencies - the ability to carry out such professional duties by types of activities that are presented in Table 3.1.

Table 3.1 - Professional bachelor's competencies under block 1 "Oil and gas wells construction"

Code	Competencies
1	2
PK1 ₁	Ability to create drilling technology for oil and gas wells
PK1 ₂	Ability to construct oil and gas wells
PK1 ₃	Ability to calculate optimal drilling modes for oil and gas wells
PK1 ₄	Ability to use in practice the methods of diagnostics of the level of efficiency of equipment for drilling oil and gas wells
PK1 ₅	Ability to ensure the safety of drilling operations in accordance with the operating rules
PK1 ₆	Ability to evaluate and restore the quality of oil and gas wells
PK1 ₇	Ability to regulatory and technical support for the processes of oil and gas wells
PK1 ₈	Ability to organize work on the construction of oil and gas wells under the conditions of ensuring a high level of productivity, labor safety and minimal costs
PK1 ₉	Ability to control the construction of oil and gas wells using modern methods of analysis and information processing
PK1 ₁₀	Ability to plan components of technological and organizational activity and to manage the construction of oil and gas wells
PK1 ₁₁	Ability to monitor organizational performance, efficiency, excellence and prospectivity of oil and gas wells
PK1 ₁₂	Ability to improve oil and gas well technologies and organizational activities in accordance with the requirements of modern production and competitive economy

3.2 Bachelor's Degree in Petroleum Engineering and Technology under Unit 2 "Hydrocarbon Energy Extraction, Transportation and Storage Technologies"

Object of professional activity - systems and technologies for development of oil and gas and methane-coal deposits.

Professional competencies - the ability to carry out such professional duties by types of activities that are presented in Table 3.2.

Table 3.2 - Professional bachelor's competencies under block 2 "Technologies for production, transportation and storage of carbohydrate energy"

Code	Competencies
1	2
PK2 ₁	The ability to create elements technologies of production, transportation and storage of hydrocarbon energy
PK2 ₂	The ability to evaluate gas content of methane-coal deposits and creation of systems and technologies for their development
PK2 ₃	The ability to calculation of optimal modes of operation of gas-oil supply systems for different operating conditions
PK2 ₄	The ability to the use in practice of methods of diagnostics of the level of efficiency of gas-oil supply systems
PK2 ₅	The ability to ensuring the safety of the components of gas-oil supply systems in accordance with the operating rules

1	2
PK2 ₆	The ability to evaluate and restoring item quality metrics gas and oil supply systems for specific operating conditions
PK2 ₇	Regulatory and technical capacity providing processes for creation, operation and recovery of production systems and technologiescarbohydrate energy
PK2 ₈	The ability to organize work gas and oil supply systems under conditions of high productivity, safety and minimum costs
PK2 ₉	The ability to control functioning gas and oil supply systems using modern methods of analysis and information processing
PK2 ₁₀	The ability to plan components of technological and organizational activities and management gas and oil supply systems
PK2 ₁₁	The ability to monitor organizational activity, efficiency, excellence and perspectivegas and oil supply systems
PK2 ₁₂	The ability to improve technologies for production, transportation and storage of carbohydrate energy and organizational activities in accordance with the requirements of modern production and competitive economy
PK2 ₁₃	The ability to determination of operational parameters and design of links of technological schemes of coal mines transportation for specific mining and mining and geological conditions

Matrix of conformity defined by the educational and professional program preparation of the Bachelor of Competences for the NRC descriptors

Competence classification by NQF	Knowledge	Skill	Communication	Autonomy and responsibility
Competencies (GC)				
ZK ₁ . Ability to abstractly think, analyze and synthesize elements of technical systems for the production, transportation and storage of oil and gas	+	+		
ZK ₂ . Knowledge and understanding of tasks of oil and gas engineering, understanding of peculiarities of professional activity in oil and gas industry	+	+	+	
ZK ₃ . Ability to speak the state language both verbally and in writing in a professional activity	+		+	
ZK ₄ . Ability to speak a foreign language in a professional activity	+		+	
ZK ₅ . Skills of using information and communication technologies in oil and gas engineering		+	+	
ZK ₆ . Ability to learn and master modern knowledge related to the introduction of modern technologies for oil, gas production, transportation and storage		+		
ZK ₇ . Ability to work as a team in the operation of oil and gas facilities		+	+	
ZK ₈ . Skills for safe operation at oil and gas facilities		+		
Professional Competencies (PK)				
PK ₁ . Ability to characterize geological processes and patterns of rock formation, including oil and gas deposits	+			
PK ₂ . Understanding the general structure and interrelation of individual elements of Ukraine's hydrocarbon energy supply system	+			

Competence classification by NQF	Know- ledge	Skill	Com muni- cation	Autonomy and responsibili- ty
PK ₃ . Ability to apply knowledge of physics and chemistry to analyze the physicochemical properties of oil, condensate and natural gas		+		
PK ₄ . Ability to apply knowledge of thermodynamics, hydraulics, and gas dynamics to analyze the processes of oil and gas movement in reservoirs, wells, industrial and main pipelines		+		
PK ₅ . Ability to apply mathematical methods to the analysis of technological processes of production, drilling of wells, transportation and storage of oil and gas		+		
PK ₆ . Ability to use state-of-the-art software for operational calculations of technological parameters of the processes of production, drilling of wells, transportation and storage of oil and gas	+	+		
PK ₇ . Ability to apply the basics of materials science, machine mechanics to assess the technical state of the elements of technological equipment of systems of extraction, drilling, transportation and storage of oil and gas	+	+		
PK ₈ . Ability to apply basic methods of analysis and assessment of the state of the elements of oil and gas systems by means of technical diagnostics in industrial and laboratory conditions		+		
PK ₉ . Ability to design elements of technical systems for the production, transportation and storage of oil and gas		+		
PK ₁₀ . Understanding the general principles for choosing the means of control and automation of technological processes in the oil and gas industry	+			
PK ₁₁ . Ability to analyze operating modes of an oil and gas facility, make optimal choice of technological equipment, perform optimization of operating mode by a certain criterion		+	+	+
PK ₁₂ . Ability to perform technological and technical and economic evaluation of the efficiency of using basic oil and gas technologies and technical devices		+	+	+
PK ₁₃ . Ability to plan and organize the work of a structural unit of an oil and gas company in accordance with the requirements of life safety, labor protection and environmental protection.		+	+	+
Professional competencies of Unit 1 “Oil and Gas Construction wells »				
PK ₁₁ . Ability to create drilling technology for oil and gas wells	+	+		+
PK ₁₂ . Ability to construct oil and gas wells	+	+		+
PK ₁₃ . Ability to calculate optimal drilling modes for oil and gas wells	+	+		+
Ability to use in practice the methods of diagnostics of the level of efficiency of equipment for drilling oil and	+	+	+	+

Competence classification by NQF	Know- ledge	Skill	Com muni- cation	Autonomy and responsibili- ty
gas wells				
PK1 ₅ . Ability to ensure the safety of drilling operations in accordance with the operating rules	+	+		+
PK1 ₆ . Ability to evaluate and restore the quality of oil and gas wells	+	+		+
PK1 ₇ . Ability to the normative and technical support for the processes of construction of oil and gas wells	+	+		+
PK1 ₈ . Ability to organize the work on the construction of oil and gas wells in terms of ensuring a high level of productivity, labor safety and minimal costs	+	+	+	+
PK1 ₉ . Ability to control the construction of oil and gas wells using modern methods of analysis and information processing	+	+	+	+
PK1 ₁₀ . Ability to planning of components of technological and organizational activity and management of construction of oil and gas wells	+	+	+	+
PK1 ₁₁ . Ability to monitoring of organizational activity, efficiency, perfection and prospect of oil and gas wells	+	+	+	+
PK1 ₁₂ . Ability to improve the technology of oil and gas wells and organizational activities in accordance with the requirements of modern production and a competitive economy	+	+		+
Professional competencies of Unit 2 "Hydrocarbon Energy Extraction, Transportation and Storage Technologies"				
PK2 ₁ . The ability to create elements technologies of production, transportation and storage of hydrocarbon energy	+	+		+
PK2 ₂ . The ability to evaluate gas content of methane-coal deposits and creation of systems and technologies for their development	+	+		+
PK2 ₃ . The ability to calculation of optimal modes of operation of gas-oil supply systems for different operating conditions	+	+		+
PK2 ₄ . The ability to the use in practice of methods of diagnostics of the level of efficiency of gas-oil supply systems	+	+	+	+
PK2 ₅ . The ability to ensuring the safety of components of gas-oil supply systems in accordance with the operating rules	+	+		+
PK2 ₆ . The ability to evaluate and restoring item quality metrics gas and oil supply systems for specific operating conditions	+	+		+
PK2 ₇ . Regulatory and technical capacity providing processes for creation, operation and recovery of production systems and technologies carbonyhydrate energy	+	+		+
PK2 ₈ . The ability to organize work gas and oil supply systems under conditions of high productivity, safety and	+	+	+	+

Competence classification by NQF	Know- ledge	Skill	Com muni- cation	Autonomy and responsibili- ty
minimum costs				
PK2 ₉ .The ability to control gas and oil supply systems using modern methods of analysis and information processing	+	+	+	+
PK2 ₁₀ .The ability to plan components of technological and organizational activities and managementgas and oil supply systems	+	+	+	+
PK2 ₁₁ .The ability to monitor organizational activity, efficiency, excellence and perspectivegas and oil supply systems	+	+	+	+
PK2 ₁₂ .The ability to improve technologies for production, transportation and storage of carbohydrate energy and organizational activities in accordance with the requirements of modern production and competitive economy	+	+		+
PK2 ₁₃ .The ability to determination of operational parameters and design of links of technological schemes of coal mines transportation for specific mining and mining and geological conditions	+	+		+

4 REGULATORY CONTENTS OF PREPARATION FORMULATED IN DATES LEARNING RESULTS

The final, final and integrative learning outcomes that define the normative content of the training and correlate with the above list of general and specific competencies are given below.

Final, final and integrative learning outcomes bachelor's degree in specialty 185 Oil and Gas Engineering and Technology defining the normative content of the training and correlating with the above list of general and specific competencies presented in Table 4.1.

Table 4.1 -Bachelor's learning outcomes

Comp.	Res. teach.	Learning outcomes
1	2	3
Overall learning outcomes		
ZK ₁	ZP ₁	Demonstrate the ability to think abstractly, perform analysis in the development of technological and computational diagrams of elements of technical systems for the production, drilling, transportation and storage of oil and gas.
ZK ₂	ZP ₂	Demonstrate knowledge of the current state and a deep understanding of the role of the oil and gas industry, professional activity in ensuring energy security of Ukraine.
ZK ₃	ZP ₃	Demonstrate knowledge of technical terminology, the ability to logically express their thoughts in the official language, both orally and in writing.
ZK ₄	ZP ₄	Demonstrate the ability to communicate in a foreign language, including basic knowledge of special terminology and skills in working with foreign technical publications.
ZK ₅	ZP ₅	Demonstrate skills in applying information and communication technologies to solve a specific engineering problem related to the implementation of basic

<i>1</i>	<i>2</i>	<i>3</i>
		oil and gas technologies for the extraction, drilling, transportation and storage of oil and gas.
ZK ₆	ZP ₆	Demonstrate the ability to independently acquire new knowledge using technical literature on paper and electronic media.
ZK ₇	ZP ₇	Demonstrate teamwork skills in the course of laboratory work, development of complex course projects, preparation of presentations and more.
ZK ₈	ZP ₈	Demonstrate the skills of safe activity in the process of passing industrial practices at oil and gas facilities, during laboratory work, when using computer facilities.
Professional learning outcomes		
PK ₁	PR ₁	Describe geological processes and basic patterns of rock formation, including oil and gas deposits.
PK ₂	PR ₂	Explain the general structure, interconnection and functional purpose of individual elements of Ukraine's hydrocarbon energy supply system.
PK ₃	PR ₃	Demonstrate the application of basic concepts, basic laws of physics and chemistry to predict and analyze the physicochemical properties of oil, condensate and natural gas in the processes of their extraction, drilling, transportation and storage.
PK ₄	PR ₄	Demonstrate the ability to calculate the parameters of hydro-gas dynamic processes that accompany the movement of oil and gas in reservoirs / wells / industrial and main pipelines, taking into account the basic laws of thermodynamics, hydraulics and gas dynamics.
PK ₅	PR ₅	Apply mathematical methods to determine the specific values of technological parameters of oil and gas wells, oil and gas preparation systems, industrial and main gas pipelines, gas storage facilities, other elements of the gas supply system.
PK ₆	PR ₆	Apply state-of-the-art software for design and operational calculations of the parameters of technological processes of extraction, drilling, transportation and storage of oil and gas.
PK ₇	PR ₇	To analyze the technical state of the elements of the technological equipment of the systems of extraction, transportation and storage of oil and gas using methods based on the basics of materials science and machine mechanics.
PK ₈	PR ₈	Demonstrate the ability to apply basic methods of analysis and assessment of the state of elements of oil and gas objects by means of technical diagnostics in industrial and laboratory conditions.
PK ₉	PR ₉	To design elements of technological schemes and technical devices of oil and gas production, transportation and storage systems.
PK ₁₀	PR ₁₀	Demonstrate an understanding of the general principles for the selection of controls and automation of technological processes in the oil and gas industry.
PK ₁₁	PR ₁₁	Analyze the modes of operation of the components of an oil and gas facility, make the optimal choice of technological equipment, optimize the operating mode by a certain criterion.
PK ₁₂	PR ₁₂	Evaluate the efficiency of using basic oil and gas technologies and technical devices using technical and economic criteria.
PK ₁₃	PR ₁₃	To plan and organize the work of the structural unit of the oil and gas company in accordance with the requirements of life safety, labor protection and environmental protection.

5 SELECTIVE PREPARATION CONTENTS FORMS IN RESULTS OF THE TRAINING RESULTS

Selective content of the training in the sample blocks and the student's choice for some recommended disciplines, formulated in terms of the learning outcomes presented in tables 5.1.

Table 5.1 - Professional results of training on the selective content of Bachelor's training in oil and gas engineering and technologies by sample blocks

Comp.	Res. teach.	Learning outcomes
1	2	3
Professional learning outcomes for block 1 "Construction of oil and gas wells"		
PK1 ₁	PR1 ₁	To create drilling technologies for oil and gas wells
PK1 ₂	PR1 ₂	To build oil and gas wells
PK1 ₃	PR1 ₃	Calculate optimal drilling modes for oil and gas wells
PK1 ₄	PR1 ₄	To use in practice methods of diagnostics of level of efficiency of the equipment for drilling of oil and gas wells
PK1 ₅	PR1 ₅	Ensure the safety of drilling operations in accordance with the operating rules
PK1 ₆	PR1 ₆	Evaluate and restore quality indicators for the process of oil and gas wells
PK1 ₇	PR1 ₇	Implement regulatory and technical software processes for the construction of oil and gas wells
PK1 ₈	PR1 ₈	Organize your work for the construction of oil and gas wells in terms of ensuring a high level of productivity, safety and minimum costs
PK1 ₉	PR1 ₉	Control construction of oil and gas wells using modern methods of analysis and information processing
PK1 ₁₀	PR1 ₁₀	Plan components of technological and organizational activities and manage the construction of oil and gas wells
PK1 ₁₁	PR1 ₁₁	Monitor organizational activity, efficiency, perfection and prospect of oil and gas wells
PK1 ₁₂	PR1 ₁₂	Improve oil and gas well technologies and organizational activities in accordance with the requirements of modern production and competitive economy
Professional learning outcomes according to block 2 "Technologies for production, transportation and storage of hydrocarbon energy"		
PK2 ₁	PR2 ₁	Create items technologies of production, transportation and storage of hydrocarbon energy
PK2 ₂	PR2 ₂	Evaluate gas content of methane-coal deposits and create systems and technologies for their development
PK2 ₃	PR2 ₃	Calculate and adjust operating modes for gas and oil supply systems for different operating conditions
PK2 ₄	PR2 ₄	To use in practice methods of diagnostics of the level of efficiency of gas-oil supply systems
PK2 ₅	PR2 ₅	Ensure the safety of components of gas-oil supply systems in accordance with the operating rules
PK2 ₆	PR2 ₆	Evaluate Quality Scores and update properties items gas and oil supply systems for specific operating conditions
PK2 ₇	PR2 ₇	Implement regulatory and technical providing processes for creation, operation and recovery of production systems and technologies for hydrocarbon energy
PK2 ₈	PR2 ₈	Organize the work, ensure proper bandwidth and safe operation of the links gas and oil supply systems
PK2 ₉	PR2 ₉	Control functioning gas and oil supply systems

<i>1</i>	<i>2</i>	<i>3</i>
		using modern methods of analysis and information processing
PK2 ₁₀	PR2 ₁₀	Plan components of technological and organizational activity and managementgas and oil supply systems
PK2 ₁₁	PR2 ₁₁	Monitor organizational activity, efficiency, excellence and perspectivegas and oil supply systems
PK2 ₁₂	PR2 ₁₂	Improve technologies of production, transportation and storage of carbohydrate energy and organizational activity in accordance with the requirements of modern production and competitive economy
PK2 ₁₃	PR2 ₁₃	Determine operational parameters and design links of technological diagrams of coal mines transportation for specific mining and mining and geological conditions

6 REQUIREMENTS FOR PREVIOUS LEVEL OF EDUCATION OF MANUFACTURERS

The person has the right to get a degree bachelor's degree subject to availability in her complete secondary education.

7 SCOPE OF THE REGULATION AND SELECTION PART PROGRAM

The volume of the educational and professional program is 240 ECTS credits. The normative part of the program (standard - not less than 50%) is equal to 174 ECTS credits (72.5%). The sample size is 66 ECTS credits (27.5%).

8 DISTRIBUTION OF LEARNING RESULTS BY ORGANIZATIONAL FORMS OF THE EDUCATION PROCESS

Distribution of learning outcomes by types of learning activities specialty 185Oil and Gas Engineering and Technology is given in Table 8.1.

Table 8.1 -Distribution of learning outcomes by types of learning activities

Program learning outcomes		Name of disciplines, practices, individual tasks
<i>1</i>	<i>2</i>	
1 REGULATORY PART		
And the General Training Cycle		
Res. teach.	Overall learning outcomes	
ZR ₁	Demonstrate the ability to think abstractly, perform analysis in the development of technological and computational diagrams of elements of technical systems for the production, drilling, transportation and storage of oil and gas.	Introduction to; Fundamentals of oil and gas business; Oil and gas production technologies; World and Ukrainian culture; Philosophy
ZR ₂	Demonstrate knowledge of the current state and a deep understanding of the role of the oil and gas industry, professional activity in ensuring energy security of Ukraine.	Introduction to; Fundamentals of oil and gas business; History of Ukrainian society
ZR ₃	Demonstrate knowledge of technical terminology, the ability to logically express their thoughts in the official	Ukrainian for foreign students

<i>1</i>		<i>2</i>
	language, both orally and in writing.	
ZR ₄	Demonstrate the ability to communicate in a foreign language, including basic knowledge of special terminology and skills in working with foreign technical publications.	Ukrainian for foreign students
ZR ₅	Demonstrate skills in applying information and communication technologies to solve a specific engineering problem related to the implementation of basic oil and gas technologies for the extraction, drilling, transportation and storage of oil and gas.	Informatics, algorithmization and programming
ZR ₆	Demonstrate the ability to independently acquire new knowledge using technical literature on paper and electronic media.	Philosophy; Graduation
ZR ₇	Demonstrate teamwork skills in the course of laboratory work, development of complex course projects, preparation of presentations and more.	Philosophy; Course project on oil and gas drilling; Course project on transport systems and technologies; Study, production, and undergraduate practice
ZR ₈	Demonstrate the skills of safe activity in the process of passing industrial practices at oil and gas facilities, during laboratory work, when using computer facilities.	Civil Security; Labor protection in the oil and gas industry
II cycle of vocational training		
Res. teach.	<i>Professional learning outcomes</i>	
PR ₁	Describe geological processes and basic patterns of rock formation, including oil and gas deposits.	Geology; Geology of oil and gas fields; Geodesy; Educational practice (geological); Educational practice (geodetic)
PR ₂	Explain the general structure, interconnection and functional purpose of individual elements of Ukraine's hydrocarbon energy supply system.	Introduction to; Fundamentals of oil and gas business; Transportation systems and technologies; Basics of hydrocarbon transportation and storage Study, production, and undergraduate practice
PR ₃	Demonstrate the application of basic concepts, basic laws of physics and chemistry to predict and analyze the physicochemical properties of oil, condensate and natural gas in the processes of their extraction, drilling, transportation and storage.	Physics 1; Chemistry; Transportation systems and technologies; Basics of transportation and storage of hydrocarbons; Oil and gas extraction technologies
PR ₄	Demonstrate the ability to calculate the parameters of hydro-gas dynamic processes that accompany the move-	Hydraulics; Thermodynamics and heat

	<i>1</i>	<i>2</i>
	ment of oil and gas in reservoirs / wells / industrial and main pipelines, taking into account the basic laws of thermodynamics, hydraulics and gas dynamics.	transfer; Oil and gas mechanics; Hydromechanics in drilling
PR ₅	Apply mathematical methods to determine the specific values of technological parameters of oil and gas wells, oil and gas preparation systems, industrial and main gas pipelines, gas storage facilities, other elements of the gas supply system.	Mathematics 1; Physics 1; Informatics, algorithmization and programming; Details of machines and mechanisms; Technical mechanics and resistance of materials
PR ₆	Apply state-of-the-art software for design and operational calculations of the parameters of technological processes of extraction, drilling, transportation and storage of oil and gas.	Engineering graphics; Informatics, algorithmization and programming
PR ₇	To analyze the technical state of the elements of the technological equipment of the systems of extraction, transportation and storage of oil and gas using methods based on the basics of materials science and machine mechanics.	Material Science; Details of machines and mechanisms; Rock mechanics; Oil and gas mechanics; Technical mechanics and resistance of materials
PR ₈	Demonstrate the ability to apply basic methods of analysis and assessment of the state of elements of oil and gas objects by means of technical diagnostics in industrial and laboratory conditions.	Oil and gas equipment; Technical mechanics and resistance of materials; Metrology, standardization, certification and accreditation
PR ₉	Design elements of technological circuits and technical devices of oil and gas production, transportation and storage systems.	Fundamentals of oil and gas business; Rock mechanics; Oil and gas equipment; Well drilling (for oil and gas); Course project on oil and gas drilling; Course project on transport systems and technologies; Offshore oil and gas technologies; Basics of transportation and storage of hydrocarbons; Construction and protection of gas pipelines; Oil and gas production technologies; Economics and production management; Labor protection in the oil and gas industry; Graduation
PR ₁₀	Demonstrate an understanding of the general principles for the selection of controls and automation of technolo-	Electrical engineering and power supply;

<i>1</i>		<i>2</i>
	gical processes in the oil and gas industry.	Automation of technological processes in the oil and gas industry
PR ₁₁	Analyze the modes of operation of the components of an oil and gas facility, make the optimal choice of technological equipment, optimize the operating mode by a certain criterion.	Well drilling (for oil and gas); Course project on oil and gas drilling; Basics of transportation and storage of hydrocarbons; Oil and gas production technologies; Offshore oil and gas technologies; Graduation
PR ₁₂	Evaluate the efficiency of using basic oil and gas technologies and technical devices using technical and economic criteria.	Economics and production management; Graduation
PR ₁₃	To plan and organize the work of the structural unit of the oil and gas company in accordance with the requirements of life safety, labor protection and environmental protection.	Economics and production management; Civil Security; Occupational health and industrial sanitation; Labor protection in the oil and gas industry; Technoecology; Environmental technologies in the industry
2 SAMPLE PART		
<i>Professional learning outcomes for Unit 1 Oil and Gas Wells</i>		
PR ₁₁	To create drilling technologies for oil and gas wells	Well drilling (for solid minerals); Rock mechanics; Drilling of inclined-oriented wells; Deep drilling technology; Well Drilling (Water); Drilling of technical wells; Environmental technologies in the industry; Graduation
PR ₁₂	To build oil and gas wells	
PR ₁₃	Calculate optimal drilling modes for oil and gas wells	Hydro-mechanics in drilling; Computerization of technological calculations in drilling; Drilling of inclined-directional wells; Drilling of engineering-geological wells; Drilling tampon mixes; Drilling Fluids; Well completion; Industrial and undergraduate practice
PR ₁₄	To use in practice methods of diagnostics of level of efficiency of the equipment for drilling of oil and gas wells	
PR ₁₅	Ensure the safety of drilling operations in accordance with the operating rules	
PR ₁₆	Evaluate and restore quality indicators for the process of oil and gas wells	

<i>1</i>		<i>2</i>
PR1 ₇	Implement regulatory and technical software processes for the construction of oil and gas wells	Drilling equipment operation; Metrology, standardization, certification and accreditation
PR1 ₈	Organize your work for the construction of oil and gas wells in terms of ensuring a high level of productivity, safety and minimum costs	
PR1 ₉	Control construction of oil and gas wells using modern methods of analysis and information processing	Computerization of technological calculations in drilling
PR1 ₁₀	Plan components of technological and organizational activities and manage the construction of oil and gas wells	Drilling equipment operation
PR1 ₁₁	Monitor organizational activity, efficiency, perfection and prospect of oil and gas wells	Patent Basics affairs; Internship; Pre-diploma practice; Graduation
PR1 ₁₂	Improve oil and gas well technologies and organizational activities in accordance with the requirements of modern production and competitive economy	
<i>Professional learning outcomes for Unit 2 «Hydrocarbon energy production, transportation and storage technologies »</i>		
PR2 ₁	Create items technologies of production, transportation and storage of hydrocarbon energy	Technologies for the development of coal fields; Underground storage of hydrocarbons; Oil and gas storage facilities; Non-traditional hydrocarbon production technologies; Occupational health and industrial sanitation; Technoecology; Graduation
PR2 ₂	Evaluate gas content of methane-coal deposits and create systems and technologies for their development	Assessment of gas content of methane-coal deposits; Geotechnology; Technologies for the development of coal fields; Graduation
PR2 ₃	Calculate and adjust operating modes for gas and oil supply systems for different operating conditions	Operation of gas and oil supply systems; Pipeline transportation; Automobile gas-filling compressor stations; Modeling of technological processes; Oil and gas storage facilities; Underground storage of hydrocarbons; Industrial transport; Metrology, standardization, certification and accreditation; Industrial and undergraduate practice
PR2 ₄	To use in practice methods of diagnostics of the level of efficiency of gas-oil supply systems	
PR2 ₅	Ensure the safety of components of gas-oil supply systems in accordance with the operating rules	
PR2 ₆	Evaluate Quality Scores and update properties items gas and oil supply systems for specific operating conditions	
PR2 ₇	Implement regulatory and technical providing processes for creation, operation and recovery of production sys-	Engineering Logistics; Technological modeling

<i>1</i>		<i>2</i>
	tems and technologiescarbohydrate energy	processes; The processes of underground storage of hydrocarbons
PR2 ₈	Organize the work, ensure proper bandwidth and safe operation of the linksgas and oil supply systems	Engineering Logistics; Operation of gas and oil supply systems;
PR2 ₉	Control functioning gas and oil supply systems using modern methods of analysis and information processing	Technological modeling processes; Industrial transport
PR2 ₁₀	Plan components of technological and organizational activity and managementgas and oil supply systems	Engineering Logistics;
PR2 ₁₁	Monitor organizational activity, efficiency, excellence and perspectivegas and oil supply systems	Engineering Logistics; Internship;
PR2 ₁₂	Improve technologies of production, transportation and storage of carbohydrate energy and organizational activity in accordance with the requirements of modern production and competitive economy	Pre-diploma practice; Graduation
PR2 ₁₃	Determine operational parameters and design links of technological diagrams of coal mines transportation for specific mining and mining and geological conditions	Transportation systems of mining enterprises; Graduation

9DISTRIBUTION OF THE SCOPE OF THE PROGRAM BY EDUCATION ACTIVITIES, TERMS OF TEACHING, WEEKLY LOADING

The breakdown of program and credits by type of training is given in Table 9.1.

Table 9.1 - Breakdown of the scope of higher education program

N / a	Type of educational activity	Volume, cred.	The total. counter.	Chair that teaches	Distribution in quarters
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
1	REGULATORY PART	174,0			
1.1	General training cycle				
Z1	Ukrainian for foreign students	12.0	exam	IPT	1; 2; 3; 4
Z2	History of Ukrainian society	3.0	dc	IPT	1
Z3	Philosophy	3.0	exam	AF	5
Z4	World and Ukrainian culture	3.0	exam	AF	7
Z5	Civil Security	4.0	dc	AOP	13
1.2	Training cycle				
1.2.1	<i>Basic disciplines in the field of knowledge</i>	35,0			
B1	Mathematics1	5.0	exam	VM	1; 2
B2	Chemistry	5.0	exam	Chemistry	2; 3
B3	Informatics, algorithmization and programming	3.0	dc	CCD	2; 3
B4	Physics1	5.0	exam	Physicists	3; 4
B5	Engineering graphics	3.0	exam	OKMM	2; 3
B6	Geology	2.0	exam	FTA	2
B7	Geology	2.0	exam	GIG	3

1	2	3	4	5	6
1.2.2	<i>Specialties in the specialty</i>				
F1	Introduction to Specialty	3.0	dc	TRRC	2; 3
F2	Basics of Oil and Gas Engineering	5.0	dc	TST	3; 4
F3	Oil and Gas Deposit Geology	3.0	exam	GRRCK	3
F4	Geodesy	3.0	dc	Geod	4
F5	Oil and gas mechanics	4.5	exam	TRRC	7; 8
F6	Hydraulics	4.0	exam	GMech	5; 6
F7	Thermodynamics and heat transfer	4.0	dc	GMech	5; 6
F8	Metrology, standardization, certification and accreditation	3.0	dc	IWT	9; 10
F9	Material Science	3.0	exam	PRR	7
F10	Marine oil and gas technologies	3.5	exam	TRRC	11; 12
F11	Electrical engineering and power supply	4.0	dc	SEP	5; 6
F12	Economics and production management	4.0	dc	Pre	13; 14
F13	Fundamentals of transportation and storage of hydrocarbons	5.0	exam	TST	9; 10
F14	Oil and gas equipment	3.5	dc	TRRC	11; 12
F15	Construction and protection of gas pipelines	2.0	exam	TST	9
F16	Construction and protection of gas pipelines	2.0	exam	EIPr	10
F17	Well Drilling (Oil & Gas)	4.5	exam	TRRC	9; 10
F18	Course project on oil and gas drilling	0.5	dc	TRRC	12
F19	Labor protection in the oil and gas industry	3.0	exam	AOP	15
F20	Oil and gas extraction technologies	4.0	exam	TST	11; 12
F21	Transportation systems and technologies	4.0	dc	TST	7; 8
F22	Course project on transport systems and technologies	0.5	dc	TST	8
F23	Automation of technological processes in the oil and gas industry	4.0	dc	TRRC	15
F24	Occupational hygiene and industrial sanitation	4.0	dc	AOP	5; 6
F25	Environmental technologies in the industry	4.0	exam	Ecology	13; 14
F26	Technical mechanics and resistance of materials	5.0	exam	BTPMech	5; 6
F27	Details of machines and mechanisms	4.0	exam	OKMM	7; 8
1.3	<i>Practical training and diploma specialty</i>				
P1	Educational practice (geological)	3.0	dc	GRRCK	4
P2	Educational practice (geodetic)	3.0	dc	Geod	4
P3	Educational and introductory practice	6.0	dc	TRRC	8
P4	Internship	6.0	dc	TRRC	12
P5	Pre-diploma practice	3.0	dc	TRRC	16
P6	Graduation	4.0		TRRC	16
P7	Graduation	4.0		TST	16
P8	Graduation	1.0		AOP	16
2	SELECTIVE PART	66,0			
2.1	The discipline of sample blocks				
2.1.1	Block 1. Construction of oil and gas wells				
B1.1	Rock mechanics	4.0	exam	TRRC	5; 6
B1.2	Well Drilling (for solid minerals)	3.0	dc	TRRC	7; 8
B1.3	Well Drilling (Water)	4.0	dc	TRRC	5; 6
B1.4	Drilling of technical wells	4.0	dc	TRRC	9; 10
B1.5	Drilling of engineering-geological wells	3.0	dc	TRRC	9; 10

1	2	3	4	5	6
B1.6	Hydromechanics in drilling	6.0	exam	TRRC	11; 12
B1.7	Drilling Fluids	4.0	dc	TRRC	11; 12
B1.8	Computerization of technological calculations in drilling	3.0	dc	TRRC	11; 12
B1.9	Deep drilling technology	4.0	dc	TRRC	15
B1.10	Drilling of inclined-directional wells	4.0	exam	TRRC	15
B1.11	Fundamentals of the patent case	4.0	dc	TRRC	13; 14
B1.12	Drilling tampon mixes	4.0	exam	TRRC	15
B1.13	Drilling equipment operation	4.0	exam	TRRC	13; 14
B1.14	Well completion	3.0	dc	TRRC	14
2.1.2	Block 2. Extraction, transportation and storage technologies carbohydrate energy				
B2.1	Industrial transport	4.0	exam	TST	5; 6
B2.2	Technoecology	4.0	dc	Ecology	7; 8
B2.3	Geotechnology	3.0	dc	PRR	8
B2.4	Assessment of gas content of methane-coal deposits	4.0	dc	TST	9; 10
B2.5	Modeling of technological processes	3.0	dc	TST	9; 10
B2.6	Technologies for the development of coal fields	3.0	exam	AOP	11
B2.7	Technologies for the development of coal fields	3.0	exam	TST	12
B2.8	Pipeline transportation	4.0	exam	TST	11; 12
B2.9	Oil and gas storage facilities	3.0	dc	TST	11; 12
B2.10	Transportation systems of mining enterprises	4.0	dc	TST	15
B2.11	Engineering Logistics	4.0	exam	TST	13; 14
B2.12	Technologies for the production of unconventional hydrocarbons	4.0	dc	TST	13; 14
B2.13	Processes of underground storage of hydrocarbons	4.0	exam	TST	15
B2.14	Operation of gas and oil supply systems	4.0	exam	TST	15
B2.15	Automobile gas filling compressor stations	3.0	dc	TST	15
2.2	Disciplines chosen by the student		dc		
B1	Discipline 1	3.0	dc		
B2	Discipline 2	3.0	dc		
B3	Discipline 3	3.0	dc		
B4	Discipline 4	3.0	dc		
Together for regulatory and sample parts		240,0			

Notes: *Indication of the departments responsible for teaching the disciplines:*

AOP - Aerology and Occupational Safety; BTPMech - construction, theoretical and applied mechanics; VM - Higher Mathematics; Hydrogeology and Engineering Geology; Geod - geodesy; GRRC - Geology and Exploration for Minerals; GMech - Mining Mechanics; FTA - General and Structural Geology; Ecology - ecology; EIPr - electric drive; InMov - foreign languages; IPT - History and Political Theory; CFS - physical education and sports; IWT - metrology and information and measurement technologies; OKMM - the basics of designing mechanisms and machines; CDCS - computer systems software; PREC - Applied Economics; RDP - underground mining; EPS - power supply systems; TRRC - exploration techniques for minerals; TST - transport systems and technologies; AF - Philosophy and Pedagogy.

10 REQUIREMENTS FOR THE STRUCTURE OF DISCIPLINES, PRACTICES, INDIVIDUAL TASKS

Components of the work program of the discipline must be a description of the discipline, expected learning outcomes, structure (thematic plan), topics of practical (seminar classes), laboratory, tasks for independent work, generic diagnostic tools, criteria and procedures for assessing the level of discipline formation, discipline literature (main, auxiliary), information resources on the Internet.

Compulsory components of a specific type of practice program are as follows: purpose and tasks, requirements for components, content of practice, requirements for report of trainee, evaluation of results.

The components of individual task programs should be the following: goal, output and tasks, Organization of performance, composition and structure of the explanatory note, structure, requirements for individual elements, methodological recommendations for implementation, questions for preparation for protection, bibliographic list, requirements for design, criteria and procedures for evaluating the quality of performance.

Learning outcomes by credit modules (discipline and other forms of educational process organization) are defined as the specification of programmatic learning outcomes in the programs of educational disciplines, practices, individual tasks. and are used as criteria for selecting the required content modules (topics).

The list of recommended literature should include available printed (electronic resources of local or remote access in compliance with the requirements of intellectual property law) textbooks, manuals, lecture notes, reference books, textbooks.

11 GENERAL REQUIREMENTS FOR DIAGNOSTICS

The information base for the creation of diagnostic tools for the final control should be expected learning outcomes by types of training activities.

Certification of candidates for bachelor's degree is carried out in the following forms:

Current control of student's fulfillment of educational and professional program:

- forms of current control over the disciplines of the curriculum in the specialty 185 Oil and Gas Engineering and Technology determined by the work programs of the respective disciplines;
- a form of final control over each discipline is an exam or credit;

The final control of the student's fulfillment of the educational and professional program is the certification examination in the form of complex qualification work or the diploma work of the bachelor.

The bachelor's degree is awarded by the examination board as a result of successful completion by the higher education applicant of the relevant educational program and successful passing certification exam or thesis defense.

12 TERMS OF TRAINING FOR FORMS

Eye form - 3 years 10 months, correspondence - 3 years 10 months.

13 STRUCTURAL-LOGICAL DIAGRAM

The sequence of training activities of the applicant by daytime training is given in tables 13.1 and 13.2.

Table 13.1 - Sequence of training activities by regulatory unit and block 1. Construction of oil and gas wells

Course	Semester	Quarter	Designation of educational activities	Number of disciplines taught per quarter	Amount of discipline taught per semester	Number of disciplines taught per year
1	1	1	Z1; Z2; B1; B3; B5; B6; F1	7	8	15
		2	Z1; B1; B3; B5; B7; F1	6		
	2	3	Z1; B2; B4; F2; F3	5	8	
		4	Z1; B2; B4; F2; F4; P1; P2	7		
2	3	5	Z3; F26; F6; F7; F11; F24; B1.1	7	8	16

4	6	F26; F6; F7; F11; F24; B1.1	6	8	16	
	7	Z4; F27; F5; F9; F21; B1.2	6			
	8	F27; F5; F21; F22; B1.2; B1.3; P3	7			
3	9	F8; F13; F17; F15; B1.4; B1.5	6	8	16	
	10	F8; F13; F17; F16; B1.4; B1.5; B1	7			
	11	F10; F20; F14; B1.6; B1.7; B1.8; B2	7			
	12	F10; F20; F14; F18; B1.6; B1.7; B1.8; P4	8			
4	13	Z5; F12; F25; B1.9; B1.11; B3	6	7	15	
	14	Z5; F12; F25; B1.9; B1.11; B1.14	6			
	8	15	F19; F23; B1.10; B1.12; B1.13; Q4	6		8
		16	P5; P6; P7; P8	2		

Table 13.2 - Sequence of training activities by regulatory unit and block 2. Technologies for extraction, transportation and storage of hydrocarbon energy

Course	Semester	Quarter	Designation of educational activities	Number of disciplines taught per quarter	Amount of discipline taught per semester	Number of disciplines taught per year
1	1	1	Z1; Z2; B1; B3; B5; B6; F1	7	8	15
		2	Z1; B1; B3; B5; B7; F1	6		
	2	3	Z1; B2; B4; F2; F3	5	8	
		4	Z1; B2; B4; F2; F4; P1; P2	7		
2	3	5	Z3; F26; F6; F7; F11; F24; B2.1	7	8	16
		6	F26; F6; F7; F11; F24; B2.1	6		
	4	7	Z4; F27; F5; F9; F21; B2.2	6	8	
		8	F27; F5; F21; F22; B2.2; B2.3; P3	7		
3	5	9	F8; F13; F17; F15; B2.4; B2.5	6	8	16
		10	F8; F13; F17; F16; B2.4; B2.5; B1	7		
	6	11	F10; F20; F14; B2.6; B2.8; B2.9; B2	7	8	
		12	F10; F20; F14; F18; B2.7; B2.8; B2.9; P4	8		
4	7	13	Z5; F12; F25; B2.11; B2.12; B3	6	6	15
		14	Z5; F12; F25; B2.11; B2.12	5		
	8	15	F19; F23; B2.10; B2.13; B2.14; B2.15; B2	7	9	
		16	P5; P6; P7; P8	2		

14 INTERNAL QUALITY ASSURANCE SYSTEM OF HIGHER EDUCATION

The Higher Education Quality Assurance System of the State Higher Education "NSU" contains the following components:

- ensuring the quality of higher education during the design of the educational process;
- quality assurance of higher education during the educational process in accordance with the project documents (specialty education programs, work programs of educational disciplines, other credit modules, a set of initial methodological and information support of the educational process, curriculum, individual curriculum of the higher education applicant, calculation personnel support for the implementation of the curriculum);
- management of the quality assurance system of higher education.

14.1 Competent Approach to Designing the Educational Process

The quality of higher education in the specialties and levels of higher education is established in the design of the educational process on the basis of a competent approach as follows:

- the normative part of the university's educational programs by specialty includes all competences and program results of study with a degree of complexity, characteristic for certain levels of higher education in accordance with the standards of higher education;
- substantiation of the nomenclature of organizational forms of the educational process (academic disciplines, individual tasks, practices) is carried out by adequate distribution of programmatic results of training;
- learning outcomes for each type of learning activity are determined by decomposition and concretization of programmatic learning outcomes and are used as criteria for selecting the content of educational disciplines, practices, and individual tasks;
- the planned results of training for each type of educational activity of the applicant in the form of generalized and specified control tasks are used to create diagnostic tools. Generalized control tasks should be provided to applicants at the beginning of the course;
- certification is assessed by the degree of formation of program competencies.

The implementation of a competent approach to the design of higher education by creating a clear link between the external goals of higher education with disciplines, practices and individual tasks is a decisive factor in the quality of higher education and the creation of a real system of internal provision.

The activities of the departments for the creation of educational programs, work programs and complexes of educational, methodological and information support of the discipline are regulated by the Standard "Design of the educational process", approved by the Academic Council of the University of November 15, 2016 (Protocol No. 15).

14.2 University Higher Education Quality Measurement Indicators

According to the Higher Education Quality Policy of the State University of Higher Education "NSU", approved by the Academic Council, the measurement of the quality of higher education by each specialty during self-examination and external evaluation of the activity of the University and its departments is carried out by such indicators;

- quality of higher education content;
- quality of educational programs of NSU in specialties;
- quality of educational process;
- quality of participants in the initial process;
- quality of educational and logistical resources;
- quality of higher education results;
- quality dynamics.

14.3 Quality Management of Higher Education

Higher education quality management system is a set of organizational measures, techniques, processes, procedures and mechanisms by which NSU ensures the effectiveness of the internal quality system.

The quality management system is based on the following principles:

- organization of the system functioning with the participation of external parties;
- orientation towards consumers of educational services;
- the regulatory support for the implementation of the quality policy is carried out by the NSU standards for all quality assurance indicators;
- ensuring academic honesty and freedom;
- avoidance of academic fraud;
- Prevention of intolerance or discrimination of students or teachers;
- meeting the expectations of society, higher education providers, employers and partner organizations;
- providing quality policy with official status and accessibility for the general public;

- Subordination of the planned reports of NSU officials to the implementation status of the Higher Education Quality Policy and the University Development Program.

The following management mechanisms and the creation of an effective internal quality system are used:

1) consideration of the state of internal quality assurance of higher education by the University Supervisory Board;

2) implementation of “Measures to modernize the internal quality assurance system of the State Higher Education Institution“ NSU ”, concluded in accordance with the“ Standards and Recommendations for Quality Assurance in the European Higher Education Area (ESG) ”, approved by the Rectorate and implemented by order of the Rector;

3) systematic monitoring of the quality of teaching of disciplines by scientific and pedagogical staff, carried out by the scientific and methodological council of the University;

4) introduction of a system of interviewing applicants for higher education quality;

5) the rating of scientific and pedagogical staff by performance indicators in accordance with the licensing conditions for conducting educational activities;

6) quality control of higher education during the annual reports of the departments.

The control is carried out in accordance with the "Regulations on the recognition and monitoring of the ability of the departments to start and conduct educational activities in accordance with the license conditions", approved by the Academic Council of the State University "NSU".

The purpose of self-analysis of the chairs is as follows:

- preparation for the commencement of the pursuit of educational activity in a new specialty, another higher education level and an increase in the licensed volume;

- monitoring the level of quality of higher education during educational activities.

Analysis of self-analysis reports and development of proposals for improving the quality of higher education is carried out by a permanent working group on quality, established by the order of the Rector of January 27, 2016 under No. 4 “On the system of internal quality assurance of higher education”;

7) Rectoral control is systematically carried out in order to monitor the implementation of the competence approach, the quality of education, ensuring the objectivity of measurement and evaluation of the academic achievements of higher education applicants. Rectoral control can be carried out during control measures for any discipline and form of study;

8) Reporting of deans at the meetings of the Rectorate or the Academic Council of the University on the fulfillment of the tasks and achievement of indicators of quality assurance of higher education, which regulate the planned absolute indicators of activity, in accordance with the NSU Development Program;

9) reporting to the Academic Council of the Vice-rector for scientific-pedagogical, educational work and prospective development on the status of implementation by the units of the University of the program of development of NSU "Creating a system of quality assurance of higher education";

10) participation in the domestic and foreign systems of ranking higher education institutions and the use of rating results for management decisions.

The internal quality assurance system is evaluated by the National Agency for Quality Assurance in Higher Education or by accredited independent evaluation institutions and quality assurance for higher education to ensure that it meets the applicable requirements.

15 FINAL PROVISIONS

The educational program is published on the University's website prior to the admission of students to study.

The Bachelor of Oil and Gas Engineering and Technology training program ensures the quality of higher education at the design stage due to the following factors:

1) identification of products and tools of the bachelor's work in oil and gas engineering and technologies, subjects and objects of activity, set of techniques and methods of work;

2) formation of the list fundamental and general engineering (basic) educational disciplines, necessary for understanding and mastering of professional disciplines by specialty;

3) definition systems and technologies to be studied, including common ones that ensure the functioning of enterprises;

4) the use of programmatic learning outcomes in accordance with higher education standards as requirements for the level of formation and complexity of the bachelor's professional competencies, which can be identified, quantified and measured;

5) distribution of learning outcomes in the program by all forms of organization of educational process and types of training sessions, which eliminates duplication of educational material;

6) defining in the work programs of the disciplines, practices, individual tasks of the learning outcomes by specifying the program learning outcomes that are used as the selection criteria for the required content modules.

The cycle of vocational training in the specialty ensures the acquisition of educational and professional qualifications by the applicant.

Educational disciplines detailing the components of professional knowledge and skills are taken to the optional component of the educational program.

The educational program allows students to choose their own educational trajectory through mastering courses of the student's choice (total of 12 credits ECTS) and the disciplines of the sampling units (total 54 ECTS credits).

The responsibility for implementing the educational program and ensuring the quality of higher education is the responsibility of the graduates of the specialty departments.

Educational edition

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