Ministry of Education and Science of Ukraine
Dnipro University of Technology

MINING FACULTY

DEPARTMENT OF TRANSPORT SYSTEMS AND TECHNOLOGIES

WORK PROGRAM OF THE ACADEMIC DISCIPLINE
"Technologies of oil and gas extraction "

Field of study………….……….....	18 Production and Technology
Specialty...............................	185 Oil and Gas Engineering and Technology
Academic degree.........................	Bachelor
Academic program......	Oil and Gas Engineering and Technology
Language of study........................	English

Prolonged: for 20 __ / 20__ academic year _____ (_____) "__" ___ 20__.
(Signature, name, date)

for 20 __ / 20__ academic year _____ (_____) "__" ___ 20__.
(Signature, name, date)

Dnipro
NTU "DP"
2018

Work program of the academic discipline "Technologies of oil and gas extraction" for bachelor's specialty 185 "Oil and Gas Engineering and Technology" / L.N. Shirin EA Korovyaka / NTU "Dnipro Polytechnic" Department of transport systems and technologies. - DA: NTU «DP» 2018 - 13 p.

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The work program regulates:

– key goals and objectives;
– the disciplinary learning outcomes generated through the transformation of the intended learning outcomes of the degree program;
– the content of the discipline formed according to the criterion "disciplinary learning outcomes";
– the discipline program (thematic plan by different types of classes);
– distribution of the discipline workload by different types of classes;
– an algorithm for assessing the level of achievement of disciplinary learning outcomes (scales, tools, procedures and evaluation criteria);
– criteria and procedures for evaluating the academic achievements of applicants by discipline;
– the contents of the educational and methodological support of the discipline;

The work program is designed to implement a competency approach in planning an education process, delivery of the academic discipline, preparing students for control activities, controlling the implementation of educational activities, internal and external quality assurance in higher education, accreditation of degree programs within the specialty.

CONTENTS

1 DISCIPLINE OBJECTIVES

In the educational and professional programs of the Dnipro University of Technology specialty 185 "Oil and gas engineering and technology", the distribution of program learning outcomes (NRN) for the organizational forms of the educational process is done. In particular, the following learning outcomes are attributed to the discipline V2.7 "Pipelines":

VR2.3	Calculate and adjust the modes of gas-oil supply for various conditions
VR2.4	Use practical methods of diagnosis efficiency of gas-oil supply
VR2.5	To ensure the safety of the components of the gas oil supply in accordance with the operating rules
VR2.6	Assess the quality and restore the properties of the elements of the gas oil supply for specific conditions

The objective of discipline - formation of knowledge for the calculation methodology in the design and operation of pipelines.

The implementation of the objective requires transforming program learning outcomes into the disciplinary ones as well as an adequate selection of the contents of the discipline according to this criterion.

2 INTENDED DISCIPLINARY LEARNING OUTCOMES

Code NRN	Disciplinary learning outcomes (DRN)	
	DRN code	content
CL1	CL1-F23	analyze technological and computational circuit elements of technical systems of drilling, production, transportation and storage of oil and gas.
SR3	SR3-F23	characterized ripping, drilling, transportation and storage of hydrocarbons
SR9	SR9-F23	elements to create technological schemes and technical equipment of production, transportation and storage of oil and gas
SR11	SR11-F23-1	analyze operating modes constituents of oil and gas facility
	SR11-F23-2	conduct an optimal range of equipment
	SR11-F23-3	perform optimization of usage by certain criteria

3 BASIC DISCIPLINES

Subjects	The acquired learning outcomes
F2 Fundamentals of Oil and Gas business	know the history and prospects of oil and gas sector of Ukraine and the world
	understanding of the problems of oil and gas exploration, development patterns oil and GasIts place in society development, engineering and technology
	describe the main elements of naftohazopostochannya
	know the basics of creating elements of technological schemes and technical equipment of production, transportation and storage of oil and gas
	be aware of drilling oil and gas wells
	to know about extraction technology, methods of transmission and means of storage of carbohydrate energy

Subjects	The acquired learning outcomes
	know the basics of normative and technical support for the creation, operation and recovery systems and technologies for energy production of hydrocarbons
F14 Drilling (oil and gas)	elements to create technological schemes and technical equipment of oil and gas
	analyze operating modes constituents of oil and gas facility, to conduct an optimum range of equipment, perform the optimization of usage by certain criteria.
	determine the process parameters in the development of wells Oil and Gas
	build oil and gas wells
	carry out regulatory and technical support processes of construction of oil and gas wells
	organize work on the construction of oil and gas wells
	monitor organizational performance, efficiency, perfection and prospects of construction of oil and gas wells
F13 Fundamentals of transport and storage of hydrocarbons	make payments regimes hazonaftopostachannya of systems for different operating conditions
	apply diagnostic methods of performance systems hazonaftopostachannya
	taking measures to ensure Security systems components hazonaftopostachannya according to operating rules
	ensure quality and restore the properties of the elements of hazonaftopostachannya specific conditions

4 WORKLOAD DISTRIBUTION BY THE FORM OF EDUCATIONAL PROCESS ORGANIZATION AND TYPES OF CLASSES

Type of classes	Workload hours	Distribution by forms of education, *hours*					
		Full-time		Part-time		Distance	
		Classes (C)	Individual work (IW)	Classes (C)	Individual work (IW)	Classes (C)	Individual work (IW)
Lectures	80	26	54	-	-	12	68
Practical	40	26	14	-	-	6	34
Laboratory	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Total	120	52	68	-	-	18	102

5 DISCIPLINE PROGRAM BY TYPES OF CLASSES

Ciphers DRN	Types and topics of training sessions	The volume of components, *hours*
	LECTURES	**80**
module 1 Heotehnolohichni basis for development of oil and gas fields (40 hours)		
CL1-F23	**1. Oil and natural gas: Origin and Significance**	**2**
	Preface. 1.1. The origin of oil and natural gas	

Ciphers DRN	Types and topics of training sessions	The volume of components, *hours*
	1.2. The composition and physico-chemical properties of oil and natural gas	
	1.3 The value of natural hydrocarbons for energy and industry in general	
	1.4 Challenges and prospects of the oil and gas industry	
CL1-F23 SR3-F23	**2. The origin of hydrocarbons.**	**2**
	2.1 Conditions of the formation of deposits	
	2.2 The main types of oil and gas	
	2.2.1 The concept of "field", "trap", "deposit", "layer"	
	2.2.2 Porosity, permeability, rock trischynovatist	
	2.2.3. The forces that drive and keep the oil in the reservoir	
	2.3 Resources not related hydrocarbon minerals	
CL1-F23 SR3-F23	**3. Geological physical characteristics of the facility design**	**4**
	3.1 Terms of occurrence of productive strata	
	3.2 porid- material composition rock collectors;	
	3.3 Composition fluid reservoirs, their phase state	
	3.4 Energy characteristic of deposit	
	3.5 of oil and gas, their main characteristics	
	3.6 The limits change measurement units	
CL1-F23 SR3-F23	**4. Oil and gas**	**4**
	4.1 Geological and reserves of oil and petroleum gas in the deposit	
	4.2 Methods for determination of oil and gas.	
	4.2.1 Calculation of the oil volume method	
	4.2.2 Definition of balance reserves of oil on the cards naftonasychenoyi effective thickness.	
	4.2.3 Definition of extracted oil and gas reserves in	
	4.3 Factors extract oil (OIO) in different modes	
	4.4 Calculation (estimate) KVN.	
CL1-F23 SR3-F23	**5. Hydrodynamic basis for development of oil fields**	**4**
	5.1 Types of hydrodynamic regimes of oil and gas deposits, especially their manifestations	
	5.2. Depression stimulation.	
	5.3. The concept of system development put its main characteristics.	
	5.4. Classification systems development	
	5.5.Rozmischennya wells in the area of the deposit.	
SR3-F23 SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	**6. Calculation of key indicators of development of oil**	**6**
	6.1 Crude oil, fluid and water injection for the year and start of development	
	6.2 Selection of oil from the bottom, obvodnyuye products	
	6.3 Average daily flow rates of one well in oil and fluid acceleration	
	6.4 Compensation selection of liquid water injection, dynamic pressure reservoir and others. figures	
SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	**7. Indicators of development of gas deposits**	**4**
	7.1 Technological development indicators	
	7.2 Performance indicators of development of gas deposits.	
	7.3 Stages of development of gas fields, their selection and duration	
	7.4 Indicators of schedule and under development	

Ciphers DRN	Types and topics of training sessions	The volume of components, *hours*
SR3-F23 SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	**8. System placing wells in gas content area** gas fields	**8**
	8.1 Detection of natural gas	
	8.2 Calculation of gas reserves in gas fields	
	8.3 ratio and gas extraction layers hazoviddacha	
	8.4 Modes bearing strata	
	8.5 Parameters develop gas fields: 8.5.1 Priority commissioning technology systems; 8.5.2 Grid accommodation places in the oil drilling	
	8.6 Ways to maintain balance: 8.6.1 pace of commissioning of pumping gas; 8.6.2 Energy Technologies application layer	
SR3-F23 SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	**9. The collection and preparation of oil and gas fields**	**6**
	9.1 system of oil and gas fields, their characteristics	
	9.2 Installations and construction system of oil and gas.	
	9.3 The collection of gas in the oil fields and its preparation for transport.	
	9.4 The process of preparing oil - dehydration, desalination, stabilization, deэmulsatsyya	
	9.5 Flow charts installations for the preparation of oil.	
	9.6 Industrial collection and preparation of natural gas	
2 module Downhole oil and gas and security measures in the oil (40 hours)		
SR3-F23 SR9-F23	**10. Operating fountain wells**	**6**
	10.1 Methods of operating oil wells.	
	10.2 The rise of liquid in the wells.	
	10.3 The balance of pressures when using gas-liquid lift	
	10.4 Types flowing, artesian and gas lift	
	10.5 spouting terms and calculation principles lift	
	10.6 Equipment fountains wells.	
	10.7 Complications in the wells and fountains.	
SR3-F23 SR9-F23	**11. Operation of gas lift wells**	**6**
	11.1 gas-lift operation of wells.	
	11.2 Constructions gas lift lifts.	
	11.3 Start gas- liftnoyi wells in operation;	
	11.4 Starting pressure.	
	11.5 Periodic gas-lift.	
	11.6 Complications in the gas lift wells.	
SR3-F23 SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	**12. Operating rod hole pumps (SHSNU)**	**8**
	12.1 Schematic diagram SHSNU, its composition and purpose.	
	12.2 Sucker pumps, tubing (NKT), wellhead equipment, swing verstaty-	
	12.3 Operating and energy performance of SHSNU	
	12.4 Complications эkspluatatsiyi wells SHSNU	
	12.5 Ways to eliminate complications	
SR3-F23 SR9-F23 SR11-F23-1 SR11-F23-2	**13. Exploitation wells submersible pump installations elektrovidtsentrovyh**	**8**
	13.1 Schematic diagram of the equipment UЭTSN wells, its elements and their purpose.	

Ciphers DRN	Types and topics of training sessions	The volume of components, *hours*
SR11-F23-3	Key Features 13.2 ЭTSN region and recommended mode of operation.	
	13.3 Performance UЭTSN operation of wells.	
	13.4 Principle scheme of screw pumps, their scope	
	13.5 Instruments and apparatus for measuring liquid levels in wells	
SR3-F23 SR9-F23 SR11-F23-2 SR11-F23-3	**14. Design and regulation of oil and gas-oil fields**	**6**
	14.1. Drawing up and approval of design documents for input in the development of oil and gas-oil deposits	
CL1-F23 SR3-F23 SR9-F23	**15. Precautions when operating oil and gas fields**	**6**
	PRACTICAL TRAINING	**40**
SR9-F23 SR11-F23-1 SR11-F23-2 SR11-F23-3	1 Calculation reservoir pressure in the extraction hole	6
	2 oil well flow rate calculation	8
	3 Calculation flow rate gas wells	8
	4 Calculation of reserves of oil deposits	6
	5 Estimation of reserves gas fields	6
	6 The timing of the development of oil pool	6
	TOTAL	**120**

6 KNOWLEDGE PROGRESS TESTING

Certification of student achievement is accomplished through transparent procedures based on objective criteria in accordance with the University Regulations "On Evaluation of Higher Education Applicants' Learning Outcomes".

The level of competencies achieved in relation to the expectations, identified during the control activities, reflects the real result of the student's study of the discipline.

6.1 GRADING SCALES

Assessment of academic achievement of students of the Dnipro University of Technology is carried out based on a rating (100-point) and institutional grading scales. The latter is necessary (in the official absence of a national scale) to convert (transfer) grades for mobile students.

The scales of assessment of learning outcomes of the NTUDP students

Rating	Institutional
90 ... 100	Excellent
74 ... 89	Good
60 ... 73	Satisfactory
0 ... 59	Failed

Discipline credits are scored if the student has a final grade of at least 60 points. A lower grade is considered to be an academic debt that is subject to liquidation in

accordance with the Regulations on the Organization of the Educational Process of NTUDP.

6.2 DIAGNOSTIC TOOLS AND EVALUATION PROCEDURES

The content of diagnostic tools is aimed at controlling the level of knowledge, skills, communication, autonomy, and responsibility of the student according to the requirements of the National Qualifications Framework (NQF) up to the 7th qualification level during the demonstration of the learning outcomes regulated by the work program.

During the control activities, the student should perform tasks focused solely on the demonstration of disciplinary learning outcomes (Section 2).

Diagnostic tools provided to students at the control activities in the form of tasks for the intermediate and final knowledge progress testing are formed by specifying the initial data and a way of demonstrating disciplinary learning outcomes.

Diagnostic tools (control tasks) for the intermediate and final knowledge progress testing are approved by the appropriate department.

Type of diagnostic tools and procedures for evaluating the intermediate and final knowledge progress testing are given below.

Diagnostic and assessment procedures

INTERMEDIATE CONTROL			FINAL ASSESSMENT	
training sessions	diagnostic tools	procedures	diagnostic tools	procedures
lectures	control tasks for each topic	task during lectures	comprehensive reference work (CCW)	determining the average results of intermediate controls; CCW performance during the examination at the request of the student
practical	control tasks for each topic	tasks during practical classes		
	or individual task	tasks during independent work		

During the intermediate control, the lectures are evaluated by determining the quality of the performance of the control specific tasks. Practical classes are assessed by the quality of the control or individual task.

If the content of a particular type of teaching activity is subordinated to several descriptors, then the integral value of the assessment may be determined by the weighting coefficients set by the lecturer.

Provided that the level of results of the intermediate controls of all types of training at least 60 points, the final control can be carried out without the student's immediate participation by determining the weighted average value of the obtained grades.

Regardless of the results of the intermediate control, every student during the final knowledge progress testing has the right to perform the CDF, which contains tasks covering key disciplinary learning outcomes.

The number of specific tasks of the CDF should be consistent with the allotted time for completion. The number of CDF options should ensure that the task is individualized.

The value of the mark for the implementation of the CDF is determined by the average evaluation of the components (specific tasks) and is final.

The integral value of the CDF performance assessment can be determined by taking into account the weighting factors established by the department for each NLC descriptor.

6.3 EVALUATION CRITERIA

The actual student learning outcomes are identified and measured against what is expected during the control activities using criteria that describe the student's actions to demonstrate the achievement of the learning outcomes.

To evaluate the performance of the control tasks during the intermediate control of lectures and practicals the assimilation factor is used as a criterion, which automatically adapts the indicator to the rating scale:

$$O_i = 100 \, a \, / \, m,$$

where a - number of correct answers or significant operations performed according to the solution standard; m - the total number of questions or substantial operations of the standard.

Individual tasks and complex control works are expertly evaluated using criteria that characterize the ratio of competency requirements and evaluation indicators to a rating scale.

The content of the criteria is based on the competencies identified by the NLC for the Bachelor's level of higher education (given below).

General criteria for achieving learning outcomes 7th qualification for LDCs (BA)

Integral competence is the ability to solve complex problems and specialized practical problems in a particular area of professional activities or in a learning process that involves the use of certain theories and methods of the relevant scientific areas and characterized by complexity and conditions uncertainty.

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	Knowledge	
♦ Conceptual knowledge acquired during the training and professional activities, including some knowledge of modern achievements; ♦ critical	- A great - proper, reasonable, sensible. Measures the presence of: - conceptual knowledge; - a high degree of state ownership issues; - critical understanding of the main theories, principles, methods and concepts in education and careers	95-100
	A non-gross contains mistakes or errors	90-94
	The answer is correct but has some inaccuracies	85-89
	A correct some inaccuracies but has also proved insufficient	80-84

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
understanding of the main theories, principles, methods, and concepts in education and careers	The answer is correct but has some inaccuracies, not reasonable and meaningful	74-79
	A fragmentary	70-73
	A student shows a fuzzy idea of the object of study	65-69
	Knowledge minimally satisfactory	60-64
	Knowledge unsatisfactory	<60
Ability		
♦ solving complex problems and unforeseen problems in specialized areas of professional and/or training, which involves the collection and interpretation of information (data), choice of methods and tools, the use of innovative approaches	- The answer describes the ability to: - identify the problem; - formulate hypotheses; - solve problems; - choose adequate methods and tools; - collect and interpret logical and understandable information; - use innovative approaches to solving the problem	95-100
	The answer describes the ability to apply knowledge in practice with no blunders	90-94
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of a requirement	85-89
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the two requirements	80-84
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the three requirements	74-79
	The answer describes the ability to apply knowledge in practice but has some errors in the implementation of the four requirements	70-73
	The answer describes the ability to apply knowledge in practice while performing tasks on the model	65-69
	A characterizes the ability to apply knowledge in performing tasks on the model, but with uncertainties	60-64
	The level of skills is poor	<60
Communication		
♦ report to specialists and non-specialists of information, ideas, problems, solutions and their experience in the field of professional activity; ♦ the ability to form an effective communication strategy	- Fluent problematic area. Clarity response (report). Language - correct; - - net; - - clear; - - accurate; - - logic; - - expressive; - - concise. Communication strategy: coherent and consistent development of thought; availability of own logical reasoning; relevant arguments and its compliance with the provisions defended; the correct structure of the response (report);	95-100

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	correct answers to questions; appropriate equipment to answer questions; the ability to draw conclusions and formulate proposals	
	Adequate ownership industry issues with minor faults. Sufficient clarity response (report) with minor faults. Appropriate communication strategy with minor faults	90-94
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (total three requirements are not implemented)	85-89
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (a total of four requirements is not implemented)	80-84
	Good knowledge of the problems of the industry. Good clarity response (report) and relevant communication strategy (total not implemented the five requirements)	74-79
	Satisfactory ownership issues of the industry. Satisfactory clarity response (report) and relevant communication strategy (a total of seven requirements not implemented)	70-73
	Partial ownership issues of the industry. Satisfactory clarity response (report) and communication strategy of faults (total not implemented nine requirements)	65-69
	The fragmented ownership issues of the industry. Satisfactory clarity response (report) and communication strategy of faults (total not implemented 10 requirements)	60-64
	The level of poor communication	<60
Autonomy and responsibility		
♦ management actions or complex projects, responsible for decision-making in unpredictable conditions; ♦ responsible for the professional development of individuals and/or groups ♦ the ability to continue study with a high degree of autonomy	- Excellent individual ownership management competencies focused on: 1) management of complex projects, providing: - exploratory learning activities marked the ability to independently evaluate various life situations, events, facts, detect and defend a personal position; - the ability to work in a team; - control of their own actions; 2) responsibility for decision-making in unpredictable conditions, including: - justify their decisions the provisions of the regulatory framework of sectoral and national levels; - independence while performing tasks; - lead in discussing problems; - responsibility for the relationship; 3) responsible for the professional development of individuals and/or groups that includes: - use of vocational-oriented skills; - the use of evidence from independent and correct reasoning; - possession of all kinds of learning activities; 4) the ability to further study with a high degree of autonomy, which provides: - degree possession of fundamental knowledge;	95-100

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	- independent evaluation judgments; - high level of formation of general educational skills; - search and analysis of information resources	
	Confident personality possession competency management (not implemented two requirements)	90-94
	Good knowledge management competencies personality (not implemented three requirements)	85-89
	Good knowledge management competencies personality (not implemented the four requirements)	80-84
	Good knowledge management competencies personality (not implemented six requirements)	74-79
	Satisfactory ownership of individual competence management (not implemented seven requirements)	70-73
	Satisfactory ownership of individual competence management (not implemented eight claims)	65-69
	The level of autonomy and responsibility fragmented	60-64
	The level of autonomy and responsibility poor	<60

7 TOOLS, EQUIPMENT, AND SOFTWARE

Technical training tools via multimedia software.
Distance learning platform Moodle.

8 RECOMMENDED SOURCES

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