

**Ministry of Education and Science of Ukraine
Dnipro University of Technology**

**MINING FACULTY
DEPARTMENT OF ECOLOGY AND ENVIRONMENTAL PROTECTION
TECHNOLOGY**

“APPROVED”

Head of Department

Pavlichenko A.V. _____

“ ____ ” _____ 2018

WORK PROGRAM OF THE ACADEMIC DISCIPLINE

“ Environmental technology industry ”

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
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2018

Work program of the academic discipline “Environmental technology industry” for bachelor’s specialty 185 “Oil and Gas Engineering and Technology” / NTU “Dnipro Polytechnic” Department of environmental technologies and environmental protection. - 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.

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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 V1.16 "Environmental technologies in the field ":

VR1.1	Create technology of drilling oil and gas wells
VR1.2	Build oil and gas wells

The objective of discipline - formation of knowledge for the ability to evaluate the effectiveness of environmental protection equipment; ability to apply adequate methods reasonably choose and recommend measures and environmental technologies and sustainable environmental management, both at local (production) level, and at local and regional levels; the ability to choose the tools, equipment and calculation of the effectiveness of methods and technologies for environmental protection.

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
VR1.1 VR1.2	VR1.1-V1.16-1 VR1.2-V1.16-1	Demonstrate skills assessment of environmental and technological risks; be able to monitor and evaluate the efficiency of environmental measures and technologies used to determine the specific effect of environmental, economic or social results of their implementation on the basis of professional knowledge-based socio-economic, science and knowledge of modern methods and advanced control devices
	VR1.1-V1.16-2 VR1.2-V1.16-2	To be able to conduct choice of engineering methods to protect the environment; search of new technical and technological and organizational solutions to tackle the production and development of innovative environmental art equipment
	VR1.1-V1.16-3 VR1.2-V1.16-3	Demonstrate skill selection, planning, design and calculation parameters of certain types of equipment, technology and environmental protection technologies

3 BASIC DISCIPLINES

Subjects	The acquired learning outcomes
B2 Chemistry	To demonstrate the application of basic concepts, the basic laws of physics and chemistry for forecasting and analysis of physical and chemical properties of oil, condensate and natural gas in their production, drilling, transportation and storage.

Subjects	The acquired learning outcomes
B3 Fyzyka1	To apply mathematical methods to determine the specific values of process parameters gas wells, preparation of oil and gas industry and main gas, hazonaftoshovysch other system elements hazonaftopostachannya.
	To demonstrate the application of basic concepts, the basic laws of physics and chemistry for forecasting and analysis of physical and chemical properties of oil, condensate and natural gas in their production, drilling, transportation and storage.
B1 Matematyka1	Demonstrate the ability to apply the basic methods of analysis and assessment of the state oil and gas facilities elements of technical diagnostics in industrial and laboratory conditions.
	To apply mathematical methods to determine the specific values of process parameters gas wells, preparation of oil and gas industry and main gas, hazonaftoshovysch other system elements hazonaftopostachannya.

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	90	26	64	14	76	8	82
Practical	30	13	17	8	22	4	26
Laboratory	-	-	-	-	-	-	-
Workshops	-	-	-	-	-	-	-
Total	120	39	81	22	98	12	108

5 DISCIPLINE PROGRAM BY TYPES OF CLASSES

Ciphers DRN	Types and topics of training sessions	The volume of components, hours
	LECTURES	90
VR1.1-V1.16-1 VR1.2-V1.16-1	1. Modern ecological problems of the industrial enterprises of different economic sectors	12
VR1.1-V1.16-2 VR1.2-V1.16-2	2. Environmental protection technology air	14
VR1.1-V1.16-3 VR1.2-V1.16-3	3. Environmental Protection Technology aquatic environment	14
	4. Environmental protection technology surface and subsoil	12
	5. energy saving technologies in industry	14
	6. The low-waste and non-waste production technology	12
VR1.1-V1.16-1 VR1.2-V1.16-1	7. International cooperation in the environmental field	12
	PRACTICAL TRAINING	30
VR1.1-V1.16-1 VR1.2-V1.16-1	1. Introduction to specific applications of technological scheme of gas and dust emissions	10

Ciphers DRN	Types and topics of training sessions	The volume of components, hours
VR1.1-V1.16-2 VR1.2-V1.16-2	2. Introduction to the technological scheme of sewage treatment and industrial reuse	10
VR1.1-V1.16-3 VR1.2-V1.16-3	3. Introduction of modern technologies, storage, processing, recycling and disposal of industrial wastes of various industries	10
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		
<ul style="list-style-type: none"> ◆ Conceptual knowledge acquired during the training and professional activities, including some knowledge of modern achievements; ◆ critical understanding of the main theories, principles, methods, and concepts in education and careers 	- 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
	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		
<ul style="list-style-type: none"> ◆ solving complex problems and unforeseen problems in specialized areas of professional and/or training, which 	<ul style="list-style-type: none"> - The answer describes the ability to: - identify the problem; - formulate hypotheses; - solve problems; - choose adequate methods and tools; - collect and interpret logical and understandable 	95-100

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
involves the collection and interpretation of information (data), choice of methods and tools, the use of innovative approaches	information; - use innovative approaches to solving the problem	
	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		
<ul style="list-style-type: none"> ◆ 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 	<ul style="list-style-type: none"> - 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); correct answers to questions; appropriate equipment to answer questions; the ability to draw conclusions and formulate proposals	95-100
	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	74-79

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	clarity response (report) and relevant communication strategy (total not implemented the five requirements)	
	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		
<ul style="list-style-type: none"> ◆ 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 	<ul style="list-style-type: none"> - Excellent individual ownership management competencies focused on: <ol style="list-style-type: none"> 1) management of complex projects, providing: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - degree possession of fundamental knowledge; - independent evaluation judgments; - high level of formation of general educational skills; - search and analysis of information resources 	95-100
	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

descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	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

Background

1. Dudyuk DL Alternative energy: basic theory and problems: Textbook / DL Dudyuk, SS Mazepa, JM Hnatyshyn. - Lviv, "Magnolia 2006", 2008. - 188 p.
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3. Zashchita of industrial zahryaznenyy atmosphere here. In 2 parts. Part 1 / Ed. WITH.°Calvert, RN Ynhlunda. - M. : Metallurgy, 1988. - 760 p.
4. Ylyn LA Security and protection of Radiation: Directory. / LA Ylyn, VF°Kirillov, Y.P. Korenkov. - M. : Medicine, 1996. - 336 p.
5. Ynzhenernaya ecology: Textbook / Ed. prof. VT Medvedev. - M. : Gardariki, 2002. - 687 p.
6. LF Komarova Using water in the enterprise and in water treatment stochnyyh DIFFERENT industry industry: uchebnoe posobyе / LF Komarova, MA Poletaeva. - Barnaul: AltHTU Publishing House, 2010. - 174 p.
7. LF Komarova Inzhenernyyi okruzhayushey environment protection methods: uchebnoe posobyе / LF Komarov, LA Kormyna. - Barnaul, Altay, 2000. - 395 p.
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11. AI Rodyonov Technological processes ekologicheskoy security / Principles of environmentalytyky /: Textbook for students of technical specialties and tehnologicheskyyh. 3rd ed., Rev. and add. - Kaluga: Izd Bochkarevoy N., 2000. - 800 p.
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14. Frog BN Water preparation: uchebnoe posobyе for Universities / BN Frog, AP Shevchenko. - M. : Moscow State University, 1996. - 680 p.
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Subsidiary

1. Apostolyuk SO Industrial Ecology: Textbook /S.O. Apostolyuk, VS°Dzhygyr, AS Apostolyuk and others. - K .: Knowledge, 2005. - 474 p.

2. Boychuk YD Ecology and Environment: Tutorial / YD Boychuk, EM Soloshenko, OV Bittern. - Amounts: SHS "University Book", 2002. - 284°with.

3. Kasimov AM Modern problems and solutions in the management system opasnyu Waste Handling / AM Qasim, VT Semenov, NH Shcherban, V. Myasoedov. - Kharkov: HNAHH, 2008. - 510 p.

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11. Hall Э.Dzh. Radyatsyya and Life / Э.Dzh. Hall. - M .: Medicine, 1989. - 256 p.

12. Environmental and resource saving technologies. Guidelines for the course work for students majoring 101 "Ecology" and 183 "environmental technologies" / DV Kulikova, AV Pavlichenko. - Dnipro National Mining University - 2018. - 84 p.

Information resources

1. <http://zakon4.rada.gov.ua> Official site of the Verkhovna Rada of Ukraine
2. <http://www.mon.gov.ua> The official website of the Ministry of Education and Science_Ukraine
3. <http://www.menr.gov.ua> The official website of the Ministry of Ecology and Natural Resources of Ukraine
4. <http://www.docload.ru> Free library standards and regulations
5. www.irbis-nbuv.gov.ua Scientific Periodicals of Ukraine. Library. Vernadsky
6. <http://eco-profi.info> **Information resources, posvyaschennyy** Waste Handling production and consumption
7. <http://sop.org.ua> Nature Conservation service - Info Center
8. <http://env.teset.sumdu.edu.ua> **Research Center for Applied Environmental Research**

Educational edition

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