Ministry of Education and Science of Ukraine
Dnipro University of Technology

FACULTY OF GEOLOGICAL PROSPECTING

DEPARTMENT OF GENERAL AND STRUCTURAL GEOLOGY

"APPROVED"
Head of Department
Shevchenko S.V. _____
«__04__»____06____2019

WORK PROGRAM OF THE ACADEMIC DISCIPLINE

«Geology and Geomorphology»

Field of study ……..	19 Architecture and Building
Speciality …….....	192 Building and Civil Engineering
Academic degree …….	Bachelor
Academic program …….	Building and Civil Engineering
Type of discipline……	regulatory
Total workload..…….....….	3 ECTS credits (90 hours)
Type of final assessment	differentiated credit
Period of study .....……..	1st semester
Language of study.....	English

Lecturers: Tereshkova O.A., Bilan N.V., Nikitenko I.S.

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

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

Dnipro
NTU "DP"
2019

Work program of the academic discipline “Geology and Geomorphology” for bachelor’s specialty 192 Building and Civil Engineering / Tereshkova O.A., N.V. Bilan, I.S. Nikitenko / NTU “Dnipro Polytechnic” Department Of General and Structural Geology. – Dnipro: NTU «DP» 2019, – 13 p.

Authors:

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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.

Approved by the decision of the Methodical Commission of the speciality 192 Building and Civil Engineering (protocol № 5 from 22.03.2019).

Recommended for publication by the editorial board of Dnipro University of Technology (protocol № 7 from 05.07.2019).

CONTENTS

1 DISCIPLINE OBJECTIVES

In the educational and professional programs of the Dnipro University of Technology speciality 192 Building and Civil Engineering, the distribution of program learning outcomes (NRN) for the organizational forms of the educational process is performed. In particular, the following learning outcomes are attributed to the discipline B5 "Geology and Geomorphology":

SR10	To estimate the influence of climatic, engineering-geological and ecological features of the construction area in the design and construction of building objects
SR11	Determine and estimate the load and stress-strain state of the soil foundations and load-bearing structures of buildings (structures), including using modern information technologies

The objective of discipline – formation of competences regarding the structure, composition and age of the Earth; geological processes and their influence on the formation of relief; ideas about the inseparable unity of all natural components of the landscape of the Earth, analysis and use of engineering-geological, hydrogeological and geomorphological information in practical activity.

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)**	
	DSN code	**Content**
SR10	SR 10-2.1	to know the structure of the Earth and its components
	SR 10-2.2	to distinguish the results of endogenous, exogenous and anthropogenic processes activity, to take into account their influence on the terrestrial surface
	SR 10-2.3	to know the classification and properties of groundwater and soil, to recognize the natural and anthropogenic complexes of the landscape of the Earth
SR 11	SR 11-2.1	to determine the properties of rocks and their morphological significance
	SR 11-2.2	to analyse geological and geomorphological maps

3 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)
lecture	36	12	24	-	-	4	32
practical	-	-	-	-	-	-	-
laboratory	54	18	36	-	-	2	52
workshops	-	-	-	-	-	-	-
TOTAL	90	30	60	-	-	6	84

4 DISCIPLINE PROGRAM BY TYPES OF CLASSES

Ciphers DRN	Types and topics of training sessions	The volume of compo-nents, *hours*
	LECTURES	**36**
SR 10-2.1	**1. Geological structure of the Earth, general information about relief**	6
	1.1. Basic theoretical and methodological provisions of the discipline	
	1.2. Earth and its structure	
	1.3. Material composition of the Earth and the age of rocks	
	1.4. The concept of relief and methods of its research	
SR 10-2.2 SR 11-2.1 SR 11-2.2	**2. Processes of internal dynamics. The relief-forming role of endogenous processes**	6
	2.1. Tectonic movements and deformations of rocks	
	2.2. The processes of magmatism and metamorphism	
	2.3. The relief-forming role of endogenous processes	
	3. Processes of external dynamics. The relief-forming role of exogenous processes	12
	3.1. Rock weathering as a factor of relief-forming	
	3.2. Arid processes and eolian morphosculpture	
	3.3. Geological activity of ice and corresponding forms of relief	
	3.4. Fluvial processes and their forms of relief	
	3.5. Geological work of seas, lakes and swamps	
	3.6. Gravity and technogenesis	
SR 10-2.3 SR 11-2.1 SR 11-2.2	**4. Fundamentals of soil science and hydrogeology**	6
	4.1. Soil in engineering geology	
	4.2. Soil as a component of the pedosphere	
	4.3. Groundwater - conditions of occurrence and classification	
	5. The concept of processes in the geographical envelope. Landscape and its structure	6
	5.1. The composition and properties of natural landscapes	
	5.2. Types of the Earth Globe landscapes	
	5.3. Landscapes and human economic activity	
	Laboratory Works	**54**
SR 10-2.1 SR 10-2.2 SR 10-2.3 SR 11-2.1 SR 11-2.2	**1. Study of the material composition of the Earth's crust**	20
	1.1. Physical properties of minerals and their classification	
	1.2. Study of basic rocks and ore minerals	
	1.3. Types of rocks. The concept of structure, texture and mineral composition of rocks and their morphological significance	
	1.4. The study of the main varieties of igneous, sedimentary and metamorphic rocks	
	2. Geomorphological analysis of the territory and making a geological map in the area of horizontal bedding of rock layers	34
	3.1. Determination of morphological terrain characteristics	
	3.2. Compilation of orohydrographic characteristics of the territory	
	3.3. Making a geological map of the horizontal structure in conditions of rugged terrain	
	3.4. Making a geological cross-section by the data of a geological map	
	TOTAL	**90**

5 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.

5.1 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.

5.2 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.

5.3 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 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		
♦ 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

Descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	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); 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 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

Descriptors NLC	Requirements for knowledge, communication, autonomy and responsibility	Indicator evaluation
	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; - 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
	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

6 TOOLS, EQUIPMENT, AND SOFTWARE

Work, etalon and control collections of minerals and rocks, a set of topographic maps with a scale of 1:2000, 1:25000, 1:50000, geological compass.

Distance learning platform Moodle.

7 RECOMMENDED LITERARURE

1. Essentials of Geology / Frederick K. Lutgens, Edward J. Tarbuck. — 11th ed. Boston, 2012. – 554 p.
2. A Geology for Engineers. Blyth, F.G.H., de Freitas, M.H. London, 1984 (reprinted 2005). – 336 p.
3. Marshak S. Essentials of Geology. 4th Edition. – W.W. Norton & Company, New York – London, 2007. – ISBN 978-0-393-91939-4. – 648 p.
4. General Geology. Laboratory Operations Manual. Study of the Material Composition of the Earth's Crust for the students of specialty 6.040103 Geology/ N.V. Bilan, I.S. Nikitenko, O.A. Tereshkova, O.V. Khazova; Ministry of Education and Science of Ukraine; National Mining University. – D.: NMU, 2018. – 34 p.
5. Кратенко Л.Я. Общая геология (учебное пособие). – Д.: РИК НГУ. – 196 с. or Кратенко Л.Я. Загальна геологія (навчальний посібник). – Д.: РВК НГУ. – 183 с. (библ.) http://zsg.nmu.org.ua/ua/literatura_ua.php
6. Свинко І.М., Сивий М.Я. Геологія (підручник). – К.: Либідь, 2003. – 478 с.
7. Кратенко Л.Я. Общая геология: уч. пособие. – Д.: Національний гірничий університет, 2007. – 352 с. – Рос. мовою.
8. Паранько І.С., Сіворонов А.О., Євтєхов В.Д. Загальна геологія. Навчальний посібник. Кривий Ріг, 2003. – 464 с.
9. Мала гірнича енциклопедія. В 3 т. / за ред. В.С. Білецького. – Донецьк : Схід. видав. дім, 2013. – Т. 3. – 644 с.

Educational edition

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192 Building and Civil Engineering

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