	Syllabus **« Soil Science with Basics of Geology»**
	Educational-qualification level - Bachelor
	Specialty: 202 Plan Protection and Quarantine
	Field of knowledge: 20 "Agriculture and Food Products "
	Year of study: 2, **semester:** 3 **Mode of study:** full
	ECTS hours: 4
	Language: English
Instructor	Yuriy Kravchenko, PhD, Associate Professor
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eLearn webpage	https://elearn.nubip.edu.ua/course/view.php?id=2700

Course Overview:

This course is an introductory designed course for the Bachelor student, which provides the basic concepts of all aspects of geology and soil science. It encompasses: Earth's origin; internal and external Earth's dynamics; minerals and rocks – formation, composition, diagnostics and properties changes; agronomic ores properties and application; anthropogenic influence on geologic environment. The course presents the soil composition and genesis; physical, chemical, and biological properties; soil water; classification and mapping; soil conservation; management practices; and soil fertility and productivity (soil testing, use of fertilizers and liming), soil quality assessment. The course gives practical experience as an aid in developing understanding of the minerals, rocks and soils as natural bodies, the use of which has an influence on environmental, human society and life in general.

The course program and structure

Topics	**Hrs** (lec/ prac)	**Educational results**	**Tasks**	**Grade**
3 semester				
Module 1				
Lecture topic 1. Internal and external spheres of the Earth.	1/2	*Know*: The Earth's internal and external spheres. *Be able to*: describe the Earth's internal and external structure. *Analyze*: The Earth's spheres properties. *Comprehend*: minerals' structure and physical properties. *Use*: to describe a soil mineral composition.	Lab work №1 submitting on elearn Self-work 1.1. submitting on elearn	10 15
Lecture topic 2. Endogenic processes.	2/2	*Know*: plate tectonics and crust deformations. *Be able to*: estimate causes of earthquakes. *Analyze*: types of volcanoes. *Comprehend*: magmatic, metamorphic processes *Use:* to describe minerals.		
Lecture topic 3. Exogenic processes.	2/2	*Know*: about sedimentary processes. *Be able to*: characterize sedimentary rocks. *Analyze*: the driving forces of exogenic processes. *Comprehend*: types of exogenic processes. *Use:* at soil/relief genesis studying.		
Topic 4. What is soil?	2/2	*Know*: soil key concepts. *Be able to*: determine functions of soil. *Analyze*: soil phases. *Comprehend*: importance of soil. *Use:* knowledge about soil components in soil testing.	Lab work №2 submitting on elearn Self-work 1.2. submitting on elearn	10 15
Topic 5. Soil formation and soil processes.	2/2	*Know*: Soil formation and soil genesis. *Be able to*: describe passive and active soil forming factors. *Analyze*: soil forming processes. *Comprehend*: fundamental soil forming processes.		

		Use: knowledge about soil forming factors and processes to fill out the form of a soil profile description		
Topic 6. Soil physical properties 1. Texture and structure.	2/2	*Know*: the soil solid components. *Be able to*: provide a lab experiment for soil particles analysis. *Analyze*: particle sizes and soil texture. *Comprehend*: soil properties based on its particle composition. *Use:* a soil texture data in agronomy and land management.		
Topic 7. Soil organic matter.	2/2	*Know*: soil organic matter composition. *Be able to*: estimate the quantity of a soil organic matter. *Analyze*: a soil organic matter in a lab. *Comprehend*: a soil organic matter quality. *Use:* agricultural practices to maintain of humus quantity and quality		
Topic 8. Soil colloids, sorption, cation and anion exchange.	2/2	*Know*: origin and compositing of soil colloids. *Be able to*: estimate CEC & composition of soil adsorbing complex. *Analyze*: cation exchange capacity. *Comprehend*: role of soil colloids, cation and anion composition on soil properties. *Use:* agricultural practices to manage soil cation and anion composition.	Lab work №3 submitting on elearn Mid-term exam 1 completing	20 30
Topic 9. Soil acidity, alkalinity and salinity.	2/2	*Know*: about soil acidity and alkalinity. *Be able to*: manage soil acidity and alkalinity. *Analyze*: soil acidity and alkalinity in a lab. *Comprehend*: the reasons of soil acidity and alkalinity. *Use:* lime, gypsum and leaching to manage soil acidity, alkalinity and salinity.		
Total for Module 1				100
Module 2				
Topic 10. Soil physical properties 2. Soil structure, soil density, pore space, impacts of tillage.	2/1	*Know*: soil structure and its types. *Be able to*: evaluate in the field: soil structure, soil particle and bulk density, soil porosity. *Analyze*: soil particle and bulk density, soil porosity. *Comprehend*: soil physical properties. *Use:* soil mechanical properties knowledge for soil tillage management.	Lab work №4 submitting on elearn	10
Topic 11. Soil water, air and temperature.	2/1	*Know*: water origin, properties and structure. *Be able to*: regulate soil water, air and temperature conditions *Analyze*: plant and soil water relations (soil moisture constants). *Comprehend*: soil air/temperature & modes of energy transfer *Use:* agricultural practices to manage soil water, air and temperature regimes		
Topic 12. Soil productivity and its evaluation.	1/2	*Know*: soil productivity and its evaluation. *Be able to*: to evaluate soil productivity by a A.I.Siry method. *Analyze*: soil properties by 0 to 100-point scale. *Comprehend*: role of a soil productivity in crop yields. *Use:* a land suitability class to land management.	Lab work №5 submitting on elearn Self-work 2.1. submitting on elearn	10 15
Topic 13. Soils of the Forest Zone of Ukraine.	2/2	*Know*: natural conditions of the Forest Zone of Ukraine. *Be able to*: describe a profile of the Forest soils of Ukraine. *Analyze*: properties of the Forest Zone soils of Ukraine. *Comprehend*: the fertility management of the Forest Zone soils of Ukraine. *Use:* in agriculture the Forest Zone soils of Ukraine.		
Topic 14. Soils of the Forest-Steppe zone of Ukraine.	2/2	*Know*: natural conditions of the Forest-Steppe Zone of Ukraine. *Be able to*: describe a profile of the Forest-Steppe soils of Ukraine. *Analyze*: properties of the Forest-Steppe soils of Ukraine.	Lab work №6 submitting on elearn	10 15

		Comprehend: the fertility management of the Forest-Steppe Zone soils of Ukraine. *Use:* in agriculture the Forest-Steppe Zone soils of Ukraine.	Self-work 2.2. submitting on elearn	
Topic 15. Soils of the Steppe zone of Ukraine.	2/2	*Know*: natural conditions of the Steppe Zone of Ukraine. *Be able to*: describe a profile of the Steppe soils of Ukraine. *Analyze*: properties of the Steppe soils of Ukraine. *Comprehend*: the fertility management of the Steppe Zone soils of Ukraine. *Use:* in agriculture the Steppe Zone soils of Ukraine.		
Topic 16. Alluvial and Meadow Soils.	1/1	*Know*: natural conditions of the flooding plain soils' formation. *Be able to*: describe a profile of the flooding plain soils. *Analyze*: properties of the flooding plain soils. *Comprehend*: the fertility management of the flooding plain soils. *Use:* in agriculture the flooding plain soils.	Lab work №7 submitting on elearn Mid-term exam 2completing	10 30
Topic 17. Saline soils.	1/1	*Know*: natural conditions of the saline soils' formation. *Be able to*: describe a profile of the saline soils. *Analyze*: properties of the saline soils. *Comprehend*: the fertility level of the saline soils. *Use:* in agriculture the saline soils.		
Total for Module 2				100
Total for semester 3 ((100+100)/2)) x 0,7				**70**
Exam				**30**
Total for the course				**100**

THE COURSE POLICY

Lab Grading Policy:	Lab reports are submitted on elearn platform. Lab reports submitted after due date will be assessed at a penalty of 10% of the total lab report point value for each 24-hour period beyond the due date. Make-up lab submitting will only be provided for students with excused absences. Students are expected to submit four self-works prior a session.
Examination Policy:	Students are required to take all two mid-term exams and the final exam in this course. Copying of others' work, use of disallowed material on exams, plagiarism in assignments, or cheating in any other form as defined by the instructor will result in a grade of zero for that assignment. Multiple infractions will result in a grade of 'F' for the course. No electronic equipment, except calculators, will be allowed during exams. Violation of this will result in an immediate grade of '0' for the exam.
Attendance Policy:	Students are expected to be present at all lectures and to arrive on time. If a student must miss a lecture, her/his is responsible for all material presented during lecture and for the assigned textbook reading. Make-up quizzes, homework assignments, and examinations will only be provided for students with excused absences. Excused absences will only be granted for documented academic conflicts, international staging, documented medical reasons and force majeure. Excused absences can only be granted by Dr. Yuriy Kravchenko. Students are expected to respect the rights of others in the class. Cell phones and other electronic equipment should be turned off prior to the beginning of class.

STUDENT'S RATING SCALE

Student's rating, points	The Ukrainian National Grades	Grading Test
90-100	«Excellent»	Passed
74-89	«Good»	
60-73	«Satisfactory»	
0-59	«Unsatisfactory»	Fail