1. GENERAL INFORMATION

Study programme title	University graduate study programme in mining engineering Subprogramme Geotechnical engineering		
Course title	Soil Mechanics 2	**Semester**	I.
Teacher	Assistant professor Dubravko Domitrović, PhD	**Course code**	
Course type	☒ obligatory ☐ elective	**ECTS**	5,5
Location	Faculty of Mining, Geology and Petroleum Engineering, Pierottijeva 6, Zagreb		
Language	☐ Croatian ☒ English		

Class type	Weekly hours	Teaching staff	Office hours	Room	E-mail
Class	2	Dubravko Domitrović	Monday & Thursday 1-2 p.m.	V711	dubravko.domitrovic@rgn.hr
Practice	2	Karolina Gradiški		V503	karolina.gradiski@rgn.hr
Field lecture	0,5	Dubravko Domitrović Karolina Gradiški			

E-learning level	Level 2	**Percentage of on-line class (max. 20%)**	10%

2. COURSE DESCRIPTION

Course aims	Mining and geotechnical activities are closely connected with soil mechanics which is used to analyse the shear strength and deformations within natural and man-made soil structures or structures that are in soil. The objective is to provide students with knowledge of applications of limit equilibrium and limit plasticity analysis methods to stability problems in geotechnical engineering, such as slopes, lateral earth pressures on retaining structures, and bearing capacities of foundations. The major goals that are covered in this course are: - introduction to the Eurocode system with an emphasis on the Eurocode 7,

	- interpret geotechnical investigations, - analyze foundations, retaining walls and piles with analytical methods, - analyze foundations, retaining walls and piles with FEM, - analyze slope stability by limit equilibrium methods (global factor of safety), - assess ground-water effects on different geotechnical structures.
Requirements for applicants	Soil Mechanics 1. Pass
Programme level learning outcomes with course contribution	
Expected course level learning outcomes (4-10 outcomes)	Students will be able to: - introduce Eurocode 7 in geotechnical engineering practical application, - interpret geotechnical investigations, - design foundations, retaining walls and piles using analytical methods, - design foundations, retaining walls and piles using FEM, - analyze natural and man-made slopes stability by limit equilibrium methods (global factor of safety), - assess ground-water effects on different geotechnical structures, - evaluate shear strength parameters for the analyses (drained and undrained behaviour and parameters).

Course contents by individual lessons

Class	Practice
Class 1 – Getting to know students. Criteria for signature and passing the course. Basic and advanced literature. Web pages. Consultations. Schedule of writing exams. Structure of course.	Practice 1 – Description of projects. Instructions: How to write a project report. Basic and advanced literature for projects work.
Class 2 – Basic terminology. Basis of geotechnical design and geotechnical data. Geotechnical investigations.	Practice 2 – Project work 1 Oedometer test
Class 3 – Eurocod system. Eurocode 7.	Practice 3 – Project work 1 Direct shear test
Class 4 –	Practice 4 –

Actions and design situations. Geotechnical design by calculations, prescriptive measures, load tests and experimental models. Observational methods in geotechnical design.	Project work 1 Consolidated undrained triaxial shear test
Class 5 – Bearing capacity of foundations. Design and construction considerations. Ultimate limit state design.	Practice 5 – Project work 2 Ultimate limit state design of foundations by analytical methods.
Class 6 – Serviceability limit state design of foundations. Subsoil preparation.	Practice 6 – Project work 2 Ultimate limit state design of foundations by FEM.
Class 7 – Retaining structures. Limit states. Design situation and actions, geometrical data. Design and construction considerations. Ultimate limit state design.	Practice 7 – Project work 3 Ultimate limit state design of retaining structures by analytical methods.
Class 8 – Retaining structures. Serviceability limit state design. Repetition. Typical questions for oral examination.	Practice 8 – Project work 3 Ultimate limit state design of retaining structures by FEM.
Class 9 – Slope stability. Limit states. Design situation and actions, geometrical data. Design and construction considerations. Ultimate limit state design.	Practice V9 – Colloquium 1 (written and oral)
Class 10 – Piles. Limit states. Design methods and design considerations. Axially loaded piles.	Practice 10 – Project work 4 Limit equilibrium analysis of slope stability.
Class 11 – Piles. Statically loaded and dynamically loaded tests.	Practice 11 – Project work 4 Design axially loaded piles by analytical methods.
Class 12 – Hydraulic failure. Failure by uplift.	Practice 12 – Project work 4

	Design axially loaded piles by FEM.
Class 13 – Hydraulic failure. Failure by heave.	Practice 13 – Project work 5 Hydraulic failure analysis by analytical methods.
Class 14 – Geotechnical structures examples.	Practice 14 – Geotechnical structures examples.
Class 15 – Repetition. Typical questions for oral examination.	Practice 15 – Colloquium 2 (written and oral)

Students' obligations	Regular presence at the class (maximum absence: class 3 and practice 1), written project reports (accepted by the teacher) within personal deadline. Presence to the field work.			
Students' work track *(indicate share in ECTS points for each activity so that overall ECTS number corresponds to class credits score):*	Class attendance	1	Research	
	Project	1,5	Report	1
	Colloquium	2	Seminar paper	
	Practical work		Oral exam	
	Written exam		(Extra)	
Type of exam, grades and evaluation of students work during class and on final exam	Mark is generated from project reports (40%) and colloquiums (60%).			
Mandatory literature (available in the Library and via other media)	1. Azizi, F. (1999) Applied analyses in geotechnics, E&FN SPON 2. Lambe, T.W. and Whitman, R.V. (1979). "Soil Mechanics – SI Version". John Wiley & Sons, N.York. 3. Fleming, K., Weltman, A., Randolph, M. Elson, K. (2009). Piling Engineering. Third Edition. Taylor & Francis, Abingdon.			
Aditional literature (at the moment of study program proposition application)	1. Mehanika tla, Interna skripta, Kvasnička, P. i Domitrović, D. 2. Nonveiller, E (1981) «Mehanika tla i temeljenje građevina», Školska knjiga, Zagreb 3. Müller, B. (1982). "Geotehnički radovi i objekti"- skripta 4. Nonveiller, E. (1987). "Kliženje i stabilizacija kosina" – Školska knjiga, Zagreb. 5. Nonveiller, E. (1983). "Nasute brane – projetiranje i građenje " – Školska knjiga, Zagreb. 6. Babić, B. et al. (1995) «Geosintetici u graditeljstvu», HDGI, Zagreb			
Examination terms				
Other				

Course Teacher:

Assist. Prof. Dubravko Domitrović, PhD