

Appendix 4
COURSE SYLLABUS

HO CHI MINH CITY OPEN UNIVERSITY
FACULTY OF CIVIL ENGINEERING

COURSE SYLLABUS

I. General Information

1. Course title in Vietnamese: Cơ học đất (CENG5302)

2. Course title: Soil Mechanics

3. Knowledge/Skill block:

- | | |
|--|--|
| <input type="checkbox"/> General Knowledge | <input type="checkbox"/> Specialized Knowledge |
| <input checked="" type="checkbox"/> Fundamental knowledge | <input type="checkbox"/> Supplementary Knowledge |
| <input type="checkbox"/> Course project / Graduation project | |

4. Number of Credits

Total	Theory	Practice	Self-study
3 (3,0,6)	3	0	6

5. Teaching Institution

- a. Faculty: Faculty of Civil Engineering
- b. Lecturer(s): Dr. Tran Thanh Danh
- c. Email: danh.tt@ou.edu.vn
- d. Work place: Room.705, Faculty of Civil Engineering, Ho Chi Minh City Open University; Address: 35-37 Ho Hao Hon St, Co Giang Ward, District 1, Ho Chi Minh City

II. Course Information

1. Course Description

Soil mechanics is a subject of the fundamental knowledge of civil engineering. This course introduces the basic principles of soil mechanics with direct implications and applications to design of foundation systems. The principles of statics and mechanics are used to understand multiphase material behavior which will form the necessary background for designing foundation systems and structures.

2. Course Conditions

STT	Conditional courses	Course code
1.	Pre-requisites subject None	
2.	Prior-subject Engineering Geology + Practice	CENG6202
3.	Parallel subject Soil Mechanics: Laboratory Experiments	CENG6103

3. Course objectives

This subject will provide students with:

Course Objectives	Description	Program learning Outcomes (PLOs) be fit for to the course
CO	<i>Knowledge:</i> - To establish an understanding of the fundamental concepts of mechanics of granular materials; including: physical and mechanical properties of soil, stresses in soil, methods to determine the consolidation settlement and bearing capacity of soils, lateral earth pressures.	PLO3.2
CO	<i>Skill:</i> - To provide students with exposure to the systematic methods for solving engineering problems in soil mechanics	PLO11
CO	<i>Interpersonal Skills and Responsibility:</i> - To train students to manage their time between self study, solving assignments	PLO16

4. Course Learning Outcomes (CLOs)

After finishing the course, students should be able to:

Course Objectives	Course learning Outcome (CLO)	Description of CLO
CO1	CLO1.1	Understand the relationships between physical characteristics and mechanical properties of soils.
	CLO1.2	Understand the methods to determine stresses in soils.
	CLO1.3	Understand the one - dimensional consolidation settlement, one - dimensional consolidation laboratory test, one - dimensional consolidation theory.
	CLO1.4	Understand the shear strength of soils, laboratory tests to determine shear strength parameters, bearing capacity equations.
	CLO1.5	Understand the basic concepts of lateral earth pressures, Coulomb's earth pressure theory, Rankine's lateral earth pressure for a sloping backfill and a sloping wall face.
CO2	CLO2.1	Apply algebra, elementary calculus in the analysis of physical characteristics and mechanical properties of soils.
	CLO2.2	Apply algebra, elementary calculus in the analysis of stresses in soils.
	CLO2.3	Apply algebra, elementary calculus, and principles of soil mechanics in the analysis of soil settlement.
	CLO2.4	Apply algebra, elementary calculus, and principles of soil mechanics in the analysis of soil bearing capacity.
	CLO2.5	Apply algebra, elementary calculus, and principles of

Course Objectives	Course learning Outcome (CLO)	Description of CLO
		soil mechanics in the analysis of lateral earth pressures.
CO3	CLO3.1	Take the responsibility to solve given assignments on their own and submit the solution on time

Integrated matrix between Course learning Outcomes (CLOs) and Programme Learning Outcomes (PLOs)

CLOs	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15	PLO 16
1.1			X													
1.2			X													
1.3			X													
1.4			X													
1.5			X													
2.1			X								X					
2.2			X								X					
2.3			X								X					
2.4			X								X					
2.5			X								X					
3.1																X

5. Teaching and Learning Materials

a. Textbook

- [1] Võ Phán, Phan Lư Minh Phương, (2013). *Cơ học đất*. NXB Xây dựng.
 [2] Châu Ngọc Ân, (2015). *Cơ học đất*. NXB Đại học Quốc Gia TP.HCM.

b. Additional readings

- [3] Nguyễn Đình Dũng, (2007). *Cơ học đất*. NXB Xây dựng.
 [4] Muni Budhu, (2011). *Soil mechanics and foundations*. NXB John Wiley & Sons.
 [5] Braja M. Das và Khaled Sobhan, (2018). *Principles of geotechnical engineering*. NXB Cengage Learning.

6. Course Assessment

Assessment Components	Assessment Contents	Time of assessment	CLO	Weighting (%)
(1)	(2)	(3)	(4)	
A1. Formative assessment	A1.1 In-class Exams A1.2 Midterm Exam Chapter 1, 2, 3	After finishing the chapter 3	CLO1.1 CLO1.2 CLO1.3 CLO2.1 CLO2.2 CLO2.3 CLO3.1	50%

A2. Summative assessment	A2.1 Final Exam	By the end of terms	CLO1.1 CLO1.2 CLO1.3 CLO1.4 CLO1.5 CLO2.1 CLO2.2 CLO2.3 CLO2.4 CLO2.5 CLO3.1	50%
Total				100%

7. Schedule

Teaching Plan for full - time classes (4.5 tiết/ session)

Week/Session	Contents	CLOs	Activities of teaching and learning	Assessment criteria	Learning Materials
(1)	(2)	(3)	(4)	(5)	(6)
Session 1	Chapter 1: Geological characteristics (4,5 tiết) 1.1 Composition of soils 1.2 Physical soil states 1.3 Determination of particle size of soils 1.4 Physical states and index properties of fine-grained soils 1.5 Soil compaction 1.6 Soil classification	CLO1.1 CLO2.1 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 1, reading the chapter 2.	A1.1	[1], [2]
Session 2	Chapter 1: (tt) (1 tiết) 1.7. Hydraulic conductivity of soil 1.7.1 Methods to determine the hydraulic conductivity 1.7.2 Flow parallel & flow normal to soil layers	CLO1.1 CLO2.1 CLO3.1 CLO1.2	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the	A1.1	[1], [2]

Week/Session	Contents	CLOs	Activities of teaching and learning	Assessment criteria	Learning Materials
(1)	(2)	(3)	(4)	(5)	(6)
	Chapter 2: Stresses in soil (3,5 tiết) 2.1 Basic concepts 2.2 Total and effective stresses	CLO2.2	chapter 2.		
Session 3	Chapter 2: (tt) (4,5 tiết) 2.3 Stresses in soil from surface loads 2.3.1 Point Load 2.3.2. Line Load 2.3.3 Uniformly Loaded Circular Area	CLO1.2 CLO2.2 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 2.	A1.1	[1], [2]
Session 4	Chapter 2: (tt) (4,5 tiết) 2.3 Stresses in soil from surface loads 2.3.3. Strip Load 2.3.6 Uniformly Loaded Rectangular Area 2.3.7 Approximate Method for Rectangular Loads 2.4 Mohr circle	CLO1.2 CLO2.2 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 2, reading the chapter 3.	A1.1	[1], [2]
Session 5	Chapter 3: One-dimensional consolidation settlement (4,5 tiết) 3.1. Basic concepts 3.1.1 Basic concepts 3.1.2 Calculation of primary consolidation settlement 3.1.3 Calculation of secondary consolidation settlement	CLO1.3 CLO2.1 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 3.	A1.1	[1], [2]

Week/Session	Contents	CLOs	Activities of teaching and learning	Assessment criteria	Learning Materials
(1)	(2)	(3)	(4)	(5)	(6)
	3.1.4 One – dimensional consolidation laboratory test 3.2. Laboratory tests to determine soil parameters (c , ϕ , E_o , m_v , C_c , C_s , σ'_c , OCR) 3.3 Soil settlement estimation 3.3.1 By using e - σ curve	CLO2.3			
Session 6	Chương 3:(tt) (4,5 tiết) 3.3.2 By using e - $\log\sigma$ curve 3.3.3 Secondary consolidation 3.4 One - dimensional consolidation theory	CLO1.3 CLO2.3 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 3, reading the chapter 4.	A1.1	[1], [2]
Session 7	Chapter 4: Bearing capacity of soils (4,5 tiết) 4.1. Shear strength of soils 4.2. Mohr – Rankine equilibrium	CLO1.4 CLO2.1 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 4.	A1.2	[1], [2]
Session 8	Chương 4:(tt) (4,5 tiết) 4.3. Laboratory tests to determine shear strength parameters 4.4 Bearing capacity of soils	CLO1.4 CLO2.1 CLO2.4 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom:	A2.1	[1], [2]

Week/Session	Contents	CLOs	Activities of teaching and learning	Assessment criteria	Learning Materials
(1)	(2)	(3)	(4)	(5)	(6)
	4.5 Slope stability		listening, doing exercises. + At home: recall, doing exercises of the chapter 4, reading the chapter 5.		
Session 9	Chapter 5: Stability of earth-retaining structures (4,5 tiết) 5.1. Basic concepts of lateral earth pressures 5.2 Rankine's lateral earth pressure for a sloping backfill and a sloping wall face	CLO1.5 CLO2.5 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 5.	A2.1	[1], [2]
Session 10	Chapter 5: (tt) (3,5 tiết) 5.3 Coulomb's earth pressure theory 5.4 Stability of retaining walls Review (1 tiết)	CLO1.5 CLO2.5 CLO3.1	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises. + At home: recall, doing exercises of the chapter 5	A2.1	[1], [2]

8. Regulations

Class regulation: Students are required to obey the discipline declared by the University.