

MINISTRY OF EDUCATION AND TRAINING
HO CHI MINH CITY OPEN UNIVERSITY

COURSE SPECIFICATION

I. General information

1. Course title in Vietnamese: Cơ học đất

Course code: CENG5302

2. Course title in English: Soil Mechanics

3. Mode of delivery:

FTF Online Blended

4. Language(s) for instruction:

Vietnamese English Both

5. Knowledge/Skills:

General Major

Foundation Additional

Discipline Graduation thesis

6. Credits

Total	Theory	Practice	Self-study
3	3	0	105

7. Administration of the course:

a) Faculty/Division: Faculty of Civil Engineering

b) Academics: Dr. Tran Thanh Danh, Dr. Vo Nguyen Phu Huan, Dr. Nguyen Trong Nghia, Dr. To Thanh Sang

c) Email: danh.tt@ou.edu.vn

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II. Course overview

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. Requirements:

No.	Requirements	Code
1.	Pre-requisites	
2.	Preceding courses Engineering Geology + Practice	CENG6202
3.	Co-courses Soil Mechanics: Laboratory Experiments	CENG6103

3. Course objectives

This subject will provide students with:

Course objectives	Description	PLOs
CO1	<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
CO2	<i>Skill:</i> - To provide students with exposure to the systematic methods for solving engineering problems in soil mechanics	PLO5
CO3	<i>Interpersonal Skills and Responsibility:</i> - To train students to manage their time between self study, solving assignments	PLO8

4. Course learning outcomes (CLOs)

After finishing the course, students should be able to:

Mục tiêu môn học/Course objectives	CĐR môn học (CLO)	Mô tả CĐR -Description
CO1	CLO1	Mô tả và giải thích các tính chất vật lý và cơ học của đất. Describe the relationships between physical characteristics and mechanical properties of soils
CO2	CLO2	Xác định các thông số từ thí nghiệm đất để mô tả các tính chất của đất cũng như sức chịu tải và biến dạng lún của đất. Determine physical characteristics and mechanical properties of soils in the analysis of soil settlement

Mục tiêu môn học/Course objectives	CĐR môn học (CLO)	Mô tả CĐR -Description
		and bearing capacity.
	CLO3	Áp dụng các nguyên lý cơ học đất để tính toán và phân tích các bài toán địa kỹ thuật đơn giản. Apply principles of soil mechanics in the analysis of
CO3	CLO4	Có năng lực làm việc độc lập đáp ứng yêu cầu và tiến độ cho trước. 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	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CLO1			5						
CLO2					4				
CLO3					4				
CLO4								4	

5. Textbooks and materials

a) Giáo trình-Textbooks

[1] Võ Phán, Phan Lưu Minh Phương. *Cơ học đất*. NXB Xây dựng. 2013. [42428]

b) Tài liệu tham khảo/Other materials

[2] Châu Ngọc Ân. *Cơ học đất*. NXB Đại học Quốc Gia TP.HCM. 2015. [48337]

[3] Muni Budhu. *Soil mechanics and foundations*. NXB John Wiley & Sons. 2011. [48855]

[4] Braja M. Das và Khaled Sobhan. *Principles of geotechnical engineering*. NXB Cengage Learning. 2018. [52081]

6. Student assessment

Type of assessment	Assessment methods	Assessment time	CLOs	Weight %
(1)	(2)	(3)	(4)	

Type of assessment	Assessment methods	Assessment time	CLOs	Weight %
(1)	(2)	(3)	(4)	
A1. Formative assessment	A1.1 In-class Exams Midterm Exam Chapter 1, 2, 3	After finishing the chapter 3	CLO1 CLO2 CLO3 CLO4	50%
A2. End-of-course assessment	A.2.1 Final Exam	By the end of terms	CLO1 CLO2 CLO3	50%
Total				100 %

a) *Assessment format, content and time:*

A.1.1. In-class Exams and Midterm Exam

Format:

In - class exercises

Midterm Exam is a multiple choice test.

Content: Includes the chapters studied before the test.

Duration: 60 minutes

A.2.1 Final Exam

- Format: multiple choice test

- Duration: 90 minutes

- Content: Includes all the chapters.

b) *Rubrics*

(see matrix of multiple choice questions)

7. Teaching schedule:

Tuần/ uổi học Week Section	Nội dung Content	CDR môn học CLOs	Hoạt động dạy và học/Teaching and learning								Bài đánh giá Student assessment	Tài liệu chính và tài liệu tham khảo Textbooks and materials	
			Tự học/Self-study		Trực tiếp/FTF				Trực tuyến (nếu có)/Online (if any)				
					Lý thuyết/Theory		Thực hành/Practice		Lý thuyết/Theory				
			Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)					
1	Chapter 1: Geological characteristics 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 CLO2	- Download - LMS Tools -Problems in chapter 1 Students: + At home: recall, doing exercises of the chapter 1, reading the chapter 2. Làm các bài tập chương 1 đã học, đọc trước nội dung chương 2	12	Giảng viên: Thuyết giảng kết hợp đưa ra các ví dụ, bài tập để sinh viên thực hiện trên lớp hoặc trên LMS. Sinh viên: + Trên lớp: nghe giảng; làm bài tập, ví dụ do GV đề ra Lecturer: Teach in classroom Student: + Class: listen and do the examples. + Home: review knowledge and read books and problems	5						[1], [2], [3], [4]	
2	Chapter 2: Stresses in soil 2.1 Basic concepts 2.2 Total and effective stresses 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 CLO2 CLO4	Đọc tài liệu chương 2 trên LMS Ôn tập, làm các bài tập chương 1 đã học, đọc trước nội dung chương 2 tiếp theo	12	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	5					A.1.1	[1], [2]	
3	Chapter 2: (cont.) 2.3 Stresses in soil from surface loads	CLO1 CLO2 CLO4	Students: + At home: recall, doing exercises of the chapter 2,	12	Lecturer: Lecturing with examples and exercises for	5						A.1.1	[1], [2]

Tuần/b uổi học Week Section	Nội dung Content	CDR môn học CLOs	Hoạt động dạy và học/Teaching and learning								Bài đánh giá Student assessment	Tài liệu chính và tài liệu tham khảo Textbooks and materials
			Tự học/Self-study		Trực tiếp/FTF				Trực tuyến (nếu có)/Online (if any)			
					Lý thuyết/Theory		Thực hành/Practice		Lý thuyết/Theory			
			Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)				
	2.3.3. Strip Load 2.3.6 Uniformly Loaded Rectangular Area 2.3.7 Approximate Method for Rectangular Loads 2.4 Mohr circle		reading the chapter 3.		practicing in class. Students: + At classroom: listening, doing exercises.							
4	Chapter 3: One-dimensional consolidation settlement 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 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	CLO1 CLO2 CLO3 CLO4	Students: + At home: recall, doing exercises of the chapter 3.	12	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	5				A.1.1	[1], [2]	
5	Chương 3:(cont.) 3.3.2 By using e-log σ curve 3.3.3 Secondary consolidation 3.4 One - dimensional consolidation theory	CLO1 CLO2 CLO3 CLO4	Students: + At home: recall, doing exercises of the chapter 3, reading the chapter 4.	12	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	5				A.1.1	[1], [2]	
6	Chapter 4: Bearing capacity of soils 4.1. Shear strength of soils 4.2. Mohr – Rankine equilibrium	CLO1 CLO2 CLO3	Students: + At home: recall, doing exercises of the chapter 4.	12	Lecturer: Lecturing with examples and exercises for practicing in class. Students:	5					[1], [2]	

Tuần/b uổi học Week Section	Nội dung Content	CDR môn học CLOs	Hoạt động dạy và học/Teaching and learning								Bài đánh giá Student assessment	Tài liệu chính và tài liệu tham khảo Textbooks and materials
			Tự học/Self-study		Trực tiếp/FTF				Trực tuyến (nếu có)/Online (if any)			
					Lý thuyết/Theory		Thực hành/Practice		Lý thuyết/Theory			
			Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods	Hoạt động Activity	Số giờ Periods		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)				
					+ At classroom: listening, doing exercises.							
7	Chương 4:(cont.) 4.3. Laboratory tests to determine shear strength parameters 4.4 Bearing capacity of soils 4.5 Slope stability	CLO1 CLO2 CLO3 CLO4	Students: + At home: recall, doing exercises of the chapter 4, reading the chapter 5.	12	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	5					A.1.1	[1], [2]
8	Chapter 5: Stability of earth - retaining structures 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 CLO2 CLO3	Students: + At home: recall, doing exercises of the chapter 5.	11					Video 2 times At 5.1 Doing quiz Video 2 times At 5.2 Doing quiz	5		[1], [2], [3]
9	Chapter 5: (cont.) 5.3 Coulomb's earth pressure theory 5.4 Stability of retaining walls Review	CLO1 CLO2 CLO3	Students: + At home: recall, doing exercises of the chapter 5	10					Video 2 times At 5.3 Doing quiz Video 2 times At 5.4 Doing quiz	5		[1], [2], [4]
Tổng cộng/Total				105		35				10		

Tuần/buổi học Week Section	Nội dung Content	CĐR môn học CLOs	Hình thức dạy học Teaching and learning methods	Hình thức đánh giá Student assessment
(1)	(2)	(3)	(4)	(5)
1	Chapter 1: Geological characteristics 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 CLO2	Giảng viên: Thuyết giảng kết hợp đưa ra các ví dụ, bài tập để sinh viên thực hiện trên lớp hoặc trên LMS. Sinh viên: + Trên lớp: nghe giảng; làm bài tập, ví dụ do GV đề ra Lecturer: Teach in classroom Student: + Class: listen and do the examples. + Home: review knowledge and read books and problems	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
2	Chapter 2: Stresses in soil 2.1 Basic concepts 2.2 Total and effective stresses 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 CLO2 CLO4	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
3	Chapter 2: (cont.) 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 CLO2 CLO4	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
4	Chapter 3: One-dimensional consolidation settlement 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 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)	CLO1 CLO2 CLO3 CLO4	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test

Tuần/buổi học Week Section	Nội dung Content	CĐR môn học CLOs	Hình thức dạy học Teaching and learning methods	Hình thức đánh giá Student assessment
(1)	(2)	(3)	(4)	(5)
	3.3 Soil settlement estimation 3.3.1 By using $e-\sigma$ curve			
5	Chương 3:(cont.) 3.3.2 By using $e-\log\sigma$ curve 3.3.3 Secondary consolidation 3.4 One - dimensional consolidation theory	CLO1 CLO2 CLO3 CLO4	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
6	Chapter 4: Bearing capacity of soils 4.1. Shear strength of soils 4.2. Mohr – Rankine equilibrium	CLO1 CLO2 CLO3	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
7	Chương 4:(cont.) 4.3. Laboratory tests to determine shear strength parameters 4.4 Bearing capacity of soils 4.5 Slope stability	CLO1 CLO2 CLO3 CLO4	Lecturer: Lecturing with examples and exercises for practicing in class. Students: + At classroom: listening, doing exercises.	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
8	Chapter 5: Stability of earth -retaining structures 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 CLO2 CLO3	Video 2 times At 5.1 Doing quiz Video 2 times At 5.2 Doing quiz	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test
9	Chapter 5: (cont.) 5.3 Coulomb’s earth pressure theory 5.4 Stability of retaining walls Review	CLO1 CLO2 CLO3	Video 2 times At 5.3 Doing quiz Video 2 times At 5.4 Doing quiz	Doing exercises, examples and homeworks Submitted to LMS Multiple choices in final test

8. Course policy

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

DEAN OF THE FACULTY
(Signed with fullname)

ACADEMIC
(Signed with fullname)

Nguyễn Trọng Phước

Trần Thanh Danh