

Course: CEE 440

FOUNDATION ENGINEERING

GENERAL INFORMATION

2nd semester**Credits:** 4CU-6UC**Lectures:** T 12:00-14:00; R 12:00-14:00

INSTRUCTOR(S)

CÉSAR SAGASETA

Catedrático de Universidad. Departamento de Ciencia e Ingeniería del Terreno y de los Materiales.

ALMUDENA DA COSTA

Profesora Ayudante. Departamento de Ciencia e Ingeniería del Terreno y de los Materiales.

COURSE OBJECTIVE

Ground exploration: borings, sampling, in situ tests, geophysical exploration.

Elastic stress distribution in soils and rocks.

Limit analysis of geotechnical problems.

Shallow foundations: Bearing capacity, settlements.

Deep foundations: types of piles, bearing capacity.

Earth retaining structures: earth pressures, active, passive and at-rest cases. Design of rigid walls.

Diaphragm walls and other flexible structures.

Slope stability: types of slope failures in soils and rocks. Stability analysis. Corrective measures.

TEXTBOOK

Fundamentals of Geotechnical Engineering (2nd ed.)

Das, B.M.

Publisher: Thompson

Published 2005

GRADING

Homework: 30%**Midterm exam:** 35%**Final Exam:** 35%

COURSE SYLLABUS

Week	Day	Class	Topic	Assigned reading
1	Tu	L	Introduction	L.N.
		L	Geotechnical analysis. Ultimate and Serviceability Limit States (ULS, SLS). Global safety factors. Partial coefficients	
	Th	L	Elastic solutions: general, basic cases	6.6 and 6.7
		L	Distributed rigid and flexible loads Layered ground; stresses around cavities	6.8 to 6.10
2	Tu	PS	Problems	
		PS	Problems	
	Th	L	Limit equilibrium analysis	L.N.

		PS	Problems	
3	Tu	L	Shallow foundations: types	L.N. 12.1 to 12.5
		L	Bearing capacity. Basic concepts Long term and short term. Clays and sands	L.N.
	Th	PS	Problems	
		PS	Problems	
4	Tu	L	Allowable settlements for buildings	L.N. 12.6 to 12.11
		L	Settlement analysis. Sands	
	Th	L	Settlement analysis. Clays	
		PS	Problems	
5	Tu	PS	Problems	
		L	Deep foundations: types of piles	14.1, 14.2, 14.19
	Th	L	Bearing capacity (base and shaft)	14.3, 14.5 to 14.10
		L	Pile load tests	14.13
6	Tu	PS	Problems	
		PS	Problems	
	Th	L	Driving formulae; settlements	14.11 and 14.12
		L	Downdrag, lateral pressures; group effect	14.14 to 14.17
7	Tu	PS	Problems	
		PS	Problems	
	Th	Exam		
		Exam		
8	Tu	L	Earth pressures: general theories	11.1
		L	Active and Passive pressure. Rankine solution	11.2 to 11.4
	Th	L	Friction in walls. Coulomb's method.	11.5 to 11.7
		L	Surcharges; special problems.	L.N.
9	Tu	PS	Problems	
		PS	Problems	
	Th	L	Retaining walls	13.1 to 13.7
		L	cont	
10	Tu	PS	Problems	
		PS	Problems	
	Th	L	Braced excavations, construction	13.9
		L	Analysis of flexible walls	13.10 and L.N.
11	Tu	L	Deformations. Bottom heave	L.N. and 13.13
		PS	Problems	
	Th	PS	Problems	
		PS	Problems	S.P.W.
12	Tu	L	Slope stability. Types of movements in soil	L.N.
		L	Types of instability in rock slopes. Factor of safety	L.N. and 9.1
	Th	L	Methods of analysis. Infinite slope	9.2 and 9.3
		L	Global equilibrium.	9.4 to 9.6
13	Tu	PS	Problems	
		PS	Problems	
	Th	L	Methods of slices	9.7 and 9.8
		PS	Problems	
14	Tu	PS	Problems	
		PS	Problems	
	Th	PS	Problems	Slope
		PS	Problems	Slope
15	Tu	L	Soil improvement	L.N.
		L	cont	L.N.
	Th	Exam		
		Exam		

L.N. Lecture notes

L. Lecture

PS. Problem session