King Fahd University of Petroleum & Minerals
CIVIL ENGINEERING DEPARTMENT

CE 353-01
Geotechnical Engineering I
First Semester 2007-2008 (071)

SMW 1:10- 2:00 PM
3-206

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Text: Geotechnical Engineering & Soil Testing
By : Al-Khafaji & Andersland, 1992.

Course Description: Undergraduate Bulletin (2006-2009), p. 299

CE 353 Geotechnical Engineering I (3-3-4)

Soil formation and identification; index and classification properties of soils; clay minerals; soil compaction; capillarity, swelling, shrinkage and effective stresses; flow of water in soils; compressibility and consolidation; stress in soils; shear strength of cohesive and cohesionless soils; introduction to lateral earth pressure and shallow foundation.

Prerequisite: CE 203
Co-requisite: CE 230

Grade Distribution:

20% Laboratory
15% First Major Exam
20% Second Major Exam
10% Homework
5% Attendance/Participation
30% Final Exam
100% Total

REMARKS

1. ***Homeworks should be submitted on time.***
2. ***9 Unexcused absences will result in DN-grade.***
3. ***½ points for each absence upto (-4).***

COURSE SYLLABUS

Subject	Chapter	Section
Introduction	1	All
Scope of the Course		
Definitions		
Soil Composition		
Clay Minerals		
Soil Formation and Identification		
Nature and Behavior of Soil Materials		
Index and Classification Properties of Soils	3	All
Introduction		
Water in Soils		
Capillarity		
Grain Size and Grain Size Distribution		
Grain Shape		
Soil Aggregate		
Phase Relations		
Interaction between Water and Clay Minerals		
Consistency & Sensitivity of Clays		
Organic Soils		
Soil Classification		
The Unified Soil Classification System		
The AASHTO Soil Classification System		
Typical Soil Parameters		
Relative Density		
Soil Compaction	4	All
Compaction Theory		(Except 4.32,
Properties of Compacted Soils		4.33, 4.34,
Field Compaction & Ground Modification		4.35)
In-Place Determination of Soil Density		
Water Flow Through Soils	5	5.1-5.5,5.7, 5.8,5.11
Darcy's Law		
Permeability Tests		
Hydraulic Heads		
Seepage and Flow Nets		
Seepage Forces & Critical Gradient		

Subject	Chapter	Section
Stresses in Soils	6	6.0-6.2
Effective Stress		6.4-6.12
Mohr Circle		
Stress Due to a Point Load		
Stress Due to an Infinite Line Load		
Stress Due to an Infinite Strip Load		
Stress Due to a Linearly Increasing Infinite Strip Load		
Stress Distributions Due to an Asymmetrical Triangular Load		
Stress Due to a Vertical Embankment Load		
Stress Due to a Uniformly Loaded Circular Area		
Stress Due to a Uniformly Loaded Rectangular Area		
Stress Increment Approximation Using Newmark's Chart		
Volume Change in Soils	7	7.0-7.2, 7.4
Soil Compressibility		
Consolidation		
Rate of Consolidation		
Settlement		
Shear Strength of Soils	8	All
Stress-Strain Relationships & their Measurements		
Mohr-Coulomb Failure Criterion		
Shear Strength of Cohesionless Soils		
Shear Strength of Cohesive Soils		
Lateral Earth Pressure	9	9.0-9.2
Earth Pressure at Rest		
Active State of Stress		
Passive State of Stress		
Bearing Capacity of Shallow Foundation	10	10.0-10.2, 10.5-10.6
Bearing Capacity Theory		
Factor of Safety		