

Identification	Subject	Soil Mechanics
	Department	Civil Engineering
	Program	Undergraduate
	Term	Fall 2015
	Instructor	Ali Atefi
	E-mail:	aatefi@khazar.org
	Phone:	050 6589536
	Classroom/hours	
	Office hours	
Prerequisites	Engineering Mechanics	
Language	English	
Compulsory/Elective	Compulsory	
Description	Technology that deals with soil (and rock) as an engineering material in civil engineering projects.	
Required textbooks and course materials	Murthy, V.N.S., "Soil mechanics and Foundation Engineering". CBS Publishers Distribution Ltd., New Delhi. 2007 Gopal Ranjan and Rao A.S.R. "Basic and Applied soil mechanics", Wiley Eastern Ltd, New Delhi (India), 2000.	
Course website		
Course outline	Soil amongst most variable and difficult of all materials to understand and model Complex stress-strain (non-linear, irreversible) Properties highly variable function of soil types and stress history Properties change with time, stress, environment, ... Every site has different soil conditions - new challenge Soil "hidden" underground and data on small fraction of deposit	
Course objectives	<ol style="list-style-type: none"> 1. To appreciate soil as a vital construction material and soil mechanics in the engineering of civil infrastructure. 2. To understand relationships between physical characteristics of soils and mechanical characteristics such as conductivity; strength; compressibility. 3. To learn how to measure both physical and mechanical characteristics of soils through hands-on practice in the lab. 4. Understand the modeling techniques commonly used in soil mechanics and how to apply them. Examples here include: <ol style="list-style-type: none"> a. Darcy's law and flownets when computing two-dimensional seepage; b. Consolidation models for load-time-deformation response of soils; c. Mohr-Coulomb shear strength modeling of soils. 5. Development of good technical reporting and data presentation skills. 	
Learning outcomes	<p>Upon successfully completing this course, it expected that you would be able to:</p> <ol style="list-style-type: none"> 1. Apply fundamental concepts learned previously or concurrently in mathematics, statics, mechanics of deformable bodies, and fluid mechanics to the solution of soil mechanics problems in civil and environmental engineering. 2. Explain the difference between different types of soils in terms of both physical and mechanical characteristics. 3. Perform the common tests used to measure soils' physical and mechanical properties and know how to interpret results from such tests. 4. Apply fundamental soil mechanics principles to common civil engineering applications including: <ol style="list-style-type: none"> a. Compute time-dependent settlement of a soil deposit after a load is applied. b. Compute the seepage of groundwater into a constructed excavation, and to assess liquefaction potential. 	

	c. Compute the magnitude of loads that can be applied to a geomechanical system safely without inducing shear failure. 5. Write professional quality, clear concise technical reports and letters.		
Teaching methods	Lecture		x
	Experiential exercise		x
	Assisted work		x
	Assisted lab work		x
	Others		
Evaluation	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Class Participation and Attendance		10
	Quizzes		25
	Lab Exercises		-
	Project (3 phases)		-
	Final Exam		35
	Total		100
Policy	<ul style="list-style-type: none"> • NO CELL PHONES are allowed during lecture and lab sessions. PLEASE turn them off before lecture! (Not silent or vibrating mode) • No late assignments will be accepted without prior arrangement with the instructor for acceptable excuses. Medical and family emergency will be considered on case-by-case basis. • No late homework will be accepted. Homework is to be completed on an individual basis. Students may discuss homework with classmates, but students are responsible for your own work. If students have consulted classmates, please note the individuals name on the top of students' assignment. • Quizzes may be given unannounced throughout the term and will count as one homework. There will be no make-up quizzes. • No make-up exams. If students miss an exam, a zero score will be assigned to the missed exam. • If students should miss class due to personal emergency or medical reasons, please notify the instructor by email immediately. A doctor's note will be required for make-up work. • Students are responsible for completing the reading assigned from the textbook related to the covered topics and for checking email regularly for important information and announcements related to the course. • University policy on academic honesty concerning exams and individual work will be strictly enforced. • BE ON TIME! 		

Tentative Schedule			
Week	Date/Day (Tentative)	Topics	Textbook/Assignments
1		Introduction	Chapter 1
2		Geotechnical / Geoenvironmental Engineering	Chapter 1
3		Conduct of Subject	Chapter 2
4		Nature of Soil	Chapter 3
5		Soil Composition, Index Properties, Soil Classification	Chapter 3
6		Soil Structure: Clay-Water Forces, Interparticle Forces, Fabric	Chapter 4
7		Environmental Factors	Chapter 5
8		Dry Soil (Cohesionless)	Chapter 6
9		Mohr Circle, Stress Paths, Elastic Stress Distribution	Chapter 6
10		Stress-Strain and Strength Behavior of Sand	Chapter 7
11		Rankine Earth Pressures, Infinite Slopes, Retaining Walls	Chapter 8
12		Bearing Capacity of Sands (Theory and Practice)	Chapter 8
13		Settlement of Sands	Chapter 9
14		Saturated Soil (No or Steady State Flow)	Chapter 9
15		Effective Stress Principle, Capillarity, Soil Suction	Chapter 9
16		Final Exam	

This syllabus is a guide for the course and any modifications to it will be announced in advance.