

Instructor: Dr. Mehrdad Razavi

Office Hours: Monday 3:00 pm to 5:00 pm or by Appointment

Office: MSEC 288

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Class Website: <http://www.nmt.edu/~Mehrdad/ME420/>

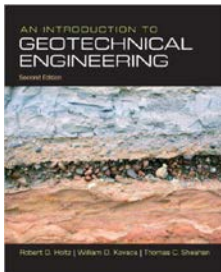
Class Schedule

Tuesday	11:00 pm to 12:15 pm	MSEC 103
Thursday	11:00 pm to 12:15 pm	MSEC 103

Soil Mechanics Lab Schedule (Starting September 5, 2017)

Section I:	Tuesday	2:00 pm to 5:00 pm	MSEC 164
Section II:	Wednesday	2:00 pm to 5:00 pm	MSEC 164
Section III:	Thursday	2:00 pm to 5:00 pm	MSEC 164

Textbook



Holtz, R. D. and Kovacs, W. D., and Sheahan, T. C. (2011). *An Introduction to Geotechnical Engineering*, 2nd Edition, Pearson.

ISBN-13: 978-0-13-249634-6

References

1. Lecture Handouts
2. Das, B. M. and Sobhan, K. (2013). *Principles of Geotechnical Engineering*, 8th Edition, Cengage Learning.
3. Knappett, J. A. and Craig, R. F. (2012). *Craig's Soil Mechanics*, 8th Edition, CRC Press.
4. Das, B. M. (2009). *Soil Mechanics Laboratory Manual*, 7th Edition, Oxford University Press.

Course Outline

Basic Concepts

- An introduction to Geotechnical engineering
- Phase relationships
- Soil classification
- Clay mineralogy

Compaction

- Application
- Compaction effort
- Standard Proctor test
- Modified Proctor test
- Compaction curve
- Optimum water content and maximum dry density
- Field compaction
- Zero-Air-Void density

Flow of Water in Soils

- Velocity, pressure, and potential heads
- Darcy's law and permeability
- Measurement of permeability
- Seepage
- Effective Stress

Shear Strength of Soils

- Mohr Circle
- Stress-strain relationships and failure criteria
- Mohr-Coulomb failure criterion
- Shear strength tests
- Shear strength of sands and clays

Consolidation

- Concept
- 1-D Consolidation equation
- Consolidation settlement
- Time rate of consolidation

Lateral Earth Pressure

- At rest earth pressure
- Active earth pressure
- Passive earth pressure

Soil Mechanics Laboratory Tests

No.	Test	Note	Report
1	Subsurface Exploration and Sampling	Video	IR ¹
2	Specific Gravity	Sand	GR ²
3	Grain Size Distribution-I	Coarse-Grained Soils	GR
4	Grain Size Distribution-II (Hydrometer)	Fine-Grained Soils	GR
5	Atterberg Limits	<i>LL</i> and <i>PL</i>	GR
6	Standard Compaction	<i>(γ_d)_{max}</i> and <i>w_{opt}</i>	GR
7	Permeability	<i>k</i>	GR
8	Direct Shear	<i>c</i> and <i>φ</i>	GR
9	Unconfined Compression Strength	<i>q_u</i>	GR
10	Triaxial Shear Strength	Demonstration	IR
11	1-D Consolidation	<i>C_s</i> , <i>C_α</i> , and <i>C_v</i>	GR

Grading

	ME 420	ME 506
Homework	25%	25%
Quiz	10%	10%
Lab Reports	20%	20%
Midterm Exam	20%	15%
Final Exam	20%	15%
Project	0%	10%
Class Participation	5%	5%
Total	100%	100%

Homework Requirement

1. All homework assignments must be handed in on engineering paper by 5:00 pm on the due date. Late homework is accepted. However, a 20% penalty is applied for each day after the due date.
2. Each problem should be clearly labeled and the solution should be presented in a logical manner. All solution steps should be included. The pages should be numbered and stapled together. Each answer should be placed in a box.

¹ Individual Report

² Group Report

3. Lab reports will be due one week after the day it is assigned.
4. Graduate students must work on a geotechnical engineering related project and present their work. The project (for graduate students only) due date is December 8, 2017 and presentations will be scheduled by the instructor. A complete report as well as PowerPoint slides must be submitted for the project.

Test Policy

1. There will be one midterm exam and one final exam.
2. To pass the course all homework assignments and lab reports should be submitted.
3. Grades will be assigned on an absolute scale, as minimum. However, I reserve the right to adjust borderline grades upward on the basis of trends in homework and class performance.