CE 353 - Soil Mechanics

- Faculty: 
  Dr. Talat A Bader

- Laboratory Assistants: 
  Umran

- Grader: 
  Mr. xxxxxxxx
CE 353 Soil Mechanics Website

- Homepage is Located in the Following address:
  - Go to http://users.kfupm.edu.sa/ce/tbader

- Contains course information
  - Schedule, Lectures, Homework, Grades Lab, Handouts, important information, etc.

Homework

- Assigned (unannounced) homework is due on Monday’s the following Week.
- All homework must be turned in (even if late) to receive a passing grade.
- Late homework = 0 except for one time per semester
Exams

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<tr>
<td>First Exam</td>
<td>Monday</td>
<td>9 Oct</td>
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<td>Second Exam</td>
<td>Monday</td>
<td>20 Nov</td>
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<td>Final Lab</td>
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<td>Jan 13</td>
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<td>Final Exam</td>
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<td>Jan 22</td>
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Check the Web for details

Grading Soil Mechanics

- The final course grade will be determined using the following parts:
  - two exams (18% + 20%) 38%
  - homework, quizzes & attendance 12%
  - average of lab reports 20%
  - final exam 30%

\[ \Sigma = 100\% \]
Homework 1

- Due next Wednesday by 9:00am Before class.
- Send me an e-mail with what ever question in your mind to my address tbader@kfupm.edu.sa
- In the subject follow the following:
  - Subject:ID#_CE353_homework 1
  - Subject:201068_CE353_Homework 01

Topics in Soil Mechanics

- Description of Soils
- Soil Composition
- Soil Compaction
- Classification of Soil
- Flow of Water in Soil: Permeability and Seepage
Topics in Soil Mechanics

- Effective Stress Concepts
- Stresses in a Soil Mass
- Compressibility of Soil
- Shear Strengths of Soil
- Soil Bearing Capacity
- Lateral Earth Pressure
What to learn from CE 353 Geotechnical Engineering?

At the end of this course, the student should be able to:

✓ To list the salient engineering properties of soils and the major factors which control these properties
✓ To describe the methods of determining these properties
✓ To identify the common situations when the soil becomes a factor in an engineering problem

✓ To identify the common situations when the soil becomes a factor in an engineering problem
✓ To perform basic analytical procedures in these situations
✓ To design foundations on sand and clay
What is Soil Mechanics?

- Soil: loose agglomeration of mineral and organic material extending from the ground surface down to solid rock.
- Mechanics: concerned with the mechanics of materials; related to properties of materials. How do materials behave? What are the patterns that we can observe?

How Pedologist Define Soil?

To a Pedologist ... Soil is the substance existing on the earth's surface, which grows and develops plant life.
How Geologist Define Soil?

Geologist:

➢ To a Geologist ..... Soil is the material in the relative thin surface zone within which roots occur, and all the rest of the crust is grouped under the term ROCK irrespective of its hardness.

How Engineer Define Soil?

Engineer:

➢ To an Engineer .... Soil is the un-aggregated or un-cemented deposits of mineral and/or organic particles or fragments covering large portion of the earth’s crust.
What is Soil Mechanics?

- Soil Mechanics is one of the youngest disciplines of Civil Engineering involving the study of soil, its behavior and application as an engineering material.

The Father of Soil Mechanics

- According to Karl Terzaghi (1948):
  - "Soil Mechanics is the application of laws of mechanics and hydraulics to engineering problems dealing with sediments and other unconsolidated accumulations of solid particles produced by the mechanical and chemical disintegration of rocks regardless of whether or not they contain an admixture of organic constituent."
Soil Mechanics

- Soil Mechanics is a subset of Geotechnical Engineering.

- Geotechnical Engineering concerns the application of civil engineering technology to some aspect of the earth, including:

Geotechnical Engineering Contains

- Soil Mechanics (Soil Properties and Behavior)

- Soil Dynamics (Dynamic Properties of Soils, Earthquake Engineering, Machine Foundation)

- Foundation Engineering (Deep & Shallow Foundation)
Geotechnical Engineering Contains

- Pavement Engineering (Flexible & Rigid Pavement)
- Rock Mechanics (Rock Stability and Tunneling)
- Geo-environmental Engineering (Soil Improvement)

Subject Organization

- Geotechnical Engineering
  - Geo-Mechanics
    - Rock Mechanics (Rock Stability & Tunneling)
    - Soil Mechanics (Soil Properties Behavior)
    - Soil Dynamics (Dynamic Properties, Soils Machine Foundation, Earthquake Eng.)
  - Geo-Environmental
    - Foundations
      - Shallow & Deep
    - Retaining Structures
    - Seepage, Slopes, and Dams
    - Pavement Eng (Flexible & Rigid)
That's all!
See you on Monday!