

ABET course syllabus (Geotechnical Engineering)

1. *Course number and name*
0941231: Geotechnical Engineering
2. *Credits and contact hours*
3 Credit Hours
3. *Instructor's or course coordinator's name*
Instructor: *Bashar Tarawneh*, Associate Professor of Civil Engineering
Course Coordinator: *Bashar Tarawneh*, Associate Professor of Civil Engineering
4. *Text book, title, author, and year*
 - “Principles of Geo-technical Engineering”, Braja M. Das and Khaled Sobhan, 8th Edition, SI Edition, , 2014, Cengage Learning ,Stamford, CT 06902, USA
 - “ An Introduction to Geotechnical Engineering”, Robert D. Holtz, William D. Kovacs, Thomas C. Sheahan, 2nd Edition, 2012, Prentice Hall, Englewood Cliffs, New Jersey 07632, USA
 - a. *other supplemental materials*
 - “ Soil Mechanics Principles and Practice”, Graham E. Barnes, 3rd Edition, 2010, Palgrave Macmillan
5. *Specific course information*
 - a. *brief description of the content of the course (catalog description)*
Phase relationships. Physical properties of soil. Soil classification. Compaction, Stresses in Soils. Permeability and seepage. Shear strength. Compressibility, consolidation and settlement
 - b. *prerequisites or co-requisites*
Prerequisite: Strength of Materials (0901241), Engineering Geology (0901230)
Co-requisite: Geotechnical Engineering Lab(0901231)
 - c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
Required for Civil Engineering
6. *Specific goals for the course*
 - a. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*
 - The student will be able to evaluate soil unit weights using weight-volume relationships and principles of compaction.
 - The student will be able to apply the principles of fluid flow for permeability and seepage analysis.
 - The student will be able to calculate settlements using methods of stress distribution and principles of soil compression.

- The student will be able to solve shear problems using principles of shear strength.
- The student will be able to analyze data using laboratory experiments.

b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): a, b, and g

7. *Brief list of topics to be covered*

- Introduction
 - Geotechnical Engineering
 - Deposition
 - Clay Mineralogy and Nano-structure
 - Phase relationships and Engineering classification of soils.
- Index Properties of Soil
 - Shrinkage Limit
 - Plastic Limit
 - Liquid Limit
 - Plasticity Index
 - Liquidity Index
 - Plasticity Chart
- Phase Relationships
 - Gravimetric
 - Volumetric
 - Volumetric/Gravimetric
- Soil Classification
 - Grain Size Analysis
 - Hydrometer
 - Classification
- Soil Compaction
 - General Definition
 - Proctor Device (Standard and Modified)
 - Compaction Curves
 - Soil Structure
 - Field Density
 - Compaction types and equipment
- Bernoulli's Equation and Permeability
 - Bernoulli's Equation
 - Darcy's Law
 - Hydraulic Conductivity
 - Absolute Permeability
 - Tests
- Seepage
 - Laplacian
 - Continuity
 - Flow nets

- Anisotropic Flow
 - Uplift Pressure
- Stresses in a soil mass
 - Mohr Circle
 - Overburden Stresses
 - Stresses due to external loads
- Compressibility of soils
- Mohr's circle of stresses;
- Shear strength of soils