



**Course Name:**

Applied Geotechnical Engineering

<b>Course Number:</b> -	<b>Credit:</b> 3
<b>Program:</b> Undergraduate	<b>Course Type:</b> Technical elective
<b>Prerequisite:</b> Foundation Engineering	<b>Corequisite:</b> -

**Course Description (Objectives):**

In this course the students become familiar with additional topics in geotechnical engineering. This course will increase the understanding of the students in basic soil mechanics concepts as well as their applications in design. A wide range of topics and applications emphasizing different geotechnical are discussed in this course.

**Course Content (outline):**

- Chapter 1: Laboratory tests and in-situ tests (4 Lectures)
  - Advantages and limitations of laboratory tests
  - Advantages and limitations of in-situ tests
  - Reliability of soil parameters based on in-situ tests
- Chapter 2: Shear strength of soils (5 Lectures)
  - Soil behavior under shearing forces
  - Effects of confining stress
  - Interpretation of soil shearing strength tests
  - Empirical equations for the determination of soil shearing strength
  - Other tests for the determination of soil shearing strength
  - Stress path
- Chapter 3: Additional topics in bearing capacity of shallow foundations (5 Lectures)
  - Mat foundations
  - Bearing capacity of shallow foundations in layered soils
- Chapter 4: Additional topics in bearing capacity of deep foundations (7 Lectures)
  - Pile load test
  - Bearing capacity of drilled shafts
  - Pile under negative skin friction
  - Bearing capacity of piles under lateral loading
- Chapter 5: Foundations on expansive soils (2 Lectures)
  - Nature of expansive soils
  - Effect of swelling on superstructures
  - Design of foundations on expansive soils
- Chapter 6: Stability of slopes (5 Lectures)
  - Different slope failures



Stability of infinite slopes  
Stability analysis by method of slices  
Taylor method  
Bishop and Morgenstern method

- Chapter 7: Ground improvement method (2 Lectures)  
Ground improvement in cohesive soils  
Ground improvement in granular soils
- Chapter 8: Correlations in geotechnical engineering (2 Lectures)  
Correlations for coarse grained soils  
Correlations for fine grained soils

## References:

- Das B.M. “Principles of Foundation Engineering”, 8th ed.
- Das B.M. “Shallow Foundations, Bearing Capacity and Settlement”, 3rd ed.
- Coduto, Kitch, and Yeung “Foundation Design Principles and Practices”, 3rd ed.
- McCarthy “Essentials of soil mechanics and Foundations”, 7th ed.