
AEN 3102 Soil Mechanic

Course Code:

Course Level: Level 3

Course Credit: 3CU

Instructor: Mr. Mutumba Charles BSc. MSc
Partime Lecturer.

Brief course description

The course enlightens and introduces undergraduate students to the fundamentals of geological formations and their importance towards understanding Soil mechanics. It also explores physical and chemical properties of soils, concepts of stress, consolidation, deformation and settlement, seepage and groundwater flow, shear strengths and its influence on slope stability and finally the application of these concepts on practical engineering works.

Course Objectives/learning outcomes

- Improve students' understanding of the principles of soil mechanics towards its application in solving practical engineering problems,
- Test and grade students on their understanding of the soil mechanics concepts

Detailed course description and outline

Physical and Chemical Properties

(4 Hours)

- Geological formation and nature of soils
- Type of soil deposits
- Physical properties of soils
- Classification and description of soils

Stresses

(4 Hours)

- Stresses at a point
- Stresses due to self weight
- Stresses due to applied loads

Deformation and Settlement

(3 Hours)

- Settlement based on elastic theory
- Vertical consolidation
- Settlement analysis

Seepage and Ground Water Flow

(6 Hours)

- Steady State flow
- Upward seepage flow
- Flow under retaining structures
- Flow through earth dams
- Flow in confined aquifers
- Flow in unconfined aquifers

Shear Strength and Stability of Slopes

(8 Hours)

- Stability of infinite slopes
 - Stability of cuttings
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- Stability of embankments
 - Stability of earth dams
 - Tri-axial compression test
 - Direction of failure planes
 - Pore pressure
 - Use of total stress and effective stress shear strength parameters

Lateral Earth Pressure

(2 Hours)

- Rankine's theory of earth pressure
- Coulomb's theory of earth pressure

Design of Earth Retaining Structures

(3 Hours)

- Gravity and cantilever walls
- Cantilever sheet pile walls
- Anchored sheet pile walls

Labs/Field Activities

(60 Hours)

- Laboratory determination of coefficient of permeability
- In-situ determination of coefficient of permeability
- Direct shear test
- Tri-axial shear test
- Pore water pressure measurements
- Oedometer test
- Soil sampling exercises

Mode of delivery: Lectures, tutorials and practicals

Mode of Assessment

1. Course work: assignments and practicals (20%)
2. Quizzes and tests (20%)
3. Final examination (60%)

Recommended Resources

1. Lecture notes
 2. Smith G.N. & Ian G.N. Smith (1998). Elements of Soil Mechanics. University Press, Cambridge
 3. Peter L. Berry & David Reid (1987). Introduction to Soil Mechanics. McGraw-Hill, London
 4. The internet and other electronic resources
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