

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY CIV 225 – SOIL MECHANICS (3 CR.)

Course Description

Focuses on soil in its relationship to engineering construction. Includes soil composition and structure, weight-volume relationships, sampling procedures, classification systems, water in soil, stresses, strains, bearing capacity, settlement and expansion, compaction, stabilization, and introduction to foundations and retaining walls. Lecture 3 hours per week.

General Course Purpose

The course familiarizes the student with the properties of soils, the uses of soils in construction and the science of soils engineering. In addition to the lectures, hands-on activities are integrated in the course to complement the lectures and discussions. The hands-on activities of the course introduce practical soil sampling, ASTM (American Society for Testing and Materials) and AASHTO (American Association of State Highway and Transportation Officials) testing specifications, and laboratory testing of soils to predict engineering performance.

Course Prerequisites/Corequisites

Prerequisites: EGR 130 or EGR 240.

Course Objectives

Upon completing the course, the student will be able to:

- Identify the engineering characteristics of soil
- Read borehole logs and identify soils, including soil type (by Unified Soil Classification System), and soil condition (water content, unit weight, void ratio, etc.)
- Calculate quantities of water flowing through soil and water pressure in soil
- Describe laboratory tests for characterizing soil, including Atterberg Limits, gradation, soil consolidation, and soil strength
- Understand and calculate the onset of quick conditions in soil
- Calculate stresses in soil, including effective stress, surcharge stress, and stresses from applied loads
- Calculate magnitude and rate of primary settlement of soil
- Describe foundation bearing capacity and calculate foundation settlement
- Apply Mohr-Coulomb characterization of soil strength

Major Topics to be Included

- Origin, characteristics, composition, structure and classification of soils
- Soil composition and stress measurements
- Fluid flow through soil
- Stresses in soil masses
- Consolidation, settlement and soil strength
- Investigation and soil tests
- Earth moving, soil compaction and stabilization
- Foundation bearing capacity and settlement
- Basic soil field and laboratory tests