

1. *Course number and name*

ENGR 431 Foundation Engineering

2. *Credits and contact hours*

3 Credit Hours

3. *Instructor's or course coordinator's name*

Instructor: T.B. D'Orazio, Professor of Civil Engineering

Course coordinator: T.B. D'Orazio, Professor of Civil Engineering

4. *Text book, title, author, and year*

Coduto, Donald, Foundation Engineering, 2nd edition, Prentice Hall, 2011

a. other supplemental materials

None.

5. Specific course information

a. brief description of the content of the course (catalog description)

Settlement of structures on deep and shallow foundations. Evaluation of undrained and drained soil strength. Analysis and design of gravity, cantilever and anchored walls. Ultimate capacity of deep and shallow foundations.

b. prerequisites or co-requisites

Engr 430

c. indicate whether a required, elective, or selected elective course in the program

Elective for Civil Engineering.

6. *Specific goals for the course. Specific outcomes of instruction.*

Students will demonstrate an ability to:

- Determine active earth pressure for walls.
- Determine passive earth pressure for walls.
- Design retaining walls under a variety of conditions.

Students will demonstrate an ability to:

- Analyze the bearing capacity of shallow foundations (mat and spread footings).
- Evaluate stresses on shallow foundations.
- Design shallow foundations.
- Determine the capacity of deep foundations (piers and piles).
- Evaluate the settlement of deep foundations.
- Design deep foundations.
- Select and design an appropriate foundation scheme for particular soil (environmental) conditions.
- Evaluate undrained strength.
- Evaluate drained strength.
- The role of geotechnical engineers on a construction project and how they interact with owners, architects, structural engineers, contractors and others.
- Contemporary issues in geotechnical engineering.
- The professional and ethical responsibilities of a geotechnical engineer.
- The need for working with other disciplines in solving geotechnical engineering problems.
- The need for continued learning in geotechnical engineering after graduation.

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, c, e, f, g.

7. *Brief list of topics to be covered*

- Determining settlement of structures built on mat, footing, pile and pier foundations.
- Determining active earth pressure for frictionless walls.
- Determining passive earth pressure for frictionless walls.
- Designing gravity retaining walls.
- Designing cantilever retaining walls.
- Designing braced excavations.
- Designing anchored sheet pile walls.
- Analyzing the bearing capacity of shallow foundations (mat and spread footings).
- Analyzing the bearing capacity of deep foundations (piles and piers).
- Designing shallow foundations.
- Designing deep foundations.
- Selecting an appropriate foundation scheme for particular soil (environmental) conditions.
- Understanding the importance of geotechnical engineering in society and the engineering community.