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:
Course coordinator:

4. Text book, title, author, and year

a. other supplemental materials
None.

5. Specific course information
a. brief description of the content of the course (catalog description)

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.