CE 453 – Geosystems Engineering Design

Code and Name: CE 453 – Geosystems Engineering Design
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Principles of Foundation Engineering, Das, B.M., 7th Edition, Cengage Learning, 2011,

Other References:
- *Coduto, D. P., Foundation Design: Principles and Practices, Pearson. 2nd Edition, 2001.*
- *Deep foundation Institute http://www.dfi.org/.*

Course Description:
Fundamentals of deep foundations, Pile foundations, Drilled-shaft foundations, Groundwater control for construction of foundations, Foundations on difficult soils, Introduction to soil improvement and ground modification techniques.

Pre-requisites: CE451 Foundation Engineering
Co-requisites: None

Course Learning Outcomes:
With relation to ABET Student Outcomes (From Fall 2019-SOs: 1-7)

1. Identify the appropriate deep foundation type for different soil profiles (1)
2. Identify the phenomena which may affect foundation settlement and capacity (1)
3. Calculate skin-friction and end-bearing capacity of pile foundations in various soil types (1)
4. Specify pile material types for various applications (1)
5. Evaluate pile capacity in the field using load tests, pile driving equations, and wave equation analysis (6)
6. Suggest suitable method for dewatering of foundations and foundations on difficult soils (1)

Topics to be covered:
- Introduction to deep foundations, types of piles and their structural characteristics.
- Site Load transfer mechanism, Estimation of pile capacity.
- Pile load tests, Laterally loaded piles.
- Bearing Group piles.
- Overview Introduction to drilled-shaft foundations, Construction procedures, Design considerations.
- Geotechnical Load bearing capacity of drilled shafts.
- Foundations on weak and compressible soils.
- Foundations on expansive and collapsible soils.
- Introduction to soil improvement and ground modification techniques.
- Groundwater control for construction of foundations.

Grading Policy:
The grading for the course is: 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, and projects for the remaining 20% that is modified by the course instructor.