

Course	CE 44800 – Geotechnical Investigations and Site Characterization
Type of Course	Technical Elective for Civil Engineering Program
Catalog Description	Introduction to various methods of investigations and site characterization using the field geotechnical and geophysical investigation tools; planning subsurface exploration, and interpretations of the geoen지니어ing properties and parameters for use in geotechnical infrastructure designs.
Credits	3
Contact Hours	3
Prerequisite Courses	CE 380 and CE 381 (authorized equivalent course or consent of instructor may be used in satisfying course co-requisites)
Prerequisites by Topics	Soil Mechanics and Soil Mechanics Laboratory
Textbook	Material provided during the course, including the following NHI (2002) Manual on Subsurface Investigations ; FHWA (2002) Evaluation of Soil and Rock Properties FHWA (2017) Geotechnical Site Characterization
Course Objectives	To provide students a thorough understanding of the process of geotechnical site characterization, including desk study, observational methods, conventional drilling and sampling techniques, and a broad range of in situ geotechnical and geophysical testing methods. The student will develop understanding of the capabilities and limitations of such tools, and be able to analyze the data, post-process and interpret it to meaningfully characterize the sub-surface geomaterials at variety of sites. The students should be able to plan a subsurface investigation program.
Course Outcomes	Students who successfully complete this course will be able to: <ol style="list-style-type: none">1. Work efficiently in problem-solving teams. [5]2. Conduct a comprehensive desk study as a first step of the subsurface exploration program. [6]3. Based on the outcome of desk study, plan a focused reconnaissance and visual inspection of the site to collect required information leading to the decision for preliminary and

- detailed subsurface investigations. [2, 6]
4. Develop a complete subsurface exploration program including the number and depth of boreholes for variety of sites [2, 6]
 5. Understand the effectiveness and limitations of various site investigation tools. [2, 6]
 6. Select in-situ geotechnical and geophysical exploration tools and methods appropriate for the site. [2, 6]
 7. Based on the geomaterial type, select the most suitable soil and rock sampling tool. [2, 6]
 8. Based on the subsurface exploration of a site, develop a thorough site-specific profile to support foundation analysis and design. [2, 6]
 9. Develop and interpret a boring log. [2, 6]
 10. Write a professional quality, clear and concise geotechnical site investigation report. [3]
 11. Use EXCEL tools for post-processing of the data derived from various in-situ tests used in geotechnical site investigations. [7]

Lecture Topics

1. Observational methods in geotechnical engineering
2. Desk study
3. Soil Exploration: boring and sampling
4. Rock Exploration: drilling, coring and sampling
5. Standard Penetration Test
6. Cone Penetration Test
7. Field Vane Shear Test
8. Pressuremeter Test
9. Flat Plate Dilatometer Test
10. Invasive Geophysical Tests (crosshole test, downhole test)
11. Non-invasive Geophysical Tests (seismic refraction, electrical resistivity)

Computer Usage	Medium
Lab/Field Experience	High
Design Experience	High
Coordinator	Fawad Niazi, Ph.D.
Date	1 November 2018