CE 423
GEOTECHNICAL ENGINEERING IN PROFESSIONAL PRACTICE
Fall 2016

"Virtually every structure is supported by soil or rock.
Those that aren't either fly, float, or fall over (Handy 1995)".

PURPOSE AND OBJECTIVE OF THE COURSE

The purpose of this course is to provide understanding of the concepts of geotechnical engineering in professional practice to the undergraduate (senior) and graduate students planning to pursue their career in geotechnical engineering or any other field of civil engineering. The course objectives are given below:

- Apply the principles of geotechnical engineering effectively in a "real-world setting".
- Plan, manage, and successfully execute geotechnical projects.
- Interpret and use the recommendations developed by geotechnical engineers.
- Incorporate Total Quality Management in the geotechnical projects.
- Apply professional liability, risk management, and loss prevention principles to geotechnical projects.
- Train students to work effectively and efficiently as a member of an interdisciplinary team, satisfy the needs of *internal* and *external* clients.

CLASS INSTRUCTOR	:	Sanjeev Kumar, Ph.D., P.E., Professor and Distinguished Teacher
CLASS TIME	:	Tuesday and Thursday 9:35-10:50 am (Room ENGR B42) (Due to Instructor's professional meetings, some make-up sessions may be needed)
OFFICE	:	Engineering Bldg. A, Room 108 (CEE Office) Phone: 536-2368 (office), 351-7566 (home), 201-3691 (cell) If not an emergency, please avoid calls between **10 pm** and **6 am**.
OFFICE HOURS	:	Tuesday, Wednesday, and Thursday: 8:30 - 9:30 am Please feel free to walk-in whenever I am in my office.

TEXTBOOK

A textbook covering all the objectives of the course is not currently available. Therefore, course material will be developed from several textbooks and research papers. References given under bibliography will be used.

BIBLIOGRAPHY

Principles of Geotechnical Engineering by Braja M. Das, Thomson Publishing Company
Principles of Foundation Engineering by Braja M. Das, Thomson Publishing Company
Soil Mechanics in Engineering Practice by Karl Terzaghi, Ralph B. Peck, and Gholamreza Mesri, John Wiley publishing company
Foundation Analysis and Design by *Joseph E. Bowles*, Fifth Edition
Foundation Design by *Donald P. Coduto*, Second Edition
Geotechnical and Foundation Engineering by *Robert W. Day*, McGraw Hill Publishers
Proposals, Project Reports, and other Material collected by the course instructor during his professional career.
Project Reports from other successful geotechnical consulting firms in the area.
Handouts from special lectures by consulting engineers

TENTATIVE LIST OF TOPICS TO BE COVERED IN THE COURSE

- Review of principles of soil mechanics and design of foundations, discussion on field and laboratory tests commonly used in practice, methods available for field investigations, and selection of an appropriate method for a particular project.

- Key elements of geotechnical engineering proposals and reports, Total Quality Management (TQM), project management, marketing for geotechnical projects, understanding competition, time and manpower required for regular geotechnical projects for budget estimation and scheduling purposes, red-flag words, etc.

- Professional liability, risk management and loss prevention issues on geotechnical engineering projects, types of contracts, understanding contracts and avoiding excessive and/or inappropriate professional liability.

- Discussion on geotechnical case histories. What went wrong and why?

- For a given real-word project: collection of available information from geological maps, soil conservation reports; identification of geotechnical aspects of the project; planning a soil investigation study including type and magnitude of investigation that will be used on the project; development of scope of work, proposal, and budget.
  Note: Projects will be selected from those, which have actually been executed (or being executed) by successful geotechnical consulting firms

- Understanding and developing field boring logs. Developing soil profiles and assigning engineering soil properties for analysis and design.

- Using the actual field testing data from tests such as standard penetration testing and test pits, development of lab testing program as per the budget assigned, defining site soil model and soil property values for analyses.

- Perform geotechnical analyses to evaluate the aspects of soil behavior pertinent to the project and develop recommendations.

- Preparation of a complete report summarizing the available information, the interpretation of the data, the results of the analyses, conclusions, recommendations, and presentation of the findings to the client.

- Review of the full original reports developed by consulting firms and comparing work with the actual reports, detailed discussion on the reports developed by the teams and consulting firms.

The class will be divided into groups of 3 to 5 students. At any one time, each group will work on the same project. The type of projects selected will be similar to the projects on which entry-level engineers are likely to work. After completion of each project, teams will be reorganized and new project will be assigned. Projects will be selected to cover a wide range of geotechnical issues. You will have opportunity to review the full original report of the project prepared by the consulting engineering firm after you complete your own report.

GENERAL INSTRUCTIONS

- Attendance is ***required*** for each session of this course. The information covered in each class is pertinent to understanding of the entire course. There will be several unannounced quizzes throughout the semester based on the topics discussed in the class. Unexcused absence from the class is likely to adversely affect your grade.
- There will be some field trips and/or special presentations. Therefore, flexibility with your schedule may be needed.
- All assignments and project reports must be turned-in by the due date and time given on the assignment. Late assignments and project reports will not be accepted. However, if due to some valid reason, you feel that you will not be able to complete the assignment by the due date, please let me know at least three days before the due date of the assignment. If I am not in my office, call me or send me an e-mail (kumars@ce.siu.edu).
- Anyone caught copying assignments, reports, quizzes, etc. from other students in the class or from those who have already taken the course in previous semesters will receive a grade of 'F.' Also, anyone allowing copying of his/her assignments to other students in the class will receive a grade of 'F.'
- Everybody is required to participate in class discussions.

GRADING POLICY

- Final grade will be calculated using the grading distribution and final grade assessment provided below.

Tentative Grade Distribution

Proposal - 1	10%
Project - 1	20%
Proposal - 2	15%
Project - 2	25%
Unannounced Quizzes	15%
Other Homework Assignments	15%

Note 1: Each proposal and report submitted by a group will be graded and assigned score out of 100. Each team member will also evaluate the other team members based on their contribution to the proposal and project and assign score out of 100. Then your score for each proposal and project will be calculated by multiplying the points assigned to the group report and average of points given by the team members. As an example;

Group score for Project 1	90 out of 100
Average of points given to you by your team members	80 out of 100
Your score for Project 1	$\frac{90 \times 80}{100} = 72$ out of 100

Final Grade Assessment

Percent Scores	Final Letter Grade
90 and Above	A
Between 80 and 89	B
Between 70 and 79	C
Between 60 and 69	D
59 and Below	F

Note: Overall score will be rounded off to the nearest whole number. As an example, 79.5 will be considered as 80 and 79.4 will be considered as 79.