Fall 2015

ENCE 4340

Malay Ghose Hajra
University of New Orleans

ENCE 4340 & 5340 FOUNDATION ENGINEERING FALL 2015

UNO Catalog Data: Application of soil mechanics principles to the design of foundations, and retaining walls. Introduction to subsurface investigations, braced excavations, piles, and drilled shafts.

Prerequisite: ENCE 3340

Class meeting: Mondays and Wednesdays; 3:30pm to 4:45pm; Science Building 2120

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

Grading System:

Mid term exam	**15%**	**A: 90 and above**
Quizzes/ Class discussion	**10%**	**B: 80 and < 90**
Homeworks	**10%**	**C: 70 and < 80**
Final exam	**15%**	**D: 60 and < 70**
Class project	**50%**	

Instructor: Malay Ghose Hajra, Ph.D., P.E. ; Office Room No.: Engineering Building Room # 813
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Office Hours: 2:00 pm – 3:00 pm Mondays and Wednesdays, Engineering Building Room No. 813

Selected Course Topics

1. Subsoil exploration
2. Shallow foundations: Bearing capacity as per Terzaghi's theory, the general theory of bearing capacity (as per Meyerhof and Vesic), effect of water table and bearing capacity of foundations on slopes. Settlement of foundations on sands and clays. Common types of combined footings, bearing capacity and settlement of mat foundations.
3. Lateral earth pressure on retaining walls: earth pressure at rest, Rankine and Coulomb's theories of earth pressure, and their application to the analysis of gravity and cantilever retaining walls. Stability of retaining walls.
4. Flexible earth structures: basic principles of sheet pile walls, design procedures for anchored sheet pile walls and braced excavations.
5. Deep foundations: basic principles of computation of static bearing capacity of piles; importance of pile load tests, pile-group and their settlement; introduction to laterally loaded piles; design considerations for drilled shafts.
6. Ground modification and soil improvement: Overview of deep dynamic compaction, vibro flotation, precompression methods; use of geosynthetics in earth structures.
7. Foundations on difficult soil: Overview of expansive and collapsible soils and design considerations for foundations in these types of soil.

Selected Course Objectives:

After the completion of the appropriate individual teaching unit the student will be able to:

1. Given the appropriate soil properties and the chart or table of bearing capacity factors, determine correctly the allowable bearing capacity of a shallow foundation using the Terzaghi's and/or the general bearing capacity theory in the case of a centric or eccentrically loaded footing.
2. Given the relevant soil properties and influence coefficients for stress distribution, determine correctly the total settlement of a shallow foundation.
3. Given a cantilever or gravity wall retaining a cohesionless backfill with known properties, check the stability of the retaining wall.
4. Given a sheet pile driven into a cohesionless or cohesive soil of known properties, correctly determine the depth of penetration, the force in the anchor rod, the maximum bending moment, and choose the appropriate sheet pile section using the free earth support / fixed earth method.
5. Apply the Rowe's moment reduction procedure to the free earth support moment and select an appropriate sheet pile; Design a sheet pile by the computational diagram method.
6. Given a braced excavation in a cohesive or cohesionless soil of known properties, determine correctly the strut loads, the maximum moment in the sheet pile and select a sheet pile.
7. Given a pile or a drilled shaft driven into a cohesionless or cohesive soil of known properties compute correctly the ultimate bearing capacity of the pile and/or the drilled shaft. Given the results of a pile load test, determine the allowable pile load.
8. Given a pattern of a pile group, determine the efficiency of the pile group in cohesionless soil or cohesive soil and the settlement of the pile group.

If time permits:

9. List the various geosynthetics used in earth structures and foundations and explain their function in various applications.
10. List the various ground improvement methods & explain their application with necessary numerical computations.

Class Project: A class project will be required for this course. The topic and scope of the projects will be discussed on the first day of the class. The students will be divided into multiple groups and each group will be assigned an industry professional mentor. The projects require teamwork and all students in a team are responsible for the successful completion of the project. The class project will require a final report (due by November 26, 2015) and a 30 minute presentation by the team.

The content of the project report should provide a general background and historical perspective of the subject matter, and analysis and discussion of the applicable design methods used. Maximum report length is 25 pages and this includes double-spaced text, figures, tables, references, and appendices. A font size of 12 and a font type of Arial or Times New Roman should be used. A cover sheet and a table of contents should be provided and they are not included in the 25 page maximum length. If equations are used, they should be properly written using the Equation Editor. Handwritten equations or table/figure captions are not acceptable. Figures should preferably be redrawn. However, if they are scanned, the scan quality will be considered in grading. Neatness and organization of the paper will also be considered during grading. It is strictly forbidden to directly copy sentences from references. Students are expected to read and understand a number of references and summarize the information that they obtained in their own words. In addition, a one-page summary of the report should be distributed to the class (including the instructor) on the presentation day. The summary should include a brief background of the selected topic with an emphasis on design considerations, or results. A list of 3-4 recommended references on the selected topic should also be included at the end of the summary. Each class-project presentation (tentatively scheduled for December 4, 2015) will be followed by a 5 minutes Q&A session. EN 101 (Engineering Auditorium) will be reserved for the presentation. Students are strongly encouraged to prepare their presentations in Microsoft Power Point and to present it using a computer projector, since most professional presentations (i.e. conferences, interviews, meetings, etc.) are done in this way. A computer projector and a computer will be available in the room. The students are advised to arrive 30 minutes early and prepare (i.e. loading the file, ensuring the file is accessible, etc.). The grading scheme is based on the instructor's grade, professional mentor's assessment, and peers' grades. The presentation grade will be based on organizational skills, time management, clarity of visuals, and delivery of the speech.

General Course Policies:

Academic Integrity: Academic integrity is fundamental to the process of learning and evaluating academic performance. Academic dishonesty will not be tolerated. Academic dishonesty includes, but is not limited to, the following: cheating, plagiarism, tampering with academic records and examinations, falsifying identity, and being an accessory to acts of academic dishonesty. Refer to the Student Code of Conduct for further information. The Code is available online at http://www.studentaffairs.uno.edu.

Accommodations: It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities should contact the Office of Disability Services as well as their instructors to discuss their individual needs for accommodations. For more information, please go to http://www.ods.uno.edu.

Verification for Online Students: To ensure academic integrity, all students enrolled in distance learning courses at the University of New Orleans may be required to verify their identity when completing exams or other high-stakes assignments. At the discretion of the faculty member teaching the course, verification may include on-campus proctored examinations, off-site or online proctored examinations, or other reasonable measures to ensure student identity. If students cannot attend an on-campus proctored exam, UNO partners with ProctorU, a live, online proctoring service that allows students to complete exams from any location using a computer, webcam, and reliable internet connection. Verification measures for this course are identified below and any fees associated are the responsibility of the student.

Attendance: Class attendance is in accordance with the published university policy. You must sign in on a sign-on sheet passed around during the class. You are responsible for material identified in the Reading/Lecture schedule listed earlier and covered in class, even if absent from class for authorized activities.

Class room procedure: Come to class on time. Bring the course text, calculator, ruler, and other stationery material to each class period. Cell phones should be turned off before the class begins. Use of cell phones during quizzes/exams is prohibited. Kindly maintain class decorum as talking disturbs my concentration and of other class members.

Quizzes: Quizzes will be given in class (pre-announced) similar to or involving the concepts learned in practice problems. It may last from 10 to 20 minutes depending on the problem. All quizzes and exams are closed book and closed notes with relevant tables/charts being supplied with a few selected formulas. Use engineering paper in all your work. No make-up quiz/examination will be given except for medical reasons with substantial proof

Study assignments: Study assignments for each class are listed in the Reading/Lecture schedule. You should study at home these articles and come to class with a general understanding of the concepts to be able to understand the classroom lecture.

Students with disabilities: kindly contact the Office of Disability Services.

Graduate Credit: Graduate students need to do a project and/or additional assignments in addition to the regular assigned work for receiving Graduate credit. Please meet and discuss with me during the second week of this semester. Submittal of report for assigned project: November 26, 2015.

☺ WISH YOU ALL A REWARDING SEMESTER. GOOD LUCK ☺

Syllabus Attachment

Fall 2015

Important Dates*

Last day to adjust schedule w/out fee..... 08/18/2015
Semester Classes Begin 08/19/2015
Last day to adjust schedule w/fee,
or withdraw with 100% refund..... 08/25/2015
Last day to apply for December commencement..... 09/25/2015
Final day to drop a course or resign 10/14/2015
Mid-semester examinations.....10/05-10/09/2015
Final examinations 12/07-12/11/2015
Commencement..... 12/18/2015
**Note: check Registrar's website for Saturday and A/B sessions, and for items not listed here: http://www.registrar.uno.edu*

Fall Semester Holidays

Labor Day 09/07/2015
Mid-semester break.....10/15-10/16/2015
Thanksgiving.....11/26-11/27/2015

Withdrawal Policy – Undergraduate only

Students are responsible for initiating action to resign from the University (withdraw from all courses) or from a course on or before dates indicated in the current Important dates calendar. Students who fail to resign by the published final date for such action will be retained on the class rolls even though they may be absent for the remainder of the semester and be graded as if they were in attendance. Failure to attend classes does not constitute a resignation. Check the dates on the Registrar's website, http://www.registrar.uno.edu. Please consult The Bulletin for charges associated with dropping and adding courses.

Incomplete Policy – Undergraduate only

The grade of I means *incomplete* and is given for work of passing quality but which, because of circumstances beyond the student's control, is not complete. The issuance of the grade of I is at the discretion of the faculty member teaching the course. For all graduate and undergraduate students, a grade of I becomes a grade of F if it is not converted before the deadline for adding courses for credit (as printed in the Important Dates Calendar) of the next regular semester including summer semester.

Repeat Policy

When a student is permitted to repeat a course for credit, the last grade earned shall be the one which determines course acceptability for degree credit. A student who has earned a C or better in a course may not repeat that course unless, (1) the catalog description indicates that the course may be repeated for credit, or (2) the student's Dean gives prior approval for documented extenuating circumstances.

Graduate Policies

Graduate policies often vary from undergraduate policies. To view the applicable policies for graduate students, see the Graduate Student Handbook: http://www.uno.edu/grad/documents/GraduateStudentHandbook2014.pdf

Academic Dishonesty Policy

http://www.uno.edu/student-affairs-enrollment-management/documents/academic-dishonesty-policy-rev2014.pdf

Safety Awareness Facts and Education

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://www.uno.edu/student-affairs-enrollment-management/

UNO Counseling Services and UNO Cares

UNO offers care and support for students in any type of distress. Counseling Services assist students in addressing mental health concerns through assessment, short-term counseling, and career testing and counseling. Find out more at http://www.uno.edu/counseling-services/. First-year students often have unique concerns, and UNO Cares is designed to address those students succeed. Contact UNO Cares through http://www.uno.edu/fye/uno-cares.aspx.

Emergency Procedures

Sign up for emergency notifications via text and/or email at E2Campus Notification: http://www.uno.edu/ehso/emergency-communications/index.aspx. All emergency and safety procedures are explained at the Emergency Health and Safety Office: http://www.uno.edu/ehso/.

Diversity at UNO

As the most diverse public university in the state, UNO maintains a Diversity Affairs division to support the university's efforts towards creating an environment of healthy respect, tolerance, and appreciation for the people from all walks of life, and the expression of intellectual point of view and personal lifestyle. The Office of Diversity Affairs promotes these values through a wide range of programming and activities. http://diversity.uno.edu/index.cfm

Learning and Support Services

Help is within reach in the form of learning support services, including tutoring in writing and math and other supplemental instruction. Visit the Learning Resource Center in LA 334, or learn more at http://www.uno.edu/lrc/.

Affirmative Action and Equal Opportunity

UNO is an equal opportunity employer. The Human Resource Management department has more information on UNO's compliance with federal and state regulations regarding EEOC in its Policies and Resources website: http://www.uno.edu/human-resource-management/policies.aspx