CE440/540: Foundation Engineering

Fall 2017

Instructor:	Dr. Lianyang Zhang, CE Building/Room 200A Phone: 626-0532; E-mail: lyzhang@email.arizona.edu
Time and Room:	TuTh 2:00-3:15PM; Elec & Comp Engr, Rm 102
Office Hours:	TuTh 4:30-6:00PM or By Appointment

Prerequisite(s)

CE343 Geotechnical Engineering and Design
or permission of the instructor. If the instructor has waived the prerequisite(s), you still take full responsibility for your performance in this course.

Textbook

Muni Budhu. Foundations and Earth Structures. John Wiley & Sons. 2008, 2nd printing.

References (which will be posted on D2L)

1. Peck, R. B. (1962). "Art and science in subsurface engineering." Geotechnique, 12(1), 60-66.
2. Peck, R. B. (1969). "Advantages and limitations of the observational method in applied soil mechanics." Geotechnique, 19(2), 171-187.
3. NHI (2001). "Manual on Subsurface Investigations." Publication No. FHWA NHI-01-031, National Highway Institute, Federal Highway Administration, Washington, DC.
4. Chris R. Daniel, John A. Howie, R. Scott Jackson, and Brian Walker (2005). "Review of Standard Penetration Test Short Rod Corrections." J. Geotech. And Geoenvir. Engrg. 131(4), 489-497.
5. Allen, T. M., Nowak, A. S., and Bathurst, R. J. (2005). "Calibration to Determine Load and Resistance Factors for Geotechnical and Structural Design." Transportation Research Circular E-C079, Transportation Research Board Washington, DC.
6. Paikowsky, et al. (2004). "Load and Resistance Factor Design (LRFD) for Deep Foundations." NCHRP Report 507, Transportation Research Board Washington, DC.

Grading Criteria

ACTIVITIES	PERCENTAGES
Attendance, Participation and Quizzes	10%
Homework	20%
Design Projects	20%
Mid-Term Exam	20%
Final Exam	30%

Attendance, Participation and Quizzes (10%)

Attendance will be randomly recorded by giving mini quizzes in class. If you miss a class when a quiz is given, you will lose the corresponding points for both the attendance and the quiz. Your participation in the class will be recorded based on answering oral questions in the class (right or wrong, does not matter) and participating in all class discussions. ***If you need to be absent from the class for justifiable reasons (sickness, family obligations, etc.), you must inform the instructor in advance (usually at least one week).***

Homework (20%)

Homework problems and due dates are listed on the schedule sheet. Homework must be turned in at the beginning of the class in the classroom on the due date. Late turned in homeworks will receive a zero grade. Students are expected to turn in neat and organized homework on engineering problem sheets using only one side of the sheet. Any homework which is sloppy, difficult to read, or difficult to understand will receive a reduced grade.

Design Projects (20%)

Two Design Projects, each worth 10%, will be given. The specific requirements for each project will be given on the assignment.

Mid-Term Exam (20%)

One mid-term exam will be given. The exam will be held at the same location as the class. It will be open book and open notes.

Final Exam (30%)

A final exam worth 30% of the total grade will be given at the end of the semester on the date/time listed in UA Calendar. The final exam will cover the entire syllabus (comprehensive) and be open book and open notes.

Grading Scale

Total Score	Grade Point	Total Score	Grade Point
≥ 90	A	≥ 60 to < 70	D
≥ 80 to < 90	B	< 60	E
≥ 70 to < 80	C		

Notes: 1. If the class average is above 80, grades will be based on the "traditional" scale presented in the above table. If the class average is below 80, I may translate the grading scheme by statistical curving to reflect the true class average.

2. The instructor will make the borderline decisions based on the student's motivation, attendance, participation in the class, and quality of work.

Academic Integrity

Principle Integrity and ethical behavior are expected of every student in all academic work. This Academic Integrity principle stands for honesty in all class work, and ethical conduct in all labs and clinical assignments. This principle is furthered by the student Code of Conduct and disciplinary procedures established by ABOR Policies 5-308 through 5-404, all provisions of which apply to all University of Arizona students.
This Code of Academic Integrity (hereinafter "this Code") is intended to fulfill the requirement imposed by ABOR Policy 5-403.A.4 and otherwise to supplement the Student Code of Conduct as permitted by ABOR Policy 5-308.C.1.
Failure to follow the code of academic integrity will result in failing the course and be reported to the Dean of Students' office.

Prohibited Conduct: Conduct prohibited by this Code consists of all forms of academic dishonesty, including, but not limited to:

1 Cheating, fabrication, facilitating academic dishonesty, and plagiarism as set out and defined in the Student Code of Conduct, ABOR Policy 5-308-E.6, E.10, and F.1
2 Submitting an item of academic work that has previously been submitted without fair citation of the original work or authorization by the faculty member supervising the work.
3 Violating required professional ethics rules contained or referenced in the student handbooks (hardcopy or online) of undergraduate or graduate programs, or professional colleges.
4 Violating health, safety or ethical requirements to gain any unfair advantage in lab(s) or clinical assignments.
5 Failing to observe rules of academic integrity established by a faculty member for a particular course.
6 Attempting to commit an act prohibited by this Code. Any attempt to commit an act prohibited by these rules shall be subject to sanctions to the same extent as completed acts.

Student Responsibility
Students engaging in academic dishonesty diminish their education and bring discredit to the academic community. Students shall not violate the Code of Academic Integrity and shall avoid situations likely to compromise academic integrity. Students shall observe the generally applicable provisions of this Code whether or not faculty members establish special rules of academic integrity for particular classes. Students are not excused from complying with this Code because of faculty members' failure to prevent cheating.

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Fall 2017 Class Schedule **Instructor: Lianyang Zhang**

Week	Date	Topic	Reading	HW/Project	Due (+)
1	Tue Aug 22	Introduction	Ch. 1, 2, 3, 4, 5, 6 Ref. 1, 2, 3, 4		
	Thu Aug 24	Soil mechanics			
2	Tue Aug 29	Subsurface investigations		HW1: 4.1, 4.2, 4.4, 5.7	Sep 12
	Thu Aug 31	Design methods			
3	Tue Sep 5				
	Thu Sep 7			HW2: 6.5, 6.6	Sep 19
4	Tue Sep 12				
	Thu Sep 14	Shallow foundations:	Ch. 7, 9 Ref. 5		
5	Tue Sep 19	Types of shallow foundations		HW3: 7.1, 7.4, 7.6(a), (b)	Oct 10
	Thu Sep 21	Bearing capacity of shallows foundations			
6	Tue Sep 26	Settlement of shallows foundations			
	Thu Sep 28	LRFD design of shallow foundations		HW4: 7.7, 7.9*, 7.14**	Oct 24
7	Tue Oct 3				
	Thu Oct 5				
8	Tue Oct 10				
	Thu Oct 12			Project 1	Nov 7
9	Tue Oct 17	**Mid-Term Exam**			
	Thu Oct 19	Design of mat (raft) foundations			
10	Tue Oct 24	Foundations on problematic soils			
	Thu Oct 26	Pile foundations:			
11	Tue Oct 31	Types of pile foundations			
	Thu Nov 2	Bearing capacity of single piles	Ch. 8 Ref. 6	HW5: 8.5, 8.7	Nov 21
12	Tue Nov 7	Settlement of single piles			
	Thu Nov 9	Vertically loaded pile groups			
13	Tue Nov 14	Negative friction of piles		HW6: 8.9, 8.10#	Nov 30
	Thu Nov 16	LRFD design of deep foundations			
14	Tue Nov 21	Design of piled rafts			
	Thu Nov 23	**Thanksgiving – No Class**			
15	Tue Nov 28	Horizontally loaded single piles		Project 2	Dec 5
	Thu Nov 30	Horizontally loaded pile groups			
16	Tue Dec 5	Miscellaneous/Final Review			
FINAL EXAM (Open Book and Open Notes): Tue Dec 12: 3:30-5:30 pm					

+ Due dates may change depending on the course progress; * Assume GW at surface and use D_f = 2 m; ** Only do TSA; # Do 1, 2, 4, and Determine the lateral displacement and rotation of the pile at the ground surface using Randolph's (1981) approach, assume ν_s = 0.4. Delete "Pile, 0.5 m (1.5 ft) diameter" in Figure P8.10.