

**THE UNIVERSITY OF TOLEDO**  
**CIVE 4/5220 Advanced Foundation Engineering**  
**Fall Semester, 2009**  
**MW 4:10-5:25 PL3130**

<u>LECTURES</u>	<u>TOPIC</u>	<u>READINGS</u>	<u>PROBLEMS</u>
2	Subsurface Exploration	Chapter 1, 2	2.3,5,9,11,13 Handouts
1	Soil Compaction	Chapter 14	14.1,3,5,7,9,11
2	Soil Improvement Ground Modification		
1	Limit Equilibrium	Handout	
2	<a href="#">Bearing Capacity</a>	Chapter 3	3.1,3,5,9,11
1	Foundation Design	Chapter 4	4.1,3,7,9
1	Foundation Settlement	Chapter 5	5.1,3,9,11,15,19
1	Matt Foundations	Chapter 6	6.1,3,6
1	Lateral Earth Pressure	Chapter 7	7.3,5,9, Handout
2	Retaining Wall Design <a href="#">Cant. Wall</a> <a href="#">Gravity Wall</a> Programs	Chapter 8	8.1,5,9,10 GeoChallenge
1	MIDTERM EXAM (October 21)		
2	Sheet Pile Walls <a href="#">Sheet Pile Wall</a> Program	Chapter 9	9.1,5,7,10 Handout
2	Driven Piles	Chapter 11	11.1,2,10,13
1	Laterally Loaded Piles	Handout	11.15
1	Pile Groups	Chapter 11	11.23
2	Drilled Piles	Chapter 12	12.1,3,9,13
3	Slope Stability	Handout	Handout

**Final Exam:** Wednesday, December 16, 2009

**Textbooks:** Principles of Foundation Engineering, 6th Edition, Braja M. Das (Required)

**Design Manuals:** U.S. Army Corps of Engineers Engineering Manuals (optional)

<http://140.194.76.129/publications/eng-manuals/>

FHWA Geotechnical Documents (optional)

<http://www.fhwa.dot.gov/engineering/geotech/index.cfm>

Naval Facilities (NAVFAC) Engineering Command (optional)

[http://www.wbdg.org/ccb/DOD/UFC/ufc\\_3\\_220\\_01n.pdf](http://www.wbdg.org/ccb/DOD/UFC/ufc_3_220_01n.pdf)

**Prerequisites:** CIVE 3210 Soil Mechanics, CIVE 3220 Foundation Engineering or Consent of Instructor

**Instructor:** Dr. Andrew G. Heydinger  
 Office NI3029 Phone 530-8133 Email: andrew.heydinger@utoledo.edu

**Office Hours:** Office Hours: MW 3:00 - 4:00, other times as needed or by appointment

**Course Grade:** Homework Assignments & Practicals 40%  
 Midterm exam 30%  
 Final Exam 30%

- Policy on Homework:** 1. Homework problems as announced.  
2. Unexcused late assignments will not be accepted.

**Advanced Foundation Engineering Practicals - Fall Semester, 2009**

Each Student is to submit a 1 to 2 page summary of a publication dealing with subjects covered in this course. Suggested topics are listed below. The emphasis of the presentations will be on design procedures, design applications, special problems and innovative solutions. The summaries should contain a project description, information on subsurface conditions, design/solution approach and other details of special interest. Three sources of information that can be used are:

- 1) journals and conference proceedings (e.g., ASCE Journal and GSP);
- 2) trade magazines (e.g., Geotechnical News, Geo-Strata, Civil Engineering) and
- 3) the World Wide Web.

Each student should do one practical on subsurface investigation and one practical on a failure. In addition, undergraduate students should prepare 1 practical and graduate students should prepare 2 practicals. Graduate students must use all three sources.

**List of Topics**

Subsurface Investigation Program

Soil/Ground Improvement

Sand drains; Wick drains; Stone columns; Dynamic compaction/replacement; Vibratory compaction; Deep soil mixing; Slurry walls or other

Soil Reinforcement

Retaining walls; Reinforced earth

Retaining walls

Anchored walls; Soil nailing; Flexible walls

Soil Stabilization

Soil admixtures; Grouting

Slope Stability

Reinforced slopes; Pile reinforcement; Stability of landfills

Deep Excavations

Deep soil mixing; Auger jet piles; Soil freezing or other

Shallow or Deep Foundations

Capacity of foundations; Load tests; Foundation settlement

Failures

Foundations; Retaining structures; Slopes