CE 438W Construction Engineering Capstone Design SPRING 2007

Brief Course Description

Construction project integrating geotechnical reports; materials specifications; quality control; equipment; estimation; scheduling; design details: excavations, foundations, retaining walls, formwork, pavements.

Planned Course Outcomes

Students enrolled in C E 438W should gain or enrich:

- An ability to design a system, component, or process to meet desired needs
- An ability to function on multi-disciplinary teams
- An ability to communicate effectively
- An understanding of professional and ethical responsibility
- The broad education necessary to understand the impact of engineering solutions in a global and societal context
- A knowledge of contemporary issues
- A recognition of the need for, and an ability to engage in life-long learning

Specific Course Goals and Objectives

- Expand knowledge and understanding of construction engineering, including geotechnical and materials engineering, within the framework of a realistic major design/construction project
- Advance proficiency with use of specifications, bid documents, planning and scheduling tools, estimating tools, site investigation techniques
- Apply geotechnical, pavement and materials design techniques
- Develop an appreciation for the role of professional and ethical responsibility in engineering practice
- Develop an appreciation for the impact of civil engineering construction projects in a global and societal context

Prerequisites: C E 432, C E 435 or C E 436

Time & Place: 2:30 – 3:20 P.M. Monday, Wednesday, Friday
265 Willard Building
and
8:00 – 10:00 A.M. *or* 3:30 – 5:30 p.m. Monday
228 Sackett Building

Instructor: Dr. Shelley M. Stoffels
208 Sackett Building
865-4622
Email: sms26@engr.psu.edu
Office Hours: 3:30 P.M. – 4:30 P.M. Wednesday and Friday; and by appt.

Course T.A. Michael Sgriccia

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Texts: *Construction, Planning, Equipment, and Methods*
Peurifoy, Schexnayder, Shapira, 7th Edition

Additional required readings and supplemental materials will be posted in ANGEL.

Grading:

Homework	20 %
Process and Equipment Diaries	21 %
Group Project (all submissions)	59 %

Additional course information:

- Homework is due at the *start* of the class period *before* the lecture begins. Scores on late homework assignments may be reduced by 25% of the potential score for each 24-hour period (or fraction thereof) that they are late. Prepare all homework solutions on one side of engineering paper only with boxes around final numeric answers. Computer-generated portions can be on standard computer paper. Staple all pages together.

- Required readings, homework assignments and the lecture schedule will be posted in ANGEL.

- Class attendance is critical to the successful completion of this course.

- All students must actively participate in a practicum session each week.

- No late project submissions will be accepted.

- All engineering drawings must be completed in AutoCAD.

- Final letter grades in the course will be assigned as follows: A = 94-100%; A- = 90-93%; B+ = 87-89%; B = 84-86%; B- = 80-83%; C+ = 76-79%; C= 70-75%; D = 60-69%; F = 0-59%

Academic Integrity

Students are expected to uphold the highest academic integrity. Any deviation will result in disciplinary measures consistent with University policies, including a grade of zero points for that assignment and potentially a failing grade in the class. Please consult the policies at http://www.engr.psu.edu/CurrentStudents/acadinteg.asp

Course Content

This course if focused around building on your existing knowledge of construction engineering and geotechnical and materials engineering. The course project will be centered around a design-build project. At multiple stages in the bid and subsequent project development process, submittals will be required. These will be graded, and at times corrections should be made before incorporating the material into your final project.

The design/build project for this semester will be a combined parking garage, bus station and office building. It will need to provide 90,000 sq ft of useable office space and the garage must hold 360 spaces (including handicapped spaces) with the ground level devoted only to the bus station. The project will be sited near the corner of Hastings Road and Fox Hollow Road.

Selected topics will be chosen for detailed lectures as given below. Additional lectures beyond the 30 listed may be held at the request of students. The lectures may not be held in the exact order listed, but will be ordered to supplement the capstone project.

The remaining 1/3 of the class will be conducted in weekly practicum sessions (2 hours) in the CAD lab, guest speakers, and organized site visits.

Topic	**Estimated Number of Lectures**
Course Overview and Organization	1
Project Overview	1
Engineering Economics	1
Design/Build	3
Site Investigation and Improvement	2
Specifications	2
Equipment Costs and Performance	3
Earthwork	3
Equipment Overview:	6
Dozers	
Scrapers	
Excavators and Loaders	
Haul Trucks	
Cranes, Draglines and Clamshells	
Pumping	
Blasting and Drilling	
Other	
Aggregates and Concrete Production and Placement	2
Pavement Design and Construction	3
Ethics and Professionalism	2