
CE 438 – CONSTRUCTION ENGINEERING CAPSTONE DESIGN

Instructor: Edward J. Gannon, P.E., PhD, LEED AP
113 A Physical Plant Building
206C Sackett Building
814-883-5214 cell
email: ejg3@psu.edu

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

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

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

Time & Place: MWF 2:30 – 3:20 P.M. 265 Willard Building

Course Description

This Construction Project capstone design course is intended to establish the foundation for organizational and procedural understanding in construction engineering. The student will gain the knowledge necessary to apply engineering principles in analyzing economical approaches to construction problems.

This course will cover construction methods, equipment, and cost estimation of construction materials, excavation, foundation, retaining walls, formwork, pavements and other aspects of civil engineering construction projects by integrating geotechnical reports, materials specifications, quality control, equipment, estimation, scheduling, and design details.

Course Content

This course is focused on building upon your existing knowledge of construction, geotechnical and materials engineering. There will be a series of assignments and projects that will enhance your current level of knowledge.

Selected topics will be chosen for detailed lectures as given below. The lectures may not be held in the exact order listed, but will be ordered to supplement the capstone project. The number of lectures on each topic may vary slightly, to accommodate student and project background and needs. Lecture topics may be deleted, modified or added at the discretion of the lecturer.



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Topics to be Explored

Project Deliver Methods Review
Integrated Project Delivery (IPD)
Lean Construction
Building Information Modeling (BIM)
Green Building and Construction (LEED)
Concrete Formwork
Modular Construction
Risk Assessment
Safety and OSHA
Project Contract Documents
Quality Assurance and Quality Control
Temporary Site Construction
Ethics and Professionalism
Engineering Economics Review
Earthwork and Excavation
Site Logistics
Equipment Costs and Performance
Drilling and Blasting
Foundations

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
- 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 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 project management process and procedures, geotechnical, pavement and materials design and constructability techniques
- Develop an appreciation for the role of professional and ethical responsibility in engineering and construction management practice



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<u>Grading:</u>	Homework	20 %
	Mini-exams/quizzes	10 %
	Process and Equipment Diaries	20 %
	Group Project(s)	50 %

Additional course information:

Homework assignments will be given in class with no written description; it is your responsibility to take proper notes. If you have any questions, ask. All assignments are due at the *start* of the class period. Scores on late homework assignments will be reduced. Prepare all homework solutions and projects in a professional manner. No late project submissions will be accepted.

Lecture notes will be posted on ANGEL.

Class attendance is critical to the successful completion of this course; attendance will be checked periodically and used as part of the student's grade. All students must actively participate in class .

Final letter grades in the course will be assigned as follows:

93.0 < A ≤ 100	80.0 ≤ B- < 83.0	F < 60.0
90.0 ≤ A- ≤ 93.0	77.0 ≤ C+ < 80.0	
87.0 ≤ B+ < 90.0	70.0 ≤ C < 77.0	
83.0 ≤ B < 87.0	60.0 ≤ D < 70.0	

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>

Writing Across the Curriculum

Developing the skill to communicate by means of the written word is extremely important.

This course has been designated as a "W" courses and it will include writing assignments that relate clearly to the course objectives and serve as effective instruments for learning the subject matter of the course. These assignments are designed to help students investigate the course subject matter, gain experience in interpreting data or the results of research, shape writing for a particular audience, or practice the type of writing associated with a given profession or discipline. It is highly recommended that the student make use of writing and learning centers.