

CONE 350: COMMERCIAL CONSTRUCTION AND ENGINEERING EQUIPMENT

Spring/2021

Credit Hours 3

Instructor: Mostafa Batouli, PhD, MPA, PMP

Class Time(s): MWF 9:00 – 9:50, LH 204

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Virtual Office Hours: W & R 14:00 – 15:00 by appointment via Zoom

Open Door Policy: My students are my priority. You are welcome to knock on my door at any time. Also, you can email me any time and I will respond to your questions/concerns as soon as I can. You are strongly encouraged to seek additional assistance outside of class.

COURSE OVERVIEW

Prerequisites: CONE 311- Resource Estimating

Course Description: Prepare students to enter the commercial construction sector through consideration of design, bidding/estimating, value engineering, contracts/negotiation, subcontractor relations, cost controls, management during construction, close out, post-construction requirements and the engineering equipment used during horizontal and vertical construction.

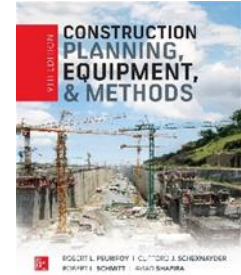
Course Goals: In this course the students will learn about the techniques and equipment to convert a raw land into a final civil facility (e.g., road, underground utility, bridge, and building). The students will learn about different sitework techniques and selection and utilization of appropriate equipment for different activities.

Course Learning Outcomes:

Upon completion of this course, students should be able to:

1. Describe the basic principles of soil mechanics and their impacts on construction processes and assess different methods for improving soil characteristics.
2. Appraise appropriateness of earthmoving and excavation methods as well as construction equipment used for hoisting materials, erecting structures, and earth moving.
3. Estimate the productivity of different construction equipment and evaluate equipment management techniques (economics, planning, cost estimation, and maintenance).
4. Compare different equipment use plans with respect to cost and schedule objectives of construction projects

Required Textbook/Materials: Peurifoy, R., Schexnayder, C., Shapira, A., Schmitt, R. *Construction Planning, Equipment, and Methods*, 9th Edition, McGraw-Hill.



Other References: To achieve the learning objectives, we will use other resources (listed below) related to the topics covered in this course. The class notes and handouts will present the material extracted from the additional references. You do not need to buy these books.

1. *Nichols, H.L., Jr. & Day, D.A., P.E., Moving the Earth, 6th Edition, McGraw-Hill, (ISBN: 978-0071502672).*
2. *Gransberg, D., Popescu, C., Ryan, R., Construction Equipment Management for Engineers, Estimators, and Owners, CRC Press.*
3. *Schaufelberger, J., Construction Equipment Management, 1st Edition, Prentice Hall.*
4. *Construction Equipment and Methods: Planning, Innovation, Safety, 1st Edition, Wiley.*

Course Format: Flipped classroom will be used as the main instructional strategy for this course. Active and collaborative learning is an important aspect of this class. The majority of the class time will be spent on problem solving activities in groups. Students are expected to read the relevant chapters from the textbook *before coming to class*. During class time, students will be assigned in-class activities and drills to have hands-on practice of the material covered. The students' participation in solving in-class problems will contribute to their participation grade and/or extra credits at sole discretion of the instructor.

COURSE RESOURCES

Writing/Tutoring Assistance: I strongly encourage you to visit the Writing Lab and Tutoring Center (in the Student Success Center in Thompson Hall), which offers one-on-one and group tutoring and consultations for students working on writing assignments.

Canvas /Citadel's Approved Learning Management System: Over the course of the semester, I may post reading notes, lesson plans, discussion prompts, self-guided lectures, grades, and other administrative information on the course Canvas site. Students must check Canvas each lesson for pertinent updates and other critical information.

COURSE POLICIES, EXPECTATIONS, AND REQUIREMENTS

COVID-19 Mandatory Mask Policy: You are mandated to wear a mask while in the classroom. If you do not wear a mask, you will be asked to leave class immediately and disciplinary action will be taken. Only time a mask can be pulled away in class is to drink water.

Updated Contact Information: Students must update contact information at the start of each semester to ensure instructor-student communication outside of Canvas, if required.

Course Material: Course material is for the sole use of students currently enrolled in the course and not for redistribution to electronic file sharing sites (share drives, Chegg, Course Hero, etc.).

Disability Policy: The Citadel complies with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. Students with disabilities who seek accommodations must make their request through Services for Students with Disabilities in the Student Success Center (117 Thompson Hall, 843-953-6877) to verify their eligibility and to identify appropriate accommodations. Students should speak to his/her professor and also make requests for academic accommodations to services for students with disabilities so we can ensure these accommodations and facilitate student success. If you have an immediate access need, please reach out to your faculty immediately in person, via email, or during office hours. Students with short-term disabilities, such as a broken arm, can often work with instructors to minimize classroom barriers. In situations where additional assistance is needed, students should contact the Services for Students with Disabilities as noted above. Please know that accommodations are not retroactive, so avoid any delays.

Weather & Campus Emergencies: In case of adverse weather, or other campus emergency, critical information will be posted on the Bulldog Alert homepage, as well as pushed to email addresses and phone numbers of those people who have updated their contact information within the Bulldog Alerts section of the Lesesne Gateway (or Canvas).

If you have not yet updated your contact information, or set up course notifications within Canvas, you should do so immediately.

Privacy Statement: The Citadel is committed to safeguarding and maintaining the privacy of your personal information. Please see privacy statements below related to technology used in this course.

Canvas Privacy Policy: <https://www.instructure.com/policies/privacy>

Zoom Privacy Policy: <https://zoom.us/privacy>

LockDown Browser Privacy Policy: <https://web.respondus.com/privacy-policy/>

Continuity of Instruction (COI): During a pandemic or catastrophic event, and after all face-to-face instruction has been suspended, communication for our class will continue to take place through Citadel email and Canvas. In the event of such an emergency, check your Citadel email account and Canvas course announcements for instructions. The following areas will also adjust during COI:

Course Requirements

- Computer
- Reliable Internet connection and software (DSL, LAN, or cable connection desirable)
- Access to Canvas
- Headset or Earbuds
- Webcam
- Scanning (possibly with smartphone)

Course Structure

This course will be delivered in a hybrid format with two alternating groups of face-to-face and online students. The online sessions will be held through virtual conferencing via the Citadel's

Learning Management System, Canvas. You will need your Citadel CWID and password to login to the course from the Canvas home page (<https://lesesnegateway.citadel.edu/cp/home/displaylogin>).

Virtual Conferencing: Zoom will be used as the virtual conferencing platform in this class. Your participation in live Zoom sessions will be recorded. These recordings will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. The use of all recordings will be in keeping with The Citadel's Privacy Policy.

Zoom Expectations: *If you do not follow these expectations, you may be removed from the Zoom meeting and marked as absent.*

1. Cameras must be on and you must remain in view during the Zoom sessions. Classes may be recorded, conduct yourself appropriately.
2. Remain on mute while your professor and/or classmates are speaking.
3. Class materials (books, notes etc.) should be out and accessible throughout the class.
4. Honor Code and Code of Conduct apply even in the virtual environment.
5. Taking photos, screenshots or recordings during class is prohibited.
6. Uniform or the appropriate attire is required at all times.
7. All classroom norms and rules apply when in a Zoom meeting. No sleeping, eating, leaving the virtual meeting without permission, being on your phone, playing video games, working on another class, etc.
8. Electronic backgrounds on your Zoom platform must be appropriate and you cannot have any inappropriate items behind you in the room while on a Zoom meeting.

Technical Assistance: If you need technical assistance at any time during the course or to report a problem you can:

- Email the Center for Excellence and Innovation in Teaching, Learning, and Distance Education (CEITL & DE) at ceitlde@citadel.edu
- Visit the Canvas tutorials found in your Citadel Online Student Resource course, or visit the HELP MENU in your course navigation bar.

Code of Conduct: Responsibility for professional conduct rests with students as adult individuals and as members of The Citadel community. CGC students and cadets are expected to conduct themselves as responsible adults. All members of the campus community are expected to use reasonable judgement in all aspects of campus life and activity and to show due concern for the welfare and rights of others. Students are expected to adhere to all federal, state, and local laws. The Citadel protects freedom of action and speech, so long as the exercise of this freedom is not of an inflammatory or demeaning nature and does not interfere with the operation of the College. The Citadel's Conduct Policy prohibits the possession of drugs, destruction of property, making false statements of emergency situations, physical or verbal abuse, or harassment of any sort. Students who violate the rules and regulations of The Citadel are subject to expulsion or lesser sanctions. These rules and regulations are published in "Regulations for Non-Cadet Students for Fall and Spring Semester And All Students, Including Cadets, for Maymester or Summer School," which can be found online at: http://www.citadel.edu/root/images/cgc/cgc_catalog/cgc-academic-catalog.pdf

Academic Integrity Statement: Students will submit only their own work for evaluation in this course, except as appropriately documented. All rules and stipulations of The Citadel's Honor Manual and Honor Code apply to this course, including its definitions and policies related to cheating, lying, stealing, and non-toleration. Cheating or evidence of academic dishonesty on any work submitted for evaluation will

result in an "F" for both the assignment and the course. To ensure academic integrity, you must abide by both the letter and spirit of all honor, documentation, and citation requirements. Plagiarism in any form is unacceptable, as it fails to meet any standard of academic work. It is your responsibility to read and understand what constitutes intentional and negligent plagiarism. Plagiarism, intentional or negligent, may be referred as an honor violation. The complete Honor Manual may be found at: <http://krausecenter.citadel.edu/wp-content/uploads/2019/08/2019-2020-Honor-Manual-WEB.pdf> and the Honor Code can be found in the CGC Course Catalog: <http://www.citadel.edu/root/images/cgc/cgc-academic-catalog.pdf>

Student Use of Electronic Devices: Students may use laptop computers or tablets for taking notes so long as they do so in a manner that does not interfere with the learning of others. Students may not play games, work on other assignments, or use their electronic devices during class except for taking notes and/or completing instructor-assigned work.

Missed or Late Work Policy: All tests, quizzes, and final examinations must be taken on the assigned date and time. Any exceptions to this policy **must** be approved **in advance** by the instructor. All course deliverables (homework, assignments, etc) are due as assigned. No late deliverables will be accepted without **approval prior to the due date**. Late submissions will receive reduced grades.

Attendance and Participation Requirements: I will record and report attendance for every class meeting. It is the student's responsibility to arrive to class on time, and to maintain class attendance throughout the duration of the semester. With this in mind:

- Class attendance is mandatory.
- Students may miss class only for authorized reasons (athletic events, academic travel, special ceremonies, guard duties, etc.)
- Illness and personal emergencies may also cause students to be absent for legitimate reasons.
- Should a student miss class for any reason, he/she will make every reasonable effort to notify the professor in advance of the absence.
- The student will be responsible for any material covered in class.
- If a student knows he/she will be absent for an examination or on the due date of a major graded requirement, that student will coordinate with his/her instructor for completion/submission requirements.
- Whether excused or unexcused, absences in excess of 20% of the meetings of a particular course can, at the discretion of the instructor, result in a grade of "F" in the course.)
- Active participation in class discussions and activities is an expectation of this course.

Assignments: Refer to the course schedule table to the assigned activities for each class. All assignments should be submitted through Canvas.

Homework is *for the student*, for his or her learning, practice and assessment. Many of the homework problems represent intentionally-challenging, real world problems. Students may work together on homework assignments to *gain additional understanding*. More than any other academic activity, continuous practice of concepts establishes long-term mastery. Students should consider the assigned homework as the minimum required practice.

Honor code, cheating and plagiarism

"A cadet does not lie, cheat, or steal, nor tolerate those who do" (The Citadel 2019). Society places its trust in engineers to ensure public safety. Accordingly, neither the Citadel Honor Code nor the engineers Code of Ethics will tolerate any form of cheating (ASCE 2017; NSPE 2007).

Any evidence of direct copying of homework assignments may result in an honor violation; therefore, students should not share homework.

Homework documentation

All homework must be properly documented. Students must document any help received from supplemental instruction, classmates, reference books, or the internet. Information from the course textbook (equations and outlines of procedures), class notes, or the professor is considered immediately available to all students and requires no documentation. For written homework, insert documentation at the point the help was received, stating who and what assistance was provided.

Homework solutions

The use of solutions during homework attempts is strongly *discouraged*. Relying on solutions from previous classes, the textbook, or the internet will result in poor performance during the exams. Never-the-less, if published solutions reveal errors, subsequent corrections require proper documentation.

Grading scheme

Homework grading by problem focusses on effort, completeness, and timeliness. Each homework problem can earn up to 10 points (100%). The grade is composed of 70% based on a *complete* homework attempt and 30% on *self-assessment* of the homework attempt. Each problem will be collected twice:

1. Initial Homework Attempt:

A CitLearn submission of homework before the solution posts.

Each problem will be evaluated based on *effort* and *completeness* for 70%. A homework missing any sections, appropriate diagrams, or a good faith effort at the solution in the required homework format will receive no credit. Problems must be uploaded as PDF documents. Free document scanning apps available for smart phones include Genius Scan, Microsoft Lens, and Dropbox. The Daniel Library also has document scanners available for use.

2. Homework Self-Assessment:

A hard-copy submission of self-assessed homework after the solution posts.

The remaining 30% will be awarded for submitting a hard copy of the *complete* and *self-assessed* homework problem. The professor will provide a minimum of 36 hours for homework assessment. An incomplete hard-copy problem will receive no additional credit.

- Assessment should provide clear documentation of corrections made in a different color.
- A minimum of a check mark in a different color next to the correct answer is required.

Typically, five potential grades can be earned.

- 100% An on-time, complete, CitLearn-submitted initial homework attempt *with* an on-time, hard-copy homework self-assessment:
70% for attempt + 30% for assessment
- 70% An on-time, complete, CitLearn-submitted initial homework attempt *without* an on-time, hard-copy self-assessment:
70% for attempt + 0% for assessment

- 60% An on-time, hard-copy homework self-assessment *without* an on-time, complete, CitLearn-submitted initial homework attempt:
30% for attempt + 30% for assessment
- 30% A hard-copy homework self-assessment on Amnesty Day *without* an on-time, CitLearn or hard-copy submission:
0% for attempt + 30% for corrections
- 0% All other homework submissions:
0% for attempt + 0% for assessment

Course Grades:

Basis of Grade

Class Participation	10%
Individual HW	20%
Equipment Presentation	5%
Intermediate Exams	45%
Final Exam	20%
Total	100%

These weights may be changed at the discretion of the professor to reflect the emphasis placed on the material presented during the course. All examinations, homework, and other student work are the intellectual property of the student but may be retained by the professor. Examination dates and homework assignments are indicated in the Course Schedule but are subject to change at the professor's discretion. **It is the responsibility of the student to keep abreast of the class schedule.** Absence from class will not be acceptable as a valid reason for missing a scheduled assignment such as a HW or an exam.

Grading Scale:

Final Grading is based on the following scale for *Cadets*:

A= 90-100% B= 80-89% C= 70-79% D= 60-69% F=59 and below

COURSE SCHEDULE

Note: Schedule subject to change. Additional reading/activities will be assigned as needed.

Date	Discussion Topics	Reading Assignment	Assignment
20-Jan	Class Introduction, Course Logistics, Requirements, and Expectations	Syllabus	
22-Jan	Course Overview + Introduction to Construction Sitework and Equipment	Ch. 1	
25-Jan	Properties of soil	Ch. 3	
27-Jan	Soil investigations	Ch. 4	
29-Jan	Working Session		
1-Feb	Mobile Equipment Power Requirements	Ch. 6	HW 1
3-Feb	Earthwork methods and equipment (Dozers)	Ch. 7	HW 1 Corrections
5-Feb	Earthwork methods and equipment (Loaders)	Ch. 9	
8-Feb	Earthwork methods and equipment (Scarpers)	Ch. 8	HW 2
10-Feb	Working Session		HW 2 Corrections
12-Feb	Earthwork Equipment Presentations		
15-Feb	Review for Exam 1		HW 3
17-Feb	Exam 1		HW 3 Corrections
19-Feb	Excavation methods and equipment (Backhoe+ Trenchless methods)	Ch. 9	
22-Feb	Excavation methods and equipment (Draglines and Clamshells)	Ch. 9	
24-Feb	Excavation methods and equipment (Hauling trucks)	Ch. 10	
26-Feb	Working Session		
1-Mar	Excavation Equipment Presentations		HW 4
3-Mar	Demolition +Site Clearing + Grading, compaction and stabilization methods and equipment	Ch. 5	HW 4 Corrections
5-Mar	Shallow and deep foundations and pile driving	Ch. 11	
8-Mar	Lifting operations and cranes	Ch. 17	
10-Mar	Demolition +Site Clearing + Grading, compaction and stabilization, & Pile Driving Equipment Presentations		
12-Mar			
15-Mar	Concrete Construction and Equipment	Ch. 16-18	HW 5
17-Mar	Review for Exam 2		HW 5 Corrections
19-Mar	Exam 2		
22-Mar	Paving Operations and Equipment	Ch. 15	
24-Mar	Utility Construction (Underground Utility)		

Date	Discussion Topics	Reading Assignment	Assignment
26-Mar	Construction Dewatering and Pumps		
29-Mar	Lifting, Paving, and Concrete Equipment Presentations		HW 6
31-Mar	Working Session		HW 6 Corrections
2-Apr	Equipment economic analysis (Time Value of Money)	Ch. 20	
5-Apr	Equipment economic analysis (ownership, rental, lease)	Ch. 2	
7-Apr	Equipment economic analysis (Problem Solving)	Ch. 20	
9-Apr	Working Session		
12-Apr	Equipment economic analysis (Equipment Fleet)	Ch. 2	HW 7
14-Apr	Equipment economic analysis (Problem Solving)	Ch. 2	HW 7 Corections
16-Apr	Equipment Safety	Ch. 2	
19-Apr	Working Session		HW 8
21-Apr	Review for Exam 3		HW 8 Corrections
23-Apr	Exam 3		
26-Apr	Review for the Final Exam		
28-Apr	8:00- 12:00		Final Exam

DISCLAIMER

The course schedule is a plan. The professor reserves the right to make changes in the schedule. Students will be notified accordingly.

RIGHT TO REVISE

The instructor reserves the right to modify, solely at his discretion, the course content, and the number, format, and due dates of exams, assignments, quizzes, or projects as well as their weights that will be used to determine the final grade.