

COURSE SYLLABUS
The University of Texas at Arlington
College of Engineering
Department of Civil Engineering
CE 4332 –Construction Equipment, Methods& Management
(3 Credit Hours)

Name of Instructor: Dr. Mohammad Najafi, P.E.

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Office Hours: Tuesday and Thursday, 3:00 – 5:00 PM (Additional Office Hours by Appointment).

Course Number and Section Number:

- 22154 (Section 01)

Course Title: CE 4332 – Construction Equipment, Methods & Management

Time and Place of Class Meetings: Tuesday and Thursday, 7:00 – 8:20 PM, 109, Nedderman Hall.

Teaching Assistant (TA): Saeed Janbaz

Office Telephone Number: 817-501-1416

Email: Saeed.Janbaz@mavs.uta.edu

Description of Course Content: Introduction to the construction industry and the methods, equipment, and management techniques used. Topics include equipment operating characteristics, underground construction, job site safety, and field management. Prerequisite: Grade of C or better in CE 3343.

Student General Learning Outcomes: Upon completion of the course, the student will have:

- an ability to apply knowledge of mathematics, science, and engineering,
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
- an ability to identify, formulate, and solve engineering problems,
- an understanding of professional and ethical responsibility, and
- an ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Specific Course Learning Outcomes: Upon completion of the course, the student will:

- understand different construction methods and application of equipment in construction,
- be able to preplan construction activities involving different construction equipment,
- estimate productivity and cost of construction equipment,
- plan construction equipment,
- understand major methods of heavy construction related to soil work, asphalt, and concrete,
- understand equipment economics, and
- acquire basic knowledge of equipment safety.

Prerequisite: CE 3343 with a C or better.

Required Textbooks and Other Course Materials:

Peurifoy, R., Schexnayder, C., Shapira, A. and Schmitt R. (2011). "Construction Planning, Equipment, and Methods," Eighth Edition, McGraw-Hill.

This course will utilize Blackboard:

- To access the course, go to <http://elearn.uta.edu/> and login with your NetID and password. Click on the name of the course in the upper left module after logging in.
- If you have any problems logging in, contact the [Help Desk](mailto:helpdesk@uta.edu) (helpdesk@uta.edu).
- Review the [Student Resources](http://www.uta.edu/blackboard/students/index.html) page (http://www.uta.edu/blackboard/students/index.html). This site contains valuable information that will acclimate you to your course and the Blackboard environment.

Descriptions of Major Assignments and Examinations with Due Dates: There will be three exams (two during the semester and one final), and several homework assignments. See the Tentative Course Outline for specific dates.

Tested Explicitly (TE) Component

The Civil Engineering Department ABET procedure includes assessing the achievement of various departmental student learning outcomes (<http://www.uta.edu/ce/accreditation.php>). The procedure includes explicit testing (TE) of the achievement of the departmental student learning outcomes. CE 4332 is designated as one of the TE courses and will have explicit testing of the outcome "e" in the course. This will be achieved through explicit exam problems given to test student knowledge of the outcome, reproduced below:

CE Department Outcome "e": ability to identify, formulate, and solve engineering problems:

One of the problems in each of the three exams (two mid-terms and final exam) will be designated as a TE problem for outcome "e". The total grade of these three problems is 100. A minimum grade of 70 will be deemed to signify that a student has passed the TE examination. Note that these TE problems will also be counted towards the final grade for this course.

CE 4332 – a "Design" Course

The Civil Engineering Department (CE) ABET procedure includes assessing the achievement of various departmental student learning outcomes (<http://www.uta.edu/ce/accreditation.php>). CE 4332 is designated as a "Design" course for the CE Department, through which the following outcomes will be assessed:

CE Department Outcome "c": An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

ABET Program Outcome: An ability to design a system, component or process in more than one civil engineering context.

The following process will be followed in this course towards assessing the outcomes:

1. There will be a design term project and presentation, including both analysis and synthesis requiring at least three weeks of effort.
2. The project must have some iterative components. Students will be encouraged to define the design problem, including scope and design objectives.
3. The course project will be open-ended, with at least a few alternate solutions.
4. The course project or assignment should include any applicable codes and regulations, and also a minimum of two realistic design constraints from the following list: economic, environmental, social, political, ethical, health and safety, constructability, and sustainability.
5. A design summary report must be completed by students at the semester end; it should include a documented analysis of alternatives and consideration of constraints.
6. The minimum passing grade in the project is 70.
7. The project grade will also count towards your overall course grade, as discussed later.

Grading Policy: Grades will be determined according to the following scale (the grading scale may be lowered at the discretion of the instructor, but will not be raised):

Grade	% Required
A	90 -100
B	80-89
C	70-79
D	60-69
F	Less than 60

Students will be required to accumulate points from the following:

Homework Assignments	15%
Class Attendance & Participation	10%
Project & Presentation	20%
Exams	25%
Final Exam	30%
Total	100%

Active/Cooperative Learning: This class supports a new pedagogy that promotes active learning for students' higher order critical thinking. Active learning promotes full student participation in class. Instructor may assign students to do assignments in teams and all the team members receive the same grade. If a team member refuses to cooperate on an assignment, his or her name should not be included on the completed work. Additionally, instructor may ask students to discuss lecture materials in groups and ask one of the group members to present the topic to the class.

Attendance Policy: Students are expected to attend all classes. For total professional development, class participation and oral discussions will be encouraged. Everyone is asked to arrive on time and be seated promptly for duration of class to minimize the disruption to others.

Drop Policy: Students need to consult UTA Web site for information on the university drop policy.

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law "Title IX" such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity: It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents Rules and Regulations, Series 50101, Section 2.2)

Student Support Services Available: The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students

requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. Classes are held as scheduled during this week and lectures and presentations may be given.

Librarian to Contact:

Sylvia George-Williams
Engineering Librarian
UT Arlington Science & Engineering Library
NH B03C
(817) 272-7519
sylvia@uta.edu

E-Culture Policy: The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email.

All students are assigned an email account and information about activating and using it is available at www.uta.edu/email. New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses. There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.

Laptop use in the classroom: In order to minimize distraction, the use of laptop in the classroom is NOT allowed.

Cell Phone Policy: All cell phones must be off in class and no texting is allowed. Violators of this rule will lose their participation points.

Grade Grievance Policy: Refer to UTA Catalog.

Assignment Policy:

Homework and/or class assignments, class attendance, quizzes, exams and the project are important segments of this course. **Homework and/or class assignments are taken at the beginning of the class and due at the stated date on the course outline.** Points will be subtracted for late assignments. No credit after the solution is given or maximum one week late of any assignments.

- Students, who copy homework, will receive a grade of zero (0) for those assignments and will not make good grades on the tests.
- For full or partial credit, you need to show all calculations in an organized, logical, and orderly manner. Please **write legibly, draw diagrams and underline your answers.** Type the questions and the answers for essay questions. Specify problem statements (information given), what is required, and the solution for each problem. Draw the necessary diagram(s). Show all the units during your calculations and with your answers. No partial or full credit if you do not show all of your work.
- Fold your assignment in half and put your name, course number, assignment #, date submitted and Problem #'s on the back.
- Use engineering or graph paper with no spiral edges.
- Write on only one side of the paper.
- Either pen or pencil is acceptable.
- Include your name, section, and page number (e.g. 1/3 means Page 1 of 3 Pages) on each sheet.
- Staple all pages together in the upper left corner.
- Neatly box all answers, and include appropriate units for numerical answers.
- Show all the work (e.g., no work means no credit).

NOTE: If above guidelines are not followed, the TA will either reject the assignment outright, or deduct points for items that do not conform to the above guidelines.

Exam Policy

- Students who talk during the exam, look at each other's papers, or exchange materials, their exam will be marked and their file will be submitted to the Office of Dean of Engineering for appropriate action.
- You need to organize your course notes, graded homework assignments, and previous exams in a binder for a fast and quick reference during exams.
- Periodic class exercises and may be given in the lecture period. You should bring the text, a calculator and engineering paper to every class period.
- During the exams and quizzes, you need to be AT LEAST one seat apart.

Make-up Exam Policy: None -- All students must take the exams at their scheduled times.

Project and Presentation Assignment and Policy: will be announced in class.

CE 4332 – Construction Equipment, Methods & Management TENTATIVE COURSE OUTLINE

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
Week 1					
Tues	Jan 20	Course Introduction/Machines Make it Possible	Introduction to the Course and Use of Heavy Equipment in Construction	Chapter 1	
Thurs.	Jan 22	Earthwork Construction	Planning of earthwork using mass haul diagram, selection of equipment, haul directions.	Chapter 3	
Week 2					
Tues	Jan 27	Equipment Economics	Evaluation of equipment costs using capital costs, and operation and maintenance costs by present value, annual value and future value concepts.	Chapter 2	
Thurs.	Jan 29	Compaction and Stabilization Equipment Use of Heavy Equipment in Highway Construction	Importance of compaction and stabilization, equipment used for compaction, calculation of productivity of rollers and optimum number of rollers for compaction operations.	Chapter 5	Assignment # 1
Week 3					
Tues	Feb 3	Soil and Rock	Overview of different types of soils and rocks, their quality, workability and densities.	Chapter 4	
Thurs.	Feb 5	Machine Power Requirements	Machine power required at different field conditions like slope, soil, etc.	Chapter 6	Assignment # 2
Week 4					
Tues	Feb 10	Dozers	Overview of different types of dozers used in construction, calculation of productivity and cost of activity using dozers.	Chapter 7	
Thurs.	Feb 12	Scrapers	Overview of different types of scrapers used in construction, calculation of productivity and cost	Chapter 8	Assignment # 3

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
			of activity using scrapers.		
Week 5					
Tues	Feb 17	Test 1 (Chapters 1 through 6)			
Thurs.	Feb 19	Guest Lecture: Ground Freezing by Mr. Bernd Braun			
Week 6					
Tues	Feb 24	Excavators	Overview of different types of dozers used in excavators, calculation of productivity and cost of activity using excavators.	Chapter 9	
Thurs.	Feb 26	Trucks and Hauling Equipment [Part I]	Overview of different types of trucks used in construction.	Chapter 10	Assignment # 4
Week 7					
Tues	Mar 3	Guest Lecture: Mr. Wallace Heimer, P.E., Chief Engineer for Construction, NTTA			
Thurs.	Mar 5	Trucks and Hauling Equipment [Part II] -- Graders	Calculation of productivity and cost of activity using trucks with other equipment, calculation of optimum number of equipment and trucks in a hauling crew. Overview of different types of graders used in construction, calculation of productivity and cost of activity using graders.	Chapters 10 and 11	Assignment # 5
Spring Vacation Week					
Week 8					
Tues	Mar 17	Drilling	Overview of different applications and types of drilling, calculation of productivity of drilling operations.	Chapter 12	
Thurs.	Mar 19	Tunneling and Blasting Rock	Overview of different applications and types of tunneling, calculation of productivity of blasting operations.	Chapter 13	Assignment # 6
Week 9					
Tues	Mar 24	Aggregate Production	Overview of different components of aggregate production plants.	Chapter 14	
Thurs.	Mar 26	HDD	Guest Speaker by Mr. Jonathan Faughtenberry	Chapter 12	Assignment # 7
Week 10					
Tues	Mar 31	Test 2 (Chapters 7 through 12 and Guest Lecture Presentations)			
Thurs.	Apr 2	Asphalt Mix Production and Placement	Different types of asphalt mix production plants and equipment. Requirements for placing asphalt concrete in road construction.	Chapter 15	
Week 11					
Tues	Apr 7	Concrete and Concrete Equipment	Different types of concrete mix designs and equipment for batching, mixing and placing concrete.	Chapter 16	
Thurs.	Apr 9	Mobile Cranes	Overview of different types of cranes used in construction, calculation of productivity and cost of activity using cranes	Chapter 17	Assignment # 8
Week 12					
Tues	Apr 14	Tower Cranes	Overview of different types of cranes used in construction, calculation of productivity and cost	Chapter 17	

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
			of activity using cranes		
Thurs.	Apr 16	Piles and Pile-Driving Equipment -- Air Compressors and Pumps	Overview of different types of piles used in construction and methods of their installation. Overview of different types of air compressors used to operate different tools and pumps, calculation of power requirements and selection of air compressor and pumps.	Chapter 18 Chapter 19	Assignment # 9
Week 13					
Tues	Apr 21	Building Construction and Forming Systems	Preplanning building construction, nuisance control, safety issues in building construction. Overview of different types of forming systems used in construction, calculation of formwork requirements, selection of forming system, formwork economics.	Chapter 20 Chapter 21	
Thurs.	Apr 23	Student Presentations			Assignment # 10
Week 14					
Tues	Apr 28	Student Presentations			
Thurs.	Apr 30	Student Presentations			
Week 15					
Tues	May 5	Student Presentations			
Thurs.	May 7	Review			
Week 16- Final Exam					
Thursday, May 14 th , 8:15 - 10:45 PM		Final Exam (Chapters 13 through 21)			

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – Dr. Mohammad Najafi.

Emergency Phone Numbers: In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911.