COURSE SYLLABUS

The University of Texas at Arlington

College of Engineering

Department of Civil Engineering

CE 5344 – Construction Methods: Field Operations

(3 Credit Hours)

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

Office Number: 428 Nedderman Hall

Office Telephone Number: 817-272-0507 – Lab: 817-272-9177

Email Address: Najafi@uta.edu

Office Hours: Tuesday and Thursday, 4:00 – 6:00 PM (Additional Office Hours by Appointment).

Course Number and Section Number:

- CE 5344-001-LEC (22314)—Classroom (NH 203)
- CE 5344-002 LEC (25778) –-Off the Web

Course Title: Construction Methods: Field Operations

Time and Place of Class Meetings: Tuesday and Thursday, 7:00 – 8:20 PM, Room 203, Nedderman Hall.

Teaching Assistant (TA): Agustin Villafana
Office Number: Civil Engineering Laboratory Building (CELB) – Room 141
Office Telephone Number: 817-272-9164
Email: agustin.villafana@mavs.uta.edu
Office Hours: Friday, 3 - 5 PM and Saturdays 8:00 AM to 12:00 PM (Additional Office Hours by Appointment).

Description of Course Content: Introduction to the methods, equipment, and management techniques used in the construction industry. Topics include equipment operating characteristics, job site safety, and field management. Credit not granted for both CE 4332 and CE 5344. Prerequisite: 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 (helpdesk@uta.edu).
- Review the Student Resources 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.

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.

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 the 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
UTArlington 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, 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. Web students need to submit their assignments through Blackboard.

- 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 work (e.g., no work means no credit).
- Section 02 students need to submit their assignments through Blackboard.

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 may be given in the lecture period. You should bring the text, a calculator and engineering paper to every class period.
- During the exams, you need to be AT LEAST one seat apart.
- Section 02 students must attend all tests and project presentations on campus, otherwise they must make appropriate arrangements with the Instructor one week in advance of the test or project presentation.

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 5344 – Construction Methods: Field Operations
TENTATIVE COURSE OUTLINE

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
Week 1					
Tues	Jan 14	Course Introduction/Machines Make it Possible	Introduction to the Course and Use of Heavy Equipment in Construction	Chapter 1	
Thurs.	Jan 16	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	
Week 2					
Tues	Jan 21	Earthwork Construction	Planning of earthwork using mass haul diagram, selection of equipment, haul directions.	Chapter 3	
Thurs.	Jan 23	Soil and Rock	Overview of different types of soils and rocks, their quality, workability and densities.	Chapter 4	**Assignment # 1: 2.10, 2.22, 3.5, 3.6,**
Week 3					
Tues	Jan 28	Ground Freezing	Guest Lecture Presentation		
Thurs.	Jan 30	Use of Heavy Equipment in Highway Construction	Guest Lecture Presentation		**Assignment # 2: 4.7, 4.9, and Guest Lecture Write-up**
Week 4					
Tues	Feb 4	Compaction and Stabilization Equipment	Importance of compaction and stabilization, equipment used for compaction, calculation of productivity of rollers and optimum number of rollers for compaction operations.	Chapter 5	
Thurs.	Feb 6	Machine Power Requirements	Machine power required at different field conditions like slope, soil, etc.	Chapter 6	**Assignment # 3: 5.3, 5.4, and Guest Lecture Write-up**
Week 5					
Tues	Feb 11	Dozers	Overview of different types of dozers used in construction, calculation of productivity and cost of activity using dozers.	Chapter 7	
Thurs.	Feb 13	**Test 1 (Chapters 1, 2, 3, 4, 5, and Guest Lectures)**			
Week 6					
Tues	Feb 18	Scrapers	Overview of different types of scrapers used in construction, calculation of productivity and cost of activity using scrapers.	Chapter 8	
Thurs.	Feb 20	Excavators	Overview of different types of dozers used in excavators, calculation of productivity and cost of activity using excavators.	Chapter 9	**Assignment # 4: 6.8, 6.11, 7.5, 8.8, 8.10**
Week 5					
Tues	Feb 25	Trucks and Hauling Equipment [Part I]	Overview of different types of trucks used in construction.	Chapter 10	
Thurs.	Feb 27	Trucks and Hauling Equipment [Part II]	Calculation of productivity and cost of activity using trucks with other equipment, calculation of optimum number of equipment and trucks in a hauling crew.	Chapter 10	**Assignment # 5: 9.5, 9.10, 10.5, 10.6, 10.11**

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
Week 6					
Tues	Mar 4	Graders	Overview of different types of graders used in construction, calculation of productivity and cost of activity using graders.	Chapter 11	
Thurs.	Mar 6	Drilling	Overview of different applications and types of drilling, calculation of productivity of drilling operations.	Chapter 12	**Assignment # 6: 11.4, 11.7, 12.8, 12.9**
Week 7					
Tues	Mar 11	**Spring Break**			
Thurs.	Mar 13	**Spring Break**			
Week 8					
Tues	Mar 18	Tunneling and Blasting Rock	Overview of different applications and types of tunneling, calculation of productivity of blasting operations.	Chapter 13	
Thurs.	Mar 20	Aggregate Production	Overview of different components of aggregate production plants.	Chapter 14	**Assignment # 7: 13.9, 14.5, 14.9, 14.11**
Week 9					
Tues	Mar 25	Asphalt Mix Production and Placement	Different types of asphalt mix production plants and equipment. Requirements for placing asphalt concrete in road construction.	Chapter 15	
Thurs.	Mar 27	Concrete and Concrete Equipment	Different types of concrete mix designs and equipment for batching, mixing and placing concrete.	Chapter 16	**Assignment # 8: 15.4, 15.8**
Week 10					
Tues	Mar 18	Mobile Cranes	Overview of different types of cranes used in construction, calculation of productivity and cost of activity using cranes	Chapter 17	
Thurs.	Mar 20	**Test 2 (Chapters 6 through 15)**			
Week 11					
Tues	Mar 25	Tower Cranes	Overview of different types of cranes used in construction, calculation of productivity and cost of activity using cranes	Chapter 17	
Thurs.	Mar 27	Piles and Pile-Driving Equipment	Overview of different types of piles used in construction and methods of their installation.	Chapter 18	**Assignment # 9: 16.4, 16.7, 17.4, 17.6, 17.8**
Week 12					
Tues	Apr 1	Air Compressors and Pumps	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 19	
Thurs.	Apr 3	Building Construction	Preplanning building construction, nuisance control, safety issues in building construction.	Chapter 20	Report on Project Progress

Day	Date	Topic	Learning Objectives	Text Reference	Assignments Due
Week 13					
Tues	Apr 8	Forming Systems	Overview of different types of forming systems used in construction, calculation of formwork requirements, selection of forming system, formwork economics.	Chapter 21	
Thurs.	Apr 10	Select Topics			**Assignment # 10: 18.3, 19.4, 19.7, 21.1, 21.4**
Week 14					
Tues	Apr 15	Student Presentations			**Project Due**
Thurs.	Apr 17	Student Presentations			
Week 15					
Tues	Apr 22	Student Presentations			
Thurs.	Apr 24	Student Presentations			
Week 16					
Tues	Apr 29	Student Presentations			
Thurs.	May 1	Student Presentations -- Course Overview			
Week 17- Final Exam					
Thursday, May 8, 8:15 - 10:45 PM		**Test 3 (Chapters 16, through 21)**			