

The University of Texas at Austin
Department of Civil, Architectural and Environmental Engineering
ARE 323K Project Management and Economics – Spring 2019

UNIQUE NUMBER: 14970

INSTRUCTOR: Dr. Carlos H. Caldas
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CLASS TIMES: Tuesdays and Thursdays – 11:00AM to 12:30PM - Room ECJ 1.308

OFFICE HOURS: Tuesdays and Thursdays – 1:00PM to 2:00PM, Fridays 11:00AM to 12:00PM, or by appointment. I encourage students to come see me to address any questions or concerns about the course material or other issues. I have an open door policy – if my office door is open, I will see students without an appointment. If I am busy, we will schedule a convenient time for both of us.

WEB PAGE: Canvas web site at: <https://canvas.utexas.edu>

GRADER: TBD

COURSE CATALOG DESCRIPTION:

Solving economic problems related to construction and engineering; construction project management techniques; characteristics of construction organizations, equipment, and methods.

PREREQUISITES:

M 408D, CE333T

COURSE OBJECTIVES:

This class is an introduction to project management and economics, which in real life are closely related topics. It is hard to be a good project manager without a working knowledge of finance and cash flow. And while some people get really good at economic calculations, applying the results usually takes some project management skill, whatever the domain. As such, my two main learning objectives for the course are simple but profound:

1. Learn the basics of how a project comes together (timeline, main components, participating organizations, etc.) Applications will be construction focused, but many of the ideas are generalizable.
2. Learn to be smart about money on projects (investment, budgeting, risk and decision-making).

By taking this class, you will be able to:

1. Define and describe the main elements in the project time and as well as the major sub-elements.
2. Apply net present value and related concepts to the analysis of cash flows, including selection of alternatives and life-cycle costing (this is the big one for this class).
3. Develop elementary project schedules and perform basic scheduling calculations.
4. Estimate construction costs based on square footage and quantities.
5. Identify risks in each phase and apply sensitivity analysis to quantify risks in cost and time where possible/practicable.

TEXTBOOKS:

There are two required textbooks for the course. The first is available at the bookstore:

- Newnan, Lavelle, and Eschenbach. (2017). *Engineering-Economic Analysis*. 13th Edition. Oxford University Press, New York/Oxford. (Note: 9th, 10th, 11th, and 12th editions are ok as substitutes).

The second textbook is available free online! We will use it as a general reference.

- Hendrickson and Au. (2000/3). *Project Management for Construction*. Available at <https://www.cmu.edu/cee/projects/PMbook/>

Other reading material will be distributed on Canvas or in class.

NOTE: All assigned readings are required to be completed BEFORE class. As I expect you to be familiar with them, I have every right to ask you questions about the reading during class time.

GRADING:

Grade components will be weighted as follows in the computation of the final course grade:

- Participation and Attendance: 5%
- Quizzes: 20%
- Homework Assignments: 20%
- Midterm Exam: 30%
- Final Exam; 30%

The correspondence of letter grade to numerical grade is:

A:	$\text{grade} \geq 93$	D+:	$67 \leq \text{grade} < 70$
A-:	$90 \leq \text{grade} < 93$	D:	$63 \leq \text{grade} < 67$
B+:	$87 \leq \text{grade} < 90$	D-:	$60 \leq \text{grade} < 63$
B:	$83 \leq \text{grade} < 87$	F:	$\text{grade} < 60$
B-:	$80 \leq \text{grade} < 83$		
C+:	$77 \leq \text{grade} < 80$		
C:	$73 \leq \text{grade} < 77$		
C-:	$70 \leq \text{grade} < 73$		

The instructor reserves the right to adjust letter grades, upward only, based on individual attendance and class participation if the numerical grade warrants such consideration.

Exams and Quizzes:

Quizzes and exams are closed book, closed notes examinations. I may curve exam scores upward if the class mean is low. Calculators are allowed provided you have not programmed them with notes. The final exam will be cumulative. Other exams will cover part of the class material (subjects will be announced in class). Exams may include problems, definition/matching, multiple choice, and short answer questions as appropriate to the material covered. This class has both quantitative and qualitative elements and both will be tested. Quizzes and exams will not be returned to the student. The quizzes and exams solutions will be reviewed in class. Students can check their quizzes and exams during office hours.

Homework Assignments:

Homework consists of traditional problem sets as well as short written questions relating to the course materials and reading. Homework assignments should be completed individually, but I encourage study groups for discussion. Length of homework assignments will vary, and weighting of homework grades will vary with length and difficulty.

All assignments **are due at the beginning of the period assigned** and those turned in late will count off **10% per day**. Late period begins 10 minutes after class start time (e.g., if class starts at 11:00am, any assignment turned in after 11:10am is considered late).

GRADE DISPUTES:

Your grades will be posted on Canvas and you should check there often to make sure that the posted scores are correct. Any grade disputes need to be made in writing to the instructor up to **5 calendar days** after the grades have been posted on Canvas or distributed in class, whichever occurs first, regardless of whether the student in question was present in class or not. No dispute will be accepted after the deadline. Any grade dispute request will result in the full homework, exam or quiz being re-graded, and not just the problem in question. Thus, your total grade may stay the same, increase or decrease.

ATTENDANCE:

Class attendance is 5% of your grade in this course and based on attendance. Attendance in this class is strongly encouraged. There is a lot of learning that goes on in the classroom, so I want students to attend and participate. As such, I will take attendance with a class roster most days (you sign by your name). If you do not want your name on this list, contact me as soon as possible to make other arrangements.

Class attendance will count towards class participation grade. Students get one unexcused absence free. After that, each unexcused absence counts as one letter grade less towards your final score for Participation and Attendance. Please contact me ahead of the class if you need an excused absence (e.g., travel for job interview, student activity, etc. Family fun is NOT an excused absence). If you miss a class due to illness (or death other than your own) and were not able to contact me before class, please see me as soon as possible with evidence of your illness.

Note 1: No 'free' unexcused absences are allowed on days with guest speakers (e.g., no freebies on days when people take the time to come and speak to you!).

Note 2: Extended absences without excuse are grounds for a failing grade in the course (per university policy).

Accommodations: If you have a long-term problem or family emergency, please talk with me about it as soon as possible so we can make mutually agreeable accommodations. It is difficult for me and generally unfair to other students if you approach me after the fact.

Accommodations will also be made for religious observance and for military duty. See the University policy here: <http://catalog.utexas.edu/general-information/academic-policies-and-procedures/attendance/>

EXPECTATIONS OF STUDENTS:

This is an upper division undergraduate course. At this point, I expect you to be able to learn and assimilate materials on your own. Students are also expected to comport themselves in a professional manner. Specific expectations for students include:

1. Students should review course material on their own outside of class.
2. Students should be on time to class. It can be very disruptive to other's learning to have someone come in late. The attendance sheet will be passed around at the start of class. If you are not present to sign, you may not sign in at the end of class, unless you have already made accommodations with me *before* the class.
3. Students should participate actively in course discussions. If you need to miss class, please inform the instructor ahead of time.
4. In class, students are expected to be courteous and respectful of the views and needs of other students and instructors. Disruptive students will be asked to leave. Students are allowed to use laptops during lectures for note taking only.

5. Students will not be engaged with their cell phones (or similarly technology) in class, and cell phones will be placed on silent in a bag, or turned off. If you are on your cell phone during class, you will receive not participation credit for that class. This is YOUR time in class and I would like you to get the most out of every class.
6. Students should work on in-class assignments as if they were job assignments. At any time, the instructor may call upon students to present their work to the class.
7. Students should turn in their work on-time. In the construction industry, bids for projects are not accepted posted the deadline. Similarly, in this class, homework will not be accepted after the beginning of class on the due date.
8. If you have a family emergency or extended problem with attending class or doing homework, please contact me as soon as possible so we can accommodate your needs. It is hard to do this after the fact!

GENERAL ADMINISTRATIVE RULES AND ANNOUNCEMENTS:

Course Instructor Survey/Evaluation:

An evaluation of the course and instructor will be conducted at the end of the semester using the approved UT Course/Instructor evaluation forms.

Scholastic Dishonesty:

IMPORTANT! Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, visit the Student Judicial Services web site <http://deanofstudents.utexas.edu/sjs/>, and the General Information Catalog information at <http://catalog.utexas.edu/general-information/appendices/appendix-c/student-discipline-and-conduct/>.

Students with Disabilities:

The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259 (Videophone: 512-410-6644) or <http://diversity.utexas.edu/disability/>.

Counseling:

The University of Texas at Austin maintains extensive counseling facilities for students. Resources are available at <https://cmhc.utexas.edu/>. The instructor recommends that you visit this website to become acquainted with the range of services available.

Privacy – Web Based Class Sites:

Web-based, password-protected class sites will be associated with all academic courses taught at the University. Syllabi, handouts, assignments and other resources are types of information that may be available within these sites. Site activities could include exchanging e-mail, engaging in class discussions and chats, and exchanging files. In addition, electronic class rosters will be a component of the sites. Students who do not want their names included in these electronic class rosters must restrict their directory information in the Office of the Registrar, Main Building, Room 1. For information on restricting your information, see the General Information Catalog or go to: <https://registrar.utexas.edu/students/records/restrictmyinfo>.

Dropping the Class:

Undergraduate Students: From the 1st through the 12th class day (4th class day in the summer sessions), an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 13th

(5th class day in the summer sessions) through the university's academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor.

Graduate Students: From the 1st through the 4th class day, graduate students can drop a course via the web and receive a refund. During the 5th through 12th class day, graduate students must initiate drops in the department that offers the course and receive a refund. After the 12th class day, no refund is given. No class can be added after the 12th class day. From the 13th through the 20th class day, an automatic Q is assigned with approval from the Graduate Advisor and the Graduate Dean. From the 21st class day through the last class day, graduate students can drop a class with permission from the instructor, Graduate Advisor, and the Graduate Dean. Students with 20-hr/week GRA/TA appointment or a fellowship may not drop below 9 hours.

Computer Usage:

Students are expected to be proficient on a personal computer and to be able to use CAD, word processing, and spreadsheet programs. Familiarity with the Civil Engineering Learning Resources Center (LRC) is assumed. The web-based UT Canvas system will be used extensively to coordinate class assignments and disseminate course information, including class notes.

Emergency Preparedness Plan

Emergency Preparedness means being ready. It takes an effort by all of us to create and sustain an effective emergency preparedness system. You are your own best first responder. Please use <https://preparedness.utexas.edu/welcome-emergency-preparedness> as a resource to better understand emergency preparedness at the university, and how you can become part of and contribute to the preparedness community. To monitor emergency communications for specific instructions go to utexas.edu/emergency. To report an issue (none emergency) call 512-471-4441. In case of emergency, call 911.

Recommendations Regarding Emergency Evacuation from the Office of Campus Safety and Security (512-471-5767, <https://preparedness.utexas.edu/safety/emergency-terms>)

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside (across the bridge).
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors. Do not re-enter a building unless given instructions by the following: Austin Fire Dept., The University of Texas at Austin Police Dept., or Fire Prevention Services office.
- Behavior Concerns Advice Line (BCAL) 512-232-5050. For more information visit the BCAL website: <http://www.utexas.edu/safety/bcal/>
- Link to information regarding emergency evacuation routes and emergency procedures can be found at: www.utexas.edu/emergency

Other:

All other university policies not explicitly included on this syllabus can be found on the General Information Catalog: <http://catalog.utexas.edu/general-information/>

IMPORTANT DATES:

No classes on March 19th and 21st due to Spring Break. February 6th is the last day to drop a class for a possible refund. April 8th is the last day an undergraduate student may, with the dean's approval, withdraw from the University or drop a class except for urgent and substantiated, nonacademic reasons. April 8th is the last day an undergraduate student may change registration in a class to or from the pass/fail basis. May 10th is the last day a graduate student may, with the required approvals, drop a class or withdraw from the university.

- Midterm: Thursday, March 14, 11:00 am - 12:30 pm.
- Final Exam: Saturday, May 18, 9:00 am-12:00 noon (To be Confirmed)

SCHEDULE: The course schedule is subject to changes. Any changes in the course schedule will be communicated in advance and posted in the course Canvas web page.

Week	Lect.	Date	Topic/Subject Matter	Reading
1	1	Jan 22	Course Introduction; Project Lifecycle	Hendrickson Ch.1
	2	Jan 24	Big Dig Video	
2	3	Jan 29	Economic Decisions	Newnan et al. Ch.1
	4	Jan 31	Engineering Costs	Newnan et al. Ch.2
3	5	Feb 5	Interest and Equivalence	Newnan et al. Ch.3
	6	Feb 5	Equivalence for Repeated Cash Flows	Newnan et al. Ch.4
4	7	Feb 12	Skyscraper Video: Rock and Paper	
	8	Feb 14	Present Worth Analysis	Newnan et al. Ch.5
5	9	Feb 19	Annual Cash Flow Analysis	Newnan et al. Ch.6
	10	Feb 21	Rate of Return Analysis	Newnan et al. Ch.7
6	11	Feb 26	Rate of Return Analysis	Newnan et al. Ch.7
	12	Feb 28	Other Analysis Techniques	Newnan et al. Ch.9
7	13	Mar 5	Uncertainty and Risk	Newnan et al. Ch.10
	14	Mar 7	Depreciation	Newnan et al. Ch.11
8	15	Mar 12	Depreciation	Newnan et al. Ch.11
	16	Mar 14	MIDTERM EXAM	
9		Mar 19	SPRING BREAK	
		Mar 21	SPRING BREAK	
10	17	Mar 26	Income Taxes	Newnan et al. Ch.12
	18	Mar 28	Inflation and Time Value of Money	Newnan et al. Ch.14
11	19	Apr 2	Project Cost Estimating	Hendrickson Ch.5
	20	Apr 4	Project Cost Estimating	Hendrickson Ch.5
12	21	Apr 9	Project Management Video	
	22	Apr 11	Project Cost Estimating	Hendrickson Ch.5
13	23	Apr 16	Project Cost Estimating	Hendrickson Ch.5
	24	Apr 18	Project Scheduling	Hendrickson Ch.10
14	25	Apr 23	Project Scheduling	Hendrickson Ch.10
	26	Apr 25	Project Scheduling	Hendrickson Ch.10
15	27	Apr 30	Project Scheduling	Hendrickson Ch.10
	28	May 2	Project Controls	Hendrickson Ch.12
16	29	May 7	Project Controls	Hendrickson Ch.12
	30	May 9	Project Controls	Hendrickson Ch.12
		May 18	FINAL EXAM (9:00 am-12:00 noon)	