

ME 353
Engineering Finance
Fall 2020

Professor

Dr. Benjamin D. Leibowicz
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ETC 5.128D

Topics Covered

Evaluating the financial impact of engineering decisions. Comparing alternatives with cash flow analysis considering rate of return, inflation, and taxes, with emphasis on analyzing risk. Managing complex projects with activity scheduling and resource allocation considering cash flows. Methods include probabilistic analysis and simulation.

Prerequisites

Mathematics 408D or 408M, Mechanical Engineering 205 or 318M, and Mechanical Engineering 335 with a grade of at least C- in each.

Lecture Time and Format

Lectures will be held on Tuesdays and Thursdays from 3:30 – 5:00 PM. Due to the ongoing COVID-19 pandemic, this course will be entirely web-based, with all lectures, TA sessions, and office hours held virtually using the Zoom platform within Canvas. I will record videos of all lectures and make these recordings available on the course website, so that you can view them at any time. However, I strongly encourage you to stay in the habit of attending the virtual lectures synchronously in real time, as this will help you remain on track with the material, keep a good schedule in general, ask questions when you have them, and interact with your classmates. In addition, the extra credit opportunities available through UT Instapoll (see Attendance and Extra Credit below) will only be possible if you participate in the lectures synchronously.

Office Hours

I will hold virtual office hours from 1:00 – 2:00 PM on Tuesdays and from 2:00 – 3:00 PM on Thursdays. I strongly encourage you to attend my office hours if you want help understanding course material, want to discuss course concepts, or have questions about the course in general. Problem set questions and grading issues should generally be directed to the TAs, whose sessions and office hours are listed below. If you need to meet with me outside my normal office hours, please email me stating the specific problem or topic you wish to discuss.

Name	Contact	TA Sessions	Office Hour
Cem Karamanli	cem.karamanli@utexas.edu	M 8–9 (18065) W 1–2 (18080)	
Helen Lu	helenlule@utexas.edu	W 4–5 (18095)	
Eli Reber	elireber@utexas.edu	W 3–4 (18090) W 5–6 (18100)	
Berk Sahin	berk.sahin@utexas.edu	W 11–12 (18075)	

Required Textbook

Fundamentals of Engineering Economics, Fourth Edition by Chan S. Park (Pearson)

I will assign problems from this edition of the textbook. If you choose to work with an older or international edition, it is your responsibility to make sure you do the correct problems.

Materials and Equipment

During lectures, please have a notebook and scientific calculator (or equivalent calculator on your computer) available so that you can practice solving example problems in real time. You should have Microsoft Excel installed, as it will be used in certain lectures and most of the TA sessions. For UT Instapoll questions that offer extra credit opportunities, you will need to access Canvas, so please have it open on your computer or smartphone during synchronous lectures.

Course Website

All course materials will be posted on Canvas. I will post lecture slides and video recordings after each lecture.

Grading

Your final grade will be calculated using the following weights:

Problem Sets – 20%

Team Project – 10%

TA Session Participation – 5%

Midterm Exam 1 – 17.5%

Midterm Exam 2 – 17.5%

Final Exam – 30%

UT Instapolls – 3% (extra credit)

Letter grades will be determined according to the following conversion:

A	93% or greater
A–	90% to <93%
B+	87% to <90%
B	83% to <87%
B–	80% to <83%
C+	77% to <80%
C	73% to <77%
C–	70% to <73%
D+	67% to <70%
D	63% to <67%
D–	60% to <63%
F	<60%

I may choose to raise your final grade by curving or some other method. However, these adjustments will never lower your grade.

Quantitative Reasoning Flag

This course carries the Quantitative Reasoning flag. Quantitative Reasoning courses are designed to equip you with skills that are necessary for understanding the types of quantitative arguments you will regularly encounter in your adult and professional life. You should therefore expect a substantial portion of your grade to come from your use of quantitative skills to analyze real-world problems.

Attendance and Extra Credit

I will not take attendance or formally penalize you for not participating in the lectures synchronously. You are responsible for learning all of the course material and you are ultimately free to decide whether to attend the lectures synchronously, watch the lecture videos on your own time, or skip them. Even with our web-based format due to the COVID-19 pandemic, I believe strongly that participating in the lectures in real time is immensely valuable because it allows you to fully engage with the material, interact with your classmates, and ask questions to deepen your understanding. Furthermore, I am more likely to feel comfortable adjusting your grade upward at the end of the semester if you regularly attended and participated in lecture.

TA session attendance is mandatory, and your TAs will take attendance. Your attendance at and participation in the TA session will be factored into your final grade.

Throughout the semester, I will use the UT Instapoll app in Canvas to ask questions where you can respond during lecture and see your classmates' responses in real time. To respond, you will need to attend lectures synchronously and have Canvas open on your computer or smartphone. These Instapoll questions are intended to motivate the lecture topic, help me gauge your familiarity with important concepts, and stimulate open-ended discussion. Canvas will automatically track your responses, and depending on the question, you will receive extra credit for simply participating or for submitting a correct answer. If you participate in all Instapolls over the course of the semester and get the answers correct when required, then you will be awarded 3 extra credit points added to your final numerical grade, enough to realistically bump you up to the next (half) letter grade. Please note that I have been using UT Instapoll in this manner since before the pandemic, when lectures took place in person. I introduced them to this course in Fall 2019 and found that they had clear beneficial effects on student lecture attendance, participation, interaction with peers, and engagement with the material.

Problem Sets

Problem sets will be assigned about once a week and will be due by the start of lecture (3:30 PM) the following Thursday. Please submit them electronically via Canvas as PDF files, which can be based on typed documents or scanned written work. Problem sets will include exercises from the textbook as well as additional problems. You may discuss problem sets with your classmates and work in small teams, but you must individually write up and submit your own solutions. Based on my own experience, problem set teams should be limited to four people or fewer to ensure that you fully participate in solving the problems and thoroughly understand your solutions. Late problem sets will be penalized by 10% per late day up to and including the Sunday following each Thursday due date. At that point, the solutions will be posted, and zero credit will be received for any subsequently submitted problem set.

Team Project

In late October, I will assign a team project that you will work on in groups of three or four students, and have about a month to complete. You choose your team. Compared to the problem sets, the team project will require a more comprehensive and in-depth analysis, and allow you to be creative in deciding how to approach the problem. The deliverable for the project will be a written report describing your analysis and detailing your resulting recommendations.

Exams

Due to the pandemic, all exams will be administered as take-home exams, and will be designed with this in mind. They will be released on Canvas at announced times, and you will be told exactly how long you have to complete them. You will submit your exams electronically via Canvas as PDF files.

Midterm Exam 1

Tuesday, October 6

Midterm Exam 2

Tuesday, November 10

Final Exam

Wednesday, December 16 (scheduled by the university registrar)

Honor Code and Academic Integrity

I expect everyone to follow the UT Honor Code, which states:

“The core values of the University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.”

All suspected violations of the Honor Code will be referred to the Administration for adjudication. I have formally disciplined students for Honor Code violations in the recent past, and I will do so again without hesitation if any incidents occur in this course. Violating the Honor Code undermines the quality and integrity of your academic experience and degree, and is unfair to the majority of students who go about their work the right way. Cheating can easily result in probation, suspension, or expulsion from the University. Trust me – it’s not worth it!

To avoid ambiguity, all of the following actions related to problem sets will be treated as violations of the Honor Code: copying from a solutions manual, obtaining solutions from the internet, copying from students who took the course in prior years, and copying solutions from classmates without fully participating in solving the problems. For take-home exams, you are not allowed to talk to any other person (whether they are in this class or not) about the exam in any capacity for the full duration between its release and deadline — zero exceptions. Do not make course materials available to anyone outside this course, including websites that can be accessed by the general public (e.g., CourseHero). Doing so is not only a violation of academic integrity, but is also copyright infringement subject to legal consequences.

If you witness or become aware of other students committing academic integrity violations, please report the issue to me, or directly to Student Conduct and Academic Integrity. Given the web-based format of the course this semester, I view this responsibility as more important than ever, and I strongly urge you to do the right thing and speak up if you know of any Honor Code violations taking place in this course. For more information, please see:

<http://deanofstudents.utexas.edu/conduct/index.php>

Disability Statement

Students with disabilities who require special accommodations need to get a letter that documents the disability from the Services for Students with Disabilities area within the Division of Diversity and Community Engagement (contact information below). This letter should be presented to me at the beginning of the semester and necessary accommodations should be discussed at that time. Five business days before an exam the student should remind me of any testing accommodations that will be needed.

Services for Students with Disabilities

512-471-6259

ssd@austin.utexas.edu

<http://diversity.utexas.edu/disability/>

Feedback

I am always interested in receiving constructive feedback that helps me enhance your learning experience, improve the course, and be the most effective instructor I can be. Throughout the semester I may elicit your feedback through both informal and formal channels. Please feel free to attend office hours or schedule a meeting with me at any time to discuss your own learning experience in the course, and whether there are any changes that would enhance it. Near the end of the semester you will have an opportunity to anonymously evaluate the course and myself using the standard College of Engineering evaluation form. Your feedback and suggestions are greatly appreciated, and I promise to give them careful consideration.

Tentative Course Schedule

The course schedule below is subject to change and will be updated as frequently as possible.

Date	Topic	Reading	Problem Set Assigned	Problem Set Due
8/27	Engineering Economic Decisions	1.1 – 1.4		
9/1	Time Value of Money I	2.1 – 2.4	PS 1	
9/3	Time Value of Money II	2.5		
9/8	Time Value of Money III	2.6 – 2.7	PS 2	PS 1
9/10	Understanding Money Management I	3.1 – 3.3		
9/15	Understanding Money Management II	3.4	PS 3	PS 2
9/17	Equivalence Calculations under Inflation	Chapter 4		
9/22	Present Worth Analysis I	5.1 – 5.3	PS 4	PS 3
9/24	Present Worth Analysis II	5.4		
9/29	Annual Equivalence Analysis I	Chapter 6	PS 5	PS 4
10/1	Annual Equivalence Analysis II			
10/6	<i>MIDTERM EXAM 1</i>			
10/8	Discounting Climate Change	Broome 2008 and other articles		
10/13	Rate of Return Analysis I	7.1 – 7.2	PS 6	PS 5

			Team Project Released	
10/15	Rate of Return Analysis II	7.3 – 7.4		
10/20	Benefit-Cost Analysis I	8.1 – 8.2	PS 7	PS 6
10/22	Benefit-Cost Analysis II	8.3		
10/27	Accounting for Depreciation and Income Taxes I	9.1 – 9.2	PS 8	PS 7
10/29	Accounting for Depreciation and Income Taxes II	9.3 – 9.4		
11/3	Project Cash Flow Analysis I	10.1 – 10.4	PS 9	PS 8
11/5	Project Cash Flow Analysis II	10.5 – 10.6		
11/10	<i>MIDTERM EXAM 2</i>			
11/12	<i>No lecture Work on Team Projects</i>			
11/17	Handling Project Uncertainty	11.1 – 11.3	PS 10	PS 9
11/19	Replacement Decisions	12.1 – 12.3		
11/24	Options			Team Project (Wed 11/25)
11/26	<i>No lecture Thanksgiving</i>			
12/1	Review Session			PS 10 (Tues 12/1)
12/3	Team Project Finalist Presentations			

12/16

FINAL EXAM