ME 353
Engineering Finance
Fall 2023

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
Mechanical Engineering 335 with a grade of at least C-.

Lecture Time and Format
Lectures will be held on Tuesdays and Thursdays from 8:00 – 9:30 AM in ECJ 1.202.

I encourage you to attend my lectures in person. I sincerely believe that this is the most effective way to learn and the most conducive to you earning a good grade in this course. In addition, I expect that you will enjoy the lectures more if you attend them in person.

At the same time, I want to make my lectures as accessible as possible and enable you to make your own decisions about how to participate in this course. Therefore, I will broadcast my lectures via Zoom in real time to enable synchronous virtual participation, and then upload these lecture recordings to Canvas so that you can view them at any time.

Please note that these lecture videos will not be perfect substitutes for attending lectures in person. There is a limit to how many audio-visual responsibilities I can take on without them distracting me from my primary mission, which is to teach as best I can. Therefore, the lecture recordings will feature the slides and audio of me lecturing, but you may not see me, hear all of the questions that students in the lecture hall ask, be able to ask your own questions, and so on.

Whether you attend my lectures in person or watch them on Zoom, I strongly encourage you to attend lectures synchronously in real time rather than rely solely on watching the lecture recordings later on. In-person or synchronous virtual participation will help you keep a good schedule, remain on track with the material and assignments, and give you time to absorb new concepts (and ask questions about concepts that are initially unclear) before the course continues to build on them. Other faculty members and I have noticed that students who do not attend lectures synchronously and instead watch many lecture recordings at once (e.g., shortly before an exam) have tended to perform poorly in recent semesters.

In addition, the extra credit opportunities available through UT Instapoll (see Attendance and Extra Credit below) will only be possible if you attend lecture in person or synchronously via Zoom.

Office Hours and Teaching Assistants

I will hold office hours from 4:00 – 5:00 PM on Tuesdays and from 3:00 – 4:00 PM on Thursdays in ETC 5.128D.

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.

TA Name	Contact	TA Sessions	Office Hour
Feiyang Zhao	feiyang_zhao@utexas.edu	W 1–2 (19360) W 3–4 (19365)	W 2–3 (ETC 9.130)
Siqiang (George) Guo	george.guo@utexas.edu	W 11–12 (19350) W 12–1 (19355)	M 11–12 (ETC 7.111)
Huansong Li	hl28562@my.utexas.edu	W 4–5 (19370) W 5–6 (19375)	Tu 10–11 (ETC 9.130)

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, then it is your responsibility to make sure you do the correct problems.

The materials for this class are available through the Longhorn Textbook Access (LTA) program, a collaboration between UT Austin, The University Co-op, and textbook publishers to significantly reduce the cost of digital course materials for students. You can access your required materials through the "My Textbooks" tab in Canvas. You are automatically opted into the program but can easily opt-out (and back in) via Canvas through the 12th class day. If you remain opted-in at the end of the add/drop period (12th class day fall/spring, 4th class day summer sessions), you will receive a bill through your "What I Owe" page. If you do not pay your bill by the specified deadline, you will lose access to the course materials and your charge will be removed. More information about the LTA program is available at https://www.universitycoop.com/longhorn-textbook-access#undefined.

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 many 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 lectures.

Course Website
All course materials will be posted on Canvas.

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 formally take attendance during my lectures. You are responsible for learning all of the course material and you are ultimately free to decide whether to attend the lectures in person, watch them synchronously via Zoom, or view the lecture recordings on your own time. However, I strongly encourage you to attend lectures synchronously (preferably in person, but if not, then virtually) for all of the reasons outlined above under Lecture Time and Format.

In-person TA session attendance is mandatory, and your TAs will take attendance. Your attendance at and participation in the TA sessions will be factored into your final grade. If you have a legitimate reason why you must miss a particular TA session, then please contact your TA in advance to let them know about your conflict.

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 (either in person or virtually) 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. I first incorporated UT Instapoll into this course in Fall 2019 and found that it 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 at 5 PM on the specified due date. 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 (Friday) following each Thursday (Tuesday) due date. Once 72 hours have passed after the deadline, the solutions will be posted, and zero credit will be received for any subsequently submitted problem set.

Team Project

In early October, I will assign a team project that you will work on in groups of three or four students, and have over one 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

All exams in this course will be administered in person. The midterm exams will take place during our usual lecture time and in the usual location. The final exam time and location are determined by the university registrar. If you feel that you will not be able to take an exam at the specified time and location for any reason, then you must get approval from a UT office such as Disability and Access or Engineering Student Services in order for me to grant you alternative accommodations. You may of course contact me too, but my default policy is to direct you to one of these offices and defer to their judgment, as they are in better positions than I am to evaluate students' requests for test-taking accommodations.

Midterm Exam 1
Tuesday, October 3

Midterm Exam 2
Thursday, November 2

Final Exam
Saturday, December 9, 8:00 – 10:00 AM (scheduled by the university registrar)

Learning Outcomes

By the end of this course, students will be able to …

- Properly compare cash flows occurring at different points in time.
- Evaluate the financial attractiveness of a project using quantitative methods such as present worth analysis, rate of return analysis, and more.
- Apply these methods to inform financial decisions that commonly arise in our personal lives, private sector businesses, and the public sector.
- Incorporate inflation, depreciation, and taxes into project evaluation.
- Understand how uncertainty affects financial decision-making.
- Use Microsoft Excel to efficiently implement the project evaluation methods featured in this course when projects become complex and large, involving many calculations.
- Analyze a complex, real-world financial decision-making problem by building a quantitative model and gathering relevant input data.
- Work effectively in teams on an open-ended problem.
- Develop a written report to clearly communicate the methodology and results of a financial analysis.

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. Do not make course materials

available to anyone outside this course, including on 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. 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 and Access Statement

The University is committed to creating an accessible and inclusive learning environment consistent with University policy and federal and state law. Please let me know if you experience any barriers to learning so I can work with you to ensure that you have equal opportunity to participate fully in this course. If you are a student with a disability, or think you may have a disability, and need accommodations please contact Disability and Access (D&A). Please refer to D&A's website for contact and more information: http://diversity.utexas.edu/disability/. If you are already registered with D&A, please deliver your Accommodation Letter to me as early as possible in the semester so that we can discuss your approved accommodations and needs in this course.

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 UT Austin's standard Course 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
8/22	Engineering Economic Decisions	1.1 – 1.4		
8/24	Time Value of Money I	2.1 – 2.4		
8/29	Time Value of Money II	2.5		
8/31	Time Value of Money III	2.6 – 2.7	PS 1	
9/5	Understanding Money Management I	3.1 – 3.3		
9/7	Understanding Money Management II	3.4	PS 2	PS 1
9/12	Equivalence Calculations under Inflation	Chapter 4		
9/14	Present Worth Analysis I	5.1 – 5.3	PS 3	PS 2
9/19	Present Worth Analysis II	5.4		
9/21	Annual Equivalence Analysis I	Chapter 6	PS 4	PS 3
9/26	Annual Equivalence Analysis II		PS 5	
9/28	Discounting Climate Change	Broome 2008 and other articles		PS 4
10/3	***MIDTERM EXAM 1***			
10/5	Rate of Return Analysis I	7.1 – 7.2	Team Project Released	

10/10	Rate of Return Analysis II	7.3 – 7.4	PS 6	PS 5
10/12	Benefit-Cost Analysis I	8.1 – 8.2		
10/17	Benefit-Cost Analysis II (*Zoom lecture – work travel*)	8.3	PS 7	PS 6
10/19	Accounting for Depreciation and Income Taxes I	9.1 – 9.2		
10/24	Accounting for Depreciation and Income Taxes II	9.3 – 9.4	PS 8	PS 7
10/26	Project Cash Flow Analysis I	10.1 – 10.4		
10/31	Project Cash Flow Analysis II	10.5 – 10.6	PS 9	PS 8
11/2	***MIDTERM EXAM 2***			
11/7	Handling Project Uncertainty (*Zoom lecture – work travel*)	11.1 – 11.3		
11/9	Replacement Decisions	12.1 – 12.3	PS 10	PS 9
11/14	Options			Team Project
11/16	Monte Carlo Simulation			
11/21	NO LECTURE *Thanksgiving break*			
11/23	NO LECTURE *Thanksgiving break*			
11/28	Review Session			

11/30	Team Project Finalist Presentations			PS 10
12/9	***FINAL EXAM***			