

# **SIME 5560/6560-ME EN 5186/6186 Engineering Economic Analysis**

**Professor:** Todd Easton  
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**Email:** todd.easton@utah.edu  
**Phone:** no phone  
**Class Time:** Tuesday Thursday 10-11:50  
**Class Location:** WEB 120  
**Office Hours:** Tuesdays 9-10 and Thursday 12-3 or by appointment. Email me if you want to meet over zoom.

My Utah zoom link is <https://utah.zoom.us/j/4802439332>  
Passcode:427701

## **Prerequisite:**

6186: Graduate standing. Graduate students are assumed to have met the undergraduate prereq.  
5186: One semester of probability or statistics. Typical courses include, but are not limited to, ME EN 2550, CS3130, ECE3530, or MATH 3070

## **Textbook** (Optional):

*Capital Investment Analysis for Engineering and Management*, Third Edition, by John R. Canada, William G. Sullivan, John A. White and Dennis Kulonda, Prentice Hall. I will follow the text closely.

## **Course Description**

This course focuses on financial decision making for both industry and individuals. Topics covered include: time value of money, loans, present worth analysis, rates of return, benefit to cost ratio, taxes, probabilistic cash flows, simulation of cash flows, decision analysis and decision trees.

**Course Objectives:** By taking this course, the student should develop the following skills.

Understand the time value of money

Evaluate alternatives according to present worth, annual worth, future worth, internal rate of return, external rate of returns, and benefit to cost ratios.

Calculate the impact of taxes upon the cash flows.

Perform sensitivity analysis

Evaluate random cash flows

Simulate random cash flows (graduate only)

Perform decision analysis and implement decision trees

Utilize these financial skills and decision tools to make informed decisions

These objectives will be met by through projects and exams. Graduate students will have additional requirements for the projects/exams. These additional requirements will help the students gain advanced learning outcomes involving the final 3 learning outcomes.

### **Grading Scheme**

Project 1 20% Due June 19

Project 2 20% Due July 24

Take home Midterm Exam 25% due June 30 (about a week to do it not timed)

Take home Final Exam 35% August 3. (about a week to do it not timed)

Note: Graduate students will have additional topics for projects/exams

### **Attendance:**

Attendance is heavily encouraged but not required. However, I view it as your job to be here. Recordings of lectures may be posted about a day after the lecture is given. If it has been more than two days, please send me an email.

Research on learning has indicated several things about the way people best absorb and retain information. Research indicates that learning is better accomplished through a combination of repetition and active thinking about a topic. I teach with an active learning strategy that I invented called lecture-based tutoring. I developed this method while I was the Head Athletic Mathematical Coordinator at Georgia Tech teaching athletes (Football, basketball, tennis, baseball, track, etc.) calculus and other math classes. No one failed with my tutoring style.

I keep everyone's name on a 3x5 card. I use the cards to "randomly" and exhaustively ask students questions. If the student correctly answers the question, I typically add a few comments to reiterate the idea and make sure everyone can hear. If the student does not know the answer, then I tutor the person to the answer. My goal is to make sure every student does not know the answer multiple times during the semester. My assumption is that if the student doesn't know the answer, then the whole class is confused. This allows me to see what topics I explained poorly and to help tutor the entire class to a correct understanding.

By asking every student in the class questions, the student has a chance to think, derive some idea and quickly speak in a public setting. This class is a core engineering management and an elective in systems engineering. Having good communication skills, which can always be improved, is typically necessary for success. Thus, I feel that asking students a question directly by name will help the students in their careers and life.

I know that some students have avoided coming to my class and have decided to watch the recordings to avoid being called upon. I want the class to be a safe environment where my failures and students' lack of background or knowledge are just part of an imperfect world and the learning process. As mentioned, a wrong answer or "I have no idea" is an expected result from many of my questions.

If you will avoid coming to class because of my questions asked directly to you by name, please let me know. I would rather have you here, then not here. Without question, I will remove your name from people being questioned. However, I will ask after 3 or so weeks if I can add you back to the people being called upon. Understand that I will try to convince you part way through the semester to allow me to ask you questions. I believe that all student's answering my questions improves the class for everyone. Providing your opinions and knowledge about the class improves the class for everyone. Furthermore, the students also have a chance to improve their individual communication and social skills (I estimate about 1/3 of the typical job).

### **Tentative schedule:**

#### I Principles of Engineering Economy (2 weeks)

- Accounting common practices
- Making economic decisions
- Interest and equivalence
- Equivalence of repeated cash flows
- Present, future and annual worth analysis
- Annual cash flow analysis

#### II Taxes (2 weeks)

- Personal income taxes/retirement mechanisms
- Depreciation
- MACRS

#### III Other measures of cash flows (2 weeks)

- Rate of returns
- Benefit to cost ratio
- Other analytic measures

#### Midterm

#### IV Uncertainty in cash flows (2 weeks)

- Quality of data
- Sensitivity analysis
- Probabilistic cash flows
- Simulating cash flows

#### V Decision Analysis (3 weeks)

- Decision models and rules
- Decision trees
- Other topics as time permits

# University Policies

## **1) Academic Honesty:**

All students are responsible for their own work. Please review the University of Utah's "Rights and Responsibilities of Students (Student Code/Misconduct)" policies for details about the consequences of misconduct. Students must also complete the Canvas Module for Academic Integrity before accessing other materials on the course Canvas site.

- Violations include, but are not limited to:

### **a) Cheating on an examination:**

such as copying from another's paper, using unauthorized notes, calculators, etc., or giving or receiving unauthorized aid, such as trading examinations, whispering answers, passing notes, or using electronic devices to transmit or receive information.

### **b) Plagiarism:**

This is using someone else's work without giving credit. It is, for example, using ideas, phrases, papers, laboratory reports, computer programs, data - copied directly or paraphrased - that you did not arrive at on your own. Sources include published works such as book, movies, Websites, and unpublished works such as other students' papers or material from a research service. In brief, representing someone else's work as your own is academically dishonest. The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.

### **c) Unauthorized collaboration:**

This is working with or receiving help from others on graded assignments without the specific approval of the instructor. If in doubt, seek permission from the instructor before working with others. Students are encouraged to learn from one another: Form study groups, discuss assignments, BUT each assignment must be individual work unless specifically stated and turned in as a group assignment.

- Copying another student's assignment and putting your name on it is plagiarism. - You are encouraged to talk to one another about your assignments; however, all assignments must be done by the student whose name is on it!

### **d) Academic Integrity:**

Engineering is a profession demanding a high level of personal honesty, integrity and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to

enter the profession, adhere to the Department of Mechanical Engineering Policy for Academic Misconduct.

This policy is based upon:

[the University of Utah's Policy 6-400: Code of Student Rights and Responsibilities](#)

As part of the ME policy, students must review and acknowledge the:

["ME EN Academic Misconduct Policy"](#)

This policy states:

**Academic Integrity:** Engineering is a profession that demands a high level of personal honesty, integrity, and responsibility. Therefore, it is essential that engineering students, in fulfillment of their academic requirements and in preparation to enter the engineering profession, adhere to the Department of Mechanical Engineering Policy for Academic Misconduct. This policy is based on [University of Utah Policy 6-400: Code of Student Rights and Responsibilities](#) that states "*Academic misconduct includes but is not limited to cheating, misrepresenting one's work, inappropriately collaborating, plagiarism, and fabrication or falsification of information. It also includes facilitating academic misconduct by intentionally helping or attempting to help another to commit an act of academic misconduct.*"

Students must acknowledge the ME Academic Misconduct Policy and course-specific definitions of academic misconduct by completing the corresponding CANVAS quiz by the end of the first week of class. Students who are not in compliance with this will receive an EU grade for the course.

## **COLLEGE OF ENGINEERING GUIDELINES –**

<https://www.coe.utah.edu/students/academicaffairs/academics/semester-guidelines/>

### **2) The Americans with Disabilities Act.**

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

### **3) University Safety Statement.**

The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit [safeu.utah.edu](http://safeu.utah.edu).

### **4) Addressing Sexual Misconduct.**

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

**Some students may qualify for accommodations and exemptions from these guidelines through the Americans with Disabilities Act (ADA).**

Accommodations should be obtained prior to the first day of class.

If you believe you meet these criteria, contact:

**Center for Disability and Access**

801-581-5020

disability.utah.edu

162 Union Building

200 S. Central Campus Dr.

Salt Lake City, UT 84112

**6) Drop/Withdrawal Policies.**

Students may drop a course within a given timeline of a given semester without any penalties. Students may officially withdraw (W) from a class or all classes after the drop deadline through the midpoint of a course. A "W" grade is recorded on the transcript and appropriate tuition/fees are assessed. The grade "W" is not used in calculating the student's GPA. For deadlines to withdraw from full-term, first, and second session classes, see the U's Academic Calendar.

**7) Other important information to consider including:**

a) Student Code:

<http://regulations.utah.edu/academics/6-400.php>

b) Accommodation Policy (see Section Q):

<http://regulations.utah.edu/academics/6-100.php>

**8) Wellness Statement.**

Your personal health and wellness are essential to your success as a student. Personal concerns like stress, anxiety, relationship difficulties, depression, or cross-cultural differences can interfere with a student's ability to succeed and thrive in this course and at the University of Utah.

Please feel welcome to reach out to your instructor or TA's to handle issues regarding your coursework. For helpful resources to manage your personal wellness and counseling options, contact:

**Center for Student Wellness**  
801-581-7776  
wellness.utah.edu  
2100 Eccles Student Life Center  
1836 Student Life Way  
Salt Lake City, UT 84112

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**Women's Resource Center**  
801-581-8030  
womenscenter.utah.edu  
411 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112

**9) Students with Disabilities**

The Center for Disability Services is dedicated to serving students with disabilities by providing the opportunity for success and equal access at the University of Utah. They also strive to create an inclusive, safe, and respectful environment.

For more information about what support they provide and links to other resources, view their website or contact:

**Center for Disability Services**  
801-581-5020  
disability.utah.edu  
162 Union Building  
200 S. Central Campus Dr.  
Salt Lake City, UT 84112  
Students of Ethnic Descent

**10) Other Student Groups at the U**

**To learn more about some of the other resource groups available at the U, check out:**

[getinvolved.utah.edu/](http://getinvolved.utah.edu/)  
[studentsuccess.utah.edu/resources/student-support](http://studentsuccess.utah.edu/resources/student-support)

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