

ISE 561
ECONOMIC ANALYSIS OF ENGINEERING
PROJECTS

Units: 3

Summer 2021: Tue. & Thursday 2:30-5:40 pm

Location: Online

Instructor: Dr. Shalini Gupta

Office: GER 216 C

Office Hours: Tuesday from 1:00 pm – 2:00 pm

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Teaching Assistant: TBD

Office: TBD

Office Hours: TBD

Contact Info: TBD

Course Description

A variety of techniques for evaluating the economic consequences of alternative technology-based decisions will be discussed, including those based on projected cash flows (e.g., net present value [NPV] and internal rate of return [IRR]) as well as those stemming from standard accounting methods (e.g., payback and return on investment [ROI]). The effects of depreciation accounting, tax rates and capital gains taxes will be reviewed in order to provide a firm foundation for carrying out economic studies on an after-tax basis. A portion of the course will be devoted to alternative techniques for evaluating the risk and uncertainty inherent in economic forecast analysis. With the methodologies presented in this course, the student will be able to conduct detailed, theoretically sound analyses of the economic consequences of any proposed projects, plans or policies, on a before- or after-tax basis, and taking into consideration uncertainties inherent in forecasted values.

Learning Objectives

You will learn the following topics. Introduction to engineering economy:

- Interest factors and equivalence
- Depreciation and depreciation models
- Tax considerations

- Evaluation of a single investment (including internal rate of return, net present value, cash flows)
- Capital budgeting
- Break-even models (linear and nonlinear)
- Cost comparisons
- Decision Making Under Uncertainty

Student Learning Outcomes:

- Students will be able to determine the equivalent value of money at a specified time given the timing of deposits and interest value.
- Students will be able to select the most attractive interest rate in various compound and simple interest forms.
- Students will be able to determine if an independent investment opportunity is economically attractive.
- Students will be able to determine the least-cost alternative of multiple solutions in a cost comparison scenario.
- Students will be able to identify the best project(s) to perform from a set of potential projects that are independently economically attractive.

Course Notes

D2L

Required Readings and Supplementary Materials

Economic Analysis of Capital Expenditures for Managers & Engineers, G.T. Stevens, Jr., 1994 (Relevant course material would be provided).

Description and Assessment of Assignments

All assigned sections of the texts, plus topics discussed in lecture by the instructor.

Exams: Each exam will cover the material presented up to and including the preceding homework assignment. Points will be assigned to each section of the exam. No re-takes will be allowed. No make-up exam will be given. The FINAL EXAM will cover material presented since the second midterm exam. Grading will be similar to the midterm exam. Any person caught cheating on an examination will be referred to judicial affairs.

Projects: The project is designed to exercise the skills which you develop over the course of the semester. The project will require you to collect data,

model and perform analysis. Additional details will be provided during the course.

Homework: Problems sets will be assigned. Homework is not accepted late. If a paper shows an acceptable answer to each assigned exercise, the grade for the assignment is 10 points. An answer to a quantitative exercise is acceptable if it uses the correct method and complete step by step procedure.

Surprise Quizzes: Surprise Quizzes will be given. The score will be used to determine the semester points for the quizzes. Any person caught cheating on an examination or quiz will receive a zero score for that examination or quiz.

Grading Breakdown

Exams (1)	30 %
Final Exam	30 %
Project	15%
Project Presentation	10 %
Homework	5 %
Surprise Quizzes	5 %
Attendance	5 %
Total	100%

Grading Scale (Example)

Course final grades will be determined using the following scale

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

Grading Timeline

7 – 8 Days

Academic Integrity

Any form of cheating, plagiarism, personation, falsification of a document as well as any other form of dishonest behavior related to the obtention of academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and may lead to severe penalties up to and including suspension and expulsion. As examples only, you are not permitted to:

- Falsify data or research results
- Sharing assignments
- Benefit from others' work
- Unfair advantage
- External assistance
- Possession of solutions
- Copy from anywhere without indicating where it came from
- Let another student copy your work and then submit it as his/her own
- Hand in the same assignment in more than one class
- Have unauthorized material/ collaboration or devices in an exam.
- Copy from someone's else exam/assignments
- Communicate with another student during an exam
- Add or remove pages from an examination booklet or take the booklet out of an exam room
- Acquire exam or assignment answers or questions
- Write an exam for someone else or have someone write an exam for you
- Submit false documents such as medical notes or student records

You are subject to the Academic Code of Conduct.

Student's Responsibilities

- Students are expected to attend every class. Some material may only be covered in class and not made available on the course website. Students are

expected to read the assigned material and to actively participate in class discussions.

- Students are expected to be respectful of other people's opinions and to express their own views in a calm and reasonable way. Disruptive behavior will not be tolerated.
- Students are expected to be familiar with the Academic Code of Conduct.

To quote from a USC guidebook: "Behavior that persistently or grossly interferes with classroom activities is considered disruptive behavior, and may be subject to disciplinary action. Such behavior inhibits other students' ability to learn and an instructor's ability to teach. A student responsible for disruptive behavior may be required to leave class pending discussion and resolution of the problem, and may be reported to the Office of Student Judicial Affairs for disciplinary action."

Preliminary schedule with examinations and due dates:

<u>Date</u>	<u>Topic</u>	<u>Text Chapters</u>
20-May	Introduction and Interest	Chapter 2
20-May	Interest and Interest Factors	Chapter 2
20-May	Interest and Interest Factors	Chapter 2
25-May	Interest and Interest Factors	Chapter 2
25-May	Interest and Interest Factors	Chapter 2
27-May	Depreciation	Chapter 3
27-May	Depreciation	Chapter 3
1- June	Tax Considerations	Chapter 4
1- June	Tax Considerations	Chapter 4
3- June	Economic Evaluation of a Single Project	Chapter 5
3- June	Economic Evaluation of a Single Project	Chapter 5
8- June	Exam - 1	
10- June	Capital Budgeting	Chapter 7
10- June	Capital Budgeting	Chapter 7
15- June	Cost Comparisons	Chapter 9
15- June	Cost Comparisons	Chapter 9
17- June	Break Even Models	Chapters 8
17- June	Break Even Models	Chapters 8
22- June	Decision Under Uncertainty	Chapters 15
24- June	Project Presentation	
24- June	Project Presentation	
24- June	Project Presentation	
29- June	Final Exam	

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

National Suicide Prevention Lifeline - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class. <https://equity.usc.edu/>

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

The Office of Disability Services and Programs

Provides certification for students with disabilities and helps arrange relevant accommodations. <http://dsp.usc.edu>

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic.

<https://studentaffairs.usc.edu/ssa/>

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible,

<http://emergency.usc.edu>

USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.

Provides overall safety to USC community. <http://dps.usc.edu>