

ISE 561
ECONOMIC ANALYSIS OF ENGINEERING
PROJECTS

Units: 3

2018— Tuesday & Thursday 11:00 – 12:20 pm

Location: OHE 100B

Instructor: Dr. Shalini Gupta

Office: GER 216 C

Office Hours: Thursday from 3:30 pm – 4:30 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)
- Revenue requirements
- 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

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 exams. 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 animate the system, and perform statistical analysis. Prior to working on a project, a proposal must be approved. Additional details will be provided during the course.

Homework: Problems sets will be assigned. Homework is not accepted late. Homework will be graded on an “all or nothing” basis. If a paper shows an acceptable answer to each assigned exercise, the grade for the assignment is 10 points. An answer to a qualitative exercise is acceptable if it is relevant to the issue. An answer to a quantitative exercise is acceptable if it uses approximately the correct method. If any exercise is unacceptable, the paper will be returned with no points awarded.

Grading Breakdown

Exams (1 and 2)	20% Each
Exams (3)	35%
Project	15%
Homework / In-class Practice	10%
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

Additional Policies

- The use of laptops, phones or similar devices during class is not allowed.
- Please Do Not bring food or drinks to the class (Water in plastic bottles is ok)
- All tests are closed book. Laptops and cell phones are NOT allowed.

Course Schedule: A Weekly Breakdown

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Text Chapters</u>
1	9-Jan.	Introduction and Interest	Chapter 1 & Cha. 2
2	11-Jan.	Interest and Interest Factors	Chapter 2
	16-Jan.	Interest and Interest Factors	Chapter 2
3	18-Jan.	Interest and Interest Factors	Chapter 2
	23-Jan.	Depreciation	Chapter 3
4	25-Jan.	Depreciation	Chapter 3
	30-Jan.	Tax Considerations	Chapter 4
5	1-Feb.	Tax Considerations	Chapter 4
	6-Feb.	Tax Considerations	Chapter 4
6	8-Feb.	Examination I	
	13-Feb.	Economic Evaluation of a Single Project	Chapter 5
7	15-Feb.	Economic Evaluation of a Single Project	Chapter 5
	20-Feb.	Economic Evaluation of a Single Project	Chapter 5
8	22-Feb.	Economic Evaluation of a Single Project	Chapter 5
	27-Feb.	Minimum Annual Revenue Requirements	Chapter 6
9	1-Mar.	Minimum Annual Revenue Requirements	Chapter 6
	6-Mar.	Minimum Annual Revenue Requirements	Chapter 6
10	8-Mar.	Capital Budgeting	Chapters 7
	13-Mar.	Capital Budgeting	Chapters 7
11	15-Mar.	Break Even Models	Chapters 8
	20-Mar.	Examination II	
12	22-Mar.	Break Even Models	Chapters 8
	27-Mar.	Cost Comparisons	Chapters 9
13	29-Mar.	Cost Comparisons	Chapters 9
	3-Apr.	Cost Comparisons	Chapters 9
14	5- Apr.	Cost Comparisons	Chapters 9
	10- Apr.	Decision Under Uncertainty	Chapters 15
15	12- Apr.	Decision Under Uncertainty	Chapters 15
	17- Apr.	Project Presentations	
16	19- Apr.	Project Presentations	
	24-Apr.	Project Presentations	
	26-Apr.	Final Exam - Tentative	

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>