

ISE 561
ECONOMIC ANALYSIS OF ENGINEERING PROJECTS
Spring 2017

Instructor(s): Dr. Shalini Gupta

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Instructor's Office Hours: Thursday – 3:30 pm to 5:30 pm

GTA's Office Hours: TBD

Web Site: blackboard.usc.edu

Time and Place of Class Meetings: Tuesday & Thursday 11:00 – 12:20 pm, OHE 100B

Description of Course Content: 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.

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.

Required Textbooks and Other Course Materials: Economic Analysis of Capital Expenditures for Managers & Engineers, G.T. Stevens, Jr., 1994

Course Material: 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 reported to the university.

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 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. 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 Policy: All work will be done individually unless otherwise specified.

The grading policy is expected to be as follows: Typical grade scoring:

A = 100-95

A- = 94-90

B+ = 89-85

B = 84-80

B- = 79-65

C = below 60.

Exams (1 and 2)	20% Each
Exams (3)	35%
Project	15%
Homework	10%
Total	100%

Accommodations for Disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor as early in the semester as possible. DSP is located in GFS 120 and is open 8:30 am - 5:00 pm, Monday through Friday. The phone number for DSP is (213)740-0776.

Academic Integrity: The Department of Industrial and Systems Engineering adheres to the University's policies and procedures governing academic integrity as described in SCampus. Students are expected to be aware of and to observe the academic integrity standards described in SCampus. Students should expect those standards to be enforced in this course.

Preliminary schedule with examinations and due dates:

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Text Chapters</u>
0	10-Jan	Introduction and Interest	Chapter 1 & Cha. 2
1	12- Jan	Interest and Interest Factors	Chapter 2
	17- Jan	Interest and Interest Factors	Chapter 2
2	19- Jan	Interest and Interest Factors	Chapter 2
	24- Jan	Interest and Interest Factors	Chapter 2
3	26- Jan	Depreciation	Chapter 3
	31- Jan	Depreciation	Chapter 3
4	2- Feb	Tax Considerations	Chapter 4
	7- Feb	Examination 1	
5	9- Feb	Tax Considerations	Chapter 4
	14- Feb	Economic Evaluation of a Single Project	Chapter 5
6	16- Feb	Economic Evaluation of a Single Project	Chapter 5
	21- Feb	Economic Evaluation of a Single Project	Chapter 5
7	23- Feb	Minimum Annual Revenue Requirements	Chapter 6
	28- Feb	Minimum Annual Revenue Requirements	Chapter 6
8	2-March	Capital Budgeting	Chapter 7
	7- March	Capital Budgeting	Chapter 7
9	9- March	Break Even Models	Chapters 8
	21- March	Break Even Models	Chapters 8
10	23- March	Examination II	
	28- March	Cost Comparisons	Chapters 9- Part A
11	30- March	Cost Comparisons	Chapters 9- Part A
	4-April	Cost Comparisons	Chapters 9-Part B
12	6- April	Cost Comparisons	Chapters 9- Part B
	11- April	Decision Under Uncertainty	Chapters 15
13	13- April	Decision Under Uncertainty	Chapters 15
	18- April	Project Presentations	
14	20- April	Project Presentations	
	25- April	Project Presentations	
15	27- April	Project Presentations	
	Tentative	Final Exam	

