Spring 2024

IE 334-002: Engr Econ & Cpt Inv Analy

Athanassios Bladikas

New Jersey Institute of Technology

Spring 2021 IE 334 Engineering Economy & Capital Investment Analysis (3-0-3)

Instructor: Athanassios Bladikas – 212 MEC, 973-596-3653 – bladikas@njit.edu

Class Meets: T, F 10:00 – 11:20 AM – In 2305 GITC

Description: Introduction to the principles of engineering economics for utilization and evaluation of capital investments, including time value of money, depreciation, cost of capital, life cycle cost, net present value, and payback. Consideration of decisions involving multiple choice replacement, uncertainty, and risk.

Prerequisite: Junior Standing

Objective: By the end of the course, you should be able to do the following:

- Apply economic analysis techniques to rational decision-making and alternative selection.
- Utilize spreadsheet software applications for engineering economic analysis.
- Utilize present worth, annual cash flow, rate of return, and incremental analyses, as well as other techniques.
- Be able to incorporate capital investment analysis, uncertainty and risk, and lifecycle costing within industrial applications.
- Identify lapses of ethical and professional responsibility.

Honor Code Violations/Disruptive Behavior: NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. In cases that Honor Code violations are detected, the punishments range from a minimum of failure in the assignment/course to disciplinary probation and expulsion from NJIT with notations on the students' permanent record.

Text: *Engineering Economic Analysis*, Newnan, Lavelle and Eschenbach, 14th Ed., Oxford Univ. Press, 2019. ISBN 978-0-19-0063467

Grading: Exam I: 30% Exam II: 30% Final Exam: 30% Homework & Assignments: 10%

Homework

Homework (questions at the back of each chapter) will be assigned after we cover the material needed to do the problems**.** The homework submission must show how you derived the answers. Each problem will be graded on a 10-point basis (i.e. your overall homework score may be something like 560/690=0.81). Homework must be turned in individually and submitted on time. **Homework cannot be accepted after the solutions will be posted.** Do not trust Chegg. I got in the past answers that made me wonder what problem they came from. I was told by students that Chegg is good for courses that have problems associated with solving equations like statics. This course depends more on judgement and interpretation and the solutions that Chegg provides are sometimes wrong.

Homework Submission

Please submit your homework in Canvas. When problems are solved in Excel, please submit the actual spreadsheet, so that I can see the formulas that were used to make the calculations. If Excel is not involved, submit the solutions in any format you like. It could be a Word file if you type the answers, or just a scan or picture of the solution, if you do them by hand. **You should show all calculations and not just give an answer. Make sure that what you submit is readable and right side up.**

Outline (Dates of exam and coverage of topics tentative):

Week	Dates	Topic	Reading Assignment	Homework(**)
1	1/16 & 1/19	Introduction Ethics and Overview of Concepts	Chapters 1& 2	Ethics assignment
2	1/23 & 1/26	Interest and Equivalence Nominal and effective rates	Chapter 3	
3	1/30 & 2/2	Repeated Cash Flows	Chapter 4	
4	2/6 & 2/9	Present Worth Analysis	Chapter 5	
5	2/13	Practice Problems & Review		
	2/16	***Exam I* (Ch. 3, 4 and 5)**		
6	2/21 & 2/23	Annual Cash Flow Analysis	Chapter 6	
7	2/27 & 3/1	Rate of Return Analysis	Chapter 7	
8	3/5 & 3/8	Solving for Interest Rate	Appendix 7A	
	3/12 & 3/15	***Spring Break***		
9	3/19 & 3/22	Incremental Analysis & Choosing Best Alternative	Chapter 8	
10	3/26	Review		
	3/29	**NO CLASS**		
	4/2	***Exam II* (Ch. 6, 7 and 8)**		
11	4/5	Breakeven & Benefit/Cost Analysis	Chapter 9	
12	4/9 & 4/12	Depreciation	Chapter 11	
13	4/16 & 4/19	Income Taxes	Chapter 12	
14	4/23 & 4/26	Uncertainty and Risk	Chapter 10	
15	4/30 **(Friday class)**	Review		
15	5/3 – 5/9	***Final Exam (Ch. 9, 10 11 and 12) (date/time assigned by Registrar)***		

THE EXACT EXAM I & II DATES WILL BE DETERMINED AS WE PROGRESS THROUGH THE COURSE

(**) Not all of you may have the same edition of the book, and since the numbers of homework problems vary from edition to edition, Homework problems for each chapter will be given in a .pdf and you will be getting solutions and explanations two classes later.

BSIE Program Educational Objectives

I. Program graduates use the fundamental principles and major areas of Industrial Engineering in their professional practice.
II. Program graduates are life-long learners, pursuing graduate education, and professional growth in Industrial Engineering and related fields.
III. Program graduates pursue diverse career paths and advance in a variety of industries.

BSIE Student Outcomes

(1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
(2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social and economic factors
(3) An ability to communicate effectively with a range of audiences
(4) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and social contexts
(5) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
(6) An ability to conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions
(7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

IE 334 Outcomes of Instruction:
The students will:
1 Learn to solve time value of money problems (1).
2 Learn to solve problems associated with the evaluation and justification of capital investments (1).
3 Learn to solve problems considering depreciation and taxes (1).
4 Learn to use spreadsheets to solve engineering economy problems (1).
5 Apply Engineering Ethics to actual engineering/business situations (4).