

## IME 310 ENGINEERING ECONOMY

Fall 2000

M 7:00 – 9:50 p.m.

**Catalog Description:** Application of principles of engineering economy for establishment of equipment and system feasibility. Interest, equivalence, taxes, depreciation, uncertainty and risk, incremental and sunk costs, and replacement models. Prerequisites: CS 106 or CS 306 or IME 206, MATH 123.

**Textbook:** Newnan, Donald G., J. P. Lavelle, and Eschenbach, Ted G., Engineering Economic Analysis, (Austin, TX: Engineering Press, 2000, Eighth Edition).

**References:**

1. Collier, Courtland A. and Glagola, Charles R., Engineering Economic and Cost Analysis, (Menlo Park: Addison Wesley Longman, Inc., 1998, Third Edition). [TA177.4 .C65 1998]
2. Sullivan, William G., Bontadelli, James A., and Wicks, Elin M., Engineering Economy, (Upper Saddle River: Prentice-Hall, 2000, Eleventh Edition). [TA177.4 .E539 2000]
3. Blank, Leland T. and Tarquin, Anthony J., Engineering Economy, (McGraw Hill, 1998, Fourth Edition). [TA177.4 .B58 1998]
4. Bowman, Michael S., Applied Economic Analysis for Technologists, Engineers, and Managers, (Upper Saddle River: Prentice-Hall, 1999). [TA177 .B69 1999]

**Coordinator:** Dr. Bob White, Professor, Industrial and Manufacturing Engineering.

**Instructor:** *Name:* Dr. Kailash M. Bafna, Professor  
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### Long Term Behaviors:

In the future, students completing this course can:

1. Be used as financial evaluators to judge the soundness in the selection of projects (from a large list) when working with constrained resources.
2. Be asked to advise on suitability of a specific depreciation method best suited for a given situation in order to minimize taxes.
3. Regularly make financial investment decisions consistently resulting in above average returns on their personal portfolio with reduced tax liabilities.
4. Quickly be able to adapt to using new computerized techniques as they are developed.

### Prerequisites by Topics:

1. Differential and integral calculus. (MATH 123).
2. Understanding and familiarity with computer programming. (IME 206 or equivalent).

### Course Objectives<sup>1</sup>:

At the end of the semester the student will be able to:

1. Formulate and solve time value of money problems. (a)
2. Identify sources of data and apply appropriate techniques to solve economic problems. (b, e)
3. Evaluate multiple alternatives to determine the best one. (e, k)

4. Use spread sheets for financial analysis (k).
5. Understand the importance of making appropriate economic decisions. (f)
6. Recognize the impact of engineering economics decisions in a global and societal context. (h)

<sup>1</sup> Letters in parentheses at the end of each objective refer to the ABET 2000 Engineering criteria.

**Course Schedule:**

<u>DATE</u>	<u>TOPIC</u>	<u>CHAPTER</u>
8-28	Introduction	1
	The Decision Making Process	1
	Engineering Costs and Cost Estimating	2
9- 4	<b>LABOR DAY RECESS</b>	
9-11	Interest and Equivalence	3
9-18	More Interest Formulas	4
9-25	More Interest Formulas	4
	Present Worth analysis	5
10- 2	Present Worth analysis	5
	<b>EXAMINATION # 1</b>	<b>1 – 4</b>
10- 9	Annual Cash Flow Analysis	6
	Rate of Return analysis	7
	<i>Computer Assignment # 1</i>	
10-16	Rate of Return Analysis	7
	Incremental Analysis	8
10-23	Other Analysis Techniques	9
	<i>Computer Assignment # 2</i>	
10-30	Depreciation	10
	<b>EXAMINATION # 2</b>	<b>5 -- 9</b>
11- 6	Taxes	11
	<i>Computer Assignment # 3</i>	
11-13	Replacement Analysis	12
11-20	Inflation and Price Change	13
	Estimation of Future Events	14
	<i>Computer Assignment # 4</i>	
11-27	Estimation of Future Events	14
	Rationing Capital Among Competing Projects	17
12- 4	<b>COMPREHENSIVE EXAMINATION (7:15 p.m. to 9:15 p.m.)</b>	1 - 17

**Home Work Problems:**

There are numerous problems at the end of each chapter. The majority of these problems also have answers given at the end of each question. The only way you can understand the subject material and do well in this course is by actually solving problems. Hence, it is recommended that you solve as many of the problems (for which answers are given) as possible. Not only will this help you to understand the basic concepts but also considerably reduce the amount of time you will need to solve a problem. Both of these will benefit you when taking the examinations. It is suggested that you keep a 70-page spiral bound notebook just for the problems. In this way, all your solved problems will be in one location and serve as a good review guide prior to an examination. If you have difficulty in solving any problem, inform the instructor at the beginning of the lecture.

**Library Usage:**

There are several books on the subject of Engineering Economy housed in Waldo Library containing numerous solved problems. Four of these books have been identified under References [with the call numbers]. It is strongly recommended that the student use at least these books to study the solved examples. This will greatly enhance his/her ability to analyze problems and determine the approach to be taken for solving any given problem.

**Spreadsheet Assignments:**

Four computer assignments will be given during the semester on the dates specified above and you must use EXCEL to solve each assignment. These computer assignments must be completed and submitted by 12:00 midnight on Thursday of the week in which the assignment is given. Any assignment submitted from 12:01 a.m. Friday onwards WILL RECEIVE A 'ZERO'. You will submit the assignment as an attached file by an email to the instructor with a copy to yourself. Save your email copies as proof that you have submitted the assignment. The assignments will be graded and only those not receiving full points on the assignment will receive feedback by email from the instructor. Submission of all assignments is mandatory to pass the class.

**Quizzes:**

A total of five unannounced quizzes will be given. These will be administered during the first 15 minutes of a class period. If you are late, you will not be given additional time and if you are absent, you will receive a zero for that quiz. The four highest scores (of the five total) will be counted towards the grade. A quiz will not be given if an exam is scheduled on that day.

**Evaluation Distribution:**

1.	Examination # 1	25%
2.	Examination # 2	25%
3.	Final Exam.	30%
4.	Quizzes	10%
5.	Spreadsheet Assignments	10%
	<b>Total</b>	<b>100%</b>

**Grading Scale:**

The following grading scale will be used in my class:

**A** (91 – 100 ), **BA** (88 – 90 ), **B** (81 – 87), **CB** (78 – 80), **C** (71 – 77), **DC** (68 – 70), **D** (60 – 67), **E** (below 60).

Attendance at all exams is necessary and no make-up exams will be given. All examinations, quizzes, and spreadsheet assignments will be graded on a numerical scale. At the end of the semester, the grades will be added up for all the items (with the appropriate weights) and then converted to a letter scale to determine the final course grade.

**Performance Criteria<sup>2</sup>:**

- Objective 1. Formulate and solve time value of money problems [1, 2, 3, 4, 5].
- Objective 2. Identify relevant and pertinent data and apply net present value and internal rate of return methods to solve economic problems [2, 3, 4, 5].
- Objective 3. Be able to evaluate multiple alternatives to determine the best alternative using several different methods [2, 3, 4, 5].
- Objective 4. Have the ability of using computerized spreadsheets for analyzing and evaluating a variety of financial problems [5].
- Objective 5. Correctly identify the consequences of inappropriate economic decisions, with respect to after tax income [3, 4].
- Objective 6. Correctly identify how engineering economics decisions impact individuals, companies, and society in general [2, 3, 4].

<sup>2</sup>Numbers in brackets refer to the method of evaluation as listed in the previous section.