IENG 377 Engineering Economy

Section 1	**3:30-4:45 TU & TH**	**SAS – 1021**
Section 2	**12:30-1:45 TU & TH**	**MRB - 113**

Number of Credit Hours – 3
Prerequisite: Engineering background or consent

Instructor: Dr. Robert C. Creese
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Office Hours: By Appointment

Textbook: **Strategic Cost Fundamentals** for Designers, Engineers, Technologists, Estimators, Project Managers, and Financial Analysts - Morgan & Claypool Publishers (2018) (lower cost due to no commercial art work and no individual tables)
A basic calculator(non-programmable) will be required for exams and spreadsheets will be needed for some homework problems.

Course Objective:
Engineering Economy provides a systematic framework for evaluating the economic aspects of competing design solutions.

In this course the students will have understood the concepts of financial statements, cash flows and profits, cash flows before taxes, depreciation and depletion, cash flows after taxes, loans and loan interest, evaluation of alternatives, and work on a multidisciplinary team project.

IMSE Designated Outcomes and Key Abilities for IENG 377:

IMSE Outcome # 1: Students will have acquired the ability to use modern and classical Industrial Engineering methodologies such as operations research, manufacturing systems, computer programming and simulation, production systems, human factors and ergonomics, engineering statistics and quality control, and **engineering economics.**

The designated key abilities for this course for the aforementioned outcome include an understanding of the following items.

1. Income Statement and Balance Sheets
2. Cash Flow Equivalence
3. Depreciation and Depletion
4. Loans, Principal & Interest
5. After Tax Economic Analysis
6. Evaluation of Multiple Alternatives

IMSE Outcome # 4 Students will have acquired the ability to work individually, on teams and on multidisciplinary teams to identify, formulate, and solve problems using industrial engineering knowledge skills and tools. The designated key abilities for this course for the aforementioned outcome includes an understanding of the following terms:

1. Work effectively in a multidisciplinary team

Course Schedule, Topics, Text Chapters, & Assigned Problems

Homework will be collected at the start of class on Tuesday for that assigned the previous week. Home will be submitted by team and teams should divide into two groups to determine solutions, compare the solutions, and then submit the homework with a cover page including the names &. signatures of the team members who worked on the homework.

Week	Date(s)	Topic(s)	Chapters	Homework
1	22-Aug	Introduction, Text Book, Schedule, Instructor		Get Textbook
2	Aug 27 & 29	Fundamental Terms, Financial Statements, Purcell Diagram-Class Seating & Team Formation	1 & 2	1: 1-5,7,8 & 2:1,2
3	Sept 3 & 5	Costs & Cost Estimating, Breakeven Analysis	3 & 4	3:3,4,7-10 4:2,8,9
4	Sept 10 & 12	Earned Value Management, & Definitions, Terms and Concepts for Technical Evaluations	5 & 6	5:1-3,5,6 6:1-10,12
5	Sept 17 & 19	Ch 6 Continuation & Project Team Formation		
6	Sept 24 & 26	Basic Math Relationships to Derive Engineering Economic Expressions, EXAM 1 on Ch 1-6	Ch 7 EXAM 1	7:1-11 **Sept 26**
7	Oct 1 & 3	Exam Review & Basic Economic Factors and Equations	Ch 8	8:1-6
8	Oct-08	Basic Economic Factors & Equations	Ch 8	8:7-12
9	Oct 15&17	Gradient Economic Factors and Equations	Ch 9	9:1-13,19 20
10	Oct 22 & 24	Depreciation Terms, Methods, and Systems	Ch 10	10:1-6,8,9
		Impact of Loans on Cash Flows, Taxes & Profits	Ch 11	11:1-5
11	Oct 29 & 31	Depreciation & Loans, EXAM 2 on Ch 7-11	EXAM 2	**Oct 31**
12	Nov 5 & 7	Exam Review & Basic Project Evaluation Tech.	Ch 12	12:1-6
13	Nov 12 & 14	Advanced Project Eval Techniques	Ch 13	13:1-7
		Introduction to Risk Analysis	Ch 14	14:1-4
14	Nov-19	Introduction to Risk Analysis	Ch 14	14:5
		Risk Analysis with Probability Considerations	Ch 15	15:1,2
15	Nov 20-Dec 1	Fall Break		
16	Dec 3 & 5	Risk Analysis with Probability Considerations, Project Reports & Presentations- Reports Due Dec 5	Ch 15	15:3-8
17	Dec 10 & 12	Project Reports & Presentations		
18	Dec 16-20	**Final Exams** **Section 1, Wednesday Dec 18 @ 8:00 am** **Section 2, Friday Dec 20 @ 11:00 am**		

Grading Scale	Grading	Percent
A ≥ 90	2 Exams @ 25%	50
80≤B<90	Team Homework 8%	8
70≤C<80	Team Project 12%	12
60≤D<70	Final Exam @ 30%	30
F<60	**Total**	**100**

Note: Exams will be closed book & without a computer, but exams will require the use of a basic non-programmable calculator that can perform exponential calculations.

Team Formation

The engineering economy project is a group project that involves using engineering economic relationships and cost fundamentals to solve an engineering management case. The case will reflect a multidisciplinary situation to those encountered by engineers within the first three to five years of their professional careers. Students will work on the project in groups of four to six members (7 members upper limit if class size is greater than 100) and must contain members from at least two CEMR departments and at least three different majors. Milestones for the project are:

1. Submit a proposal package that includes the team and team members – due end of week three
2. Submit a proposal package that describes the model to be developed and what scenarios will be investigated in an Excel Spreadsheet model – due end of week 13
3. Submit final Report on Dec 5th including copy of Excel Spreadsheet.
4. Give a 5 minute Power Point presentation of the team's assumptions, flow chart of the model developed, alternatives considered, analysis, and recommendations. Each member must present at least one Power Point slide.

Academic Dishonesty

Acts of academic dishonesty, such as cheating, plagiarism, assisting others in cheating may result in a failing grade (F) and be reported to the student's Department Chair.

Statement on Social Justice

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestion as to how to further a positive and open environment in this class will be appreciated and given serious consideration.

Statement of Disability Accommodation

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (304-293-6700).

Statement on Attendance

If a student is absent without an acceptable excuse on the day of a scheduled exam, you must obtain prior approval from me unless you are incapable of calling, e-mailing, or otherwise getting in contact with me. Otherwise you will receive a zero on the exam. I excuse absences due to sanctioned WVU events where your participation is required (such as a member of a WVU sport team or at a national professional society meeting). For scheduled events, one should arrange to take the test prior to the absence.

Errors

Since this is a new textbook, I would appreciate the reporting of errors that you find so they may be removed in future editions of the book. Make a list of your suggested corrections and submit it in on the last day of classes.

Prepared by:

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Professor Emeritus – IMSE
August 2019