Syllabus – ISE 460: Engineering Economy

Summer 2017, Monday 6:00pm – 9:10pm (OHE 100B)

Instructor	Erich Kreidler	Phone	949.278.7001 (appointment required)
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Office Hours	Mondays 4:30pm – 6:00pm or by appointment		

TA	TBD	Phone	TBA
Office	TBD	E-mail	TBD
Office Hours	TBD		

Course Description:

Engineering Economy is the process of making rational and intelligent decisions associated with the allocation of scarce resources in circumstances in which alternatives can be enumerated. This course provides engineers with skills to assess the costs and benefits of engineering investments, such as product and technology development programs and capital purchases. It also presents the framework for selecting among alternative designs, for managing technologies over their lifecycles, and for evaluating the finances of new ventures/projects.

Objective

To learn about the dimensions of evaluating economic alternatives. As an engineer you must be able to intelligently assess and evaluate choices. As important, you must be able to "sell" your ideas to management, or if you are a manager, evaluate options systematically to make good decisions. The course will enable you to:

1. Understand the concepts of the time value of money and interest rates
2. Analyze cash flow series using present worth, annual equivalent worth and internal rate of return methods of assessment.
3. Develop cash flow sequences that include the effects of taxes, inflation, depreciation, loan principle payments and loan interest payments.
4. Assess alternatives and cash flows under risk with varying parameters.

Pre-requisites:

Basic computational skills with spreadsheet modeling in Excel. Upper division standing in any engineering major. Other students may be admitted on a case-by-case basis.

Materials:

Fundamentals of Engineering Economic Analysis, 1st Edition by White | Grasman | Case | Needy | Pratt. Publisher: Wiley; ISBN: 978-1118414705. Available in the bookstore AND directly from Wiley.

- *Wiley Plus Subscription (online)*. We will use this framework for homework assignments, Excel formulas, data, videos and other supplemental materials provided by Wiley. Our WileyPlus section is here.

Note: You can also get an evaluation version of the book, where you can start with a 14-day grace period. Afterwards, you must activate it for full access to accomplish specific homework assignments.

Grading

Participation: 10%. This includes class participation, email interaction with the instructor, TA and other students (e.g. team work) as well as the discussion forum.

Homework assignments: 40%. Homework must be turned in at the specified due date prior to the beginning of class. No late assignments will be accepted. Homework assignments are to be done individually. If you discuss or collaborate on a homework assignment, you must indicate that on your paper. Do not give your file to anyone, or use someone else's file. Generated data and essay questions must be unique to each person.
Finally, show your work!!! If the answer to a question is given in the back of the book, don't just copy it; show how you got it.

Note: One homework assignment (lowest grade) may be dropped.

Midterm Exam: 15%. The midterm will cover all the materials discussed until the prior lecture.

Final Exam: 15%. The final exam will be comprehensive of all the course materials, with an emphasis on the second part of the course and guest lectures. The university schedules the final exam date and time. Please do not request an alternate date, as none can be accommodated.

Quizzes: 20%. Quizzes will be administered randomly throughout the semester (expect at least a quiz every week) and are intended to replace midterm examinations given the short semester. Quizzes will consist of questions about readings or assignments due on a given day. Quizzes cannot be made up and will typically take 15 minutes. *DEN Participants*: You will have a 48-hour window to submit your quiz to the DEN office for grading.

Note: One quiz (lowest grade) may be dropped.

Discussion Sessions:

Regular attendance to TA-led discussion sessions is encouraged as will contain integral ingredients of the class materials. Our lab sessions will take place on Tuesdays from 5-5:50pm at OHE 100B

Attendance:

Regular class attendance is strongly encouraged and recommended, but not mandatory.
The fine print: Not showing up to class may have an adverse effect on your class participation.

Quality Expectations:

Professional deliverables are expected at all times, both for content and presentation. This means that all the homework, project, papers and other artifacts must be prepared using a word processor, spreadsheet or any other relevant computer software. The assignments should be as professional in appearance as if you were preparing reports at work or for publication. Clearly label the problem number and your conclusions for each problem, followed by the supporting calculations. The problems must be in the order assigned.
Make sure all documents have at a minimum: Your name and/or your team member names, title, no spelling mistakes, date – and most important, a professional analysis, conclusions and/or recommendations.

Online Learning Portal: Desire2Learn (D2L)

The assignments, handouts, lecture notes, team rosters and other class information will be posted in our Desire2Learn platform: https://courses.uscden.net. All students are expected to be able to access information from here. In addition, we will complement Blackboard with WileyPlus' online environment.

Peer Evaluations

Peer evaluations are an integral part of the class. It enables each student to rate the performance of his or her peers as well as receive a performance rating. Peer evaluations are used to measure participation and determine the final grade for the team project.

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 these academic integrity standards as they will be strictly enforced throughout the semester.

Disability Services and Programs:

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 me or to the TA as early in the semester as possible. DSP is located in STU 301 and is open 8:30am – 5:00pm Monday through Friday. The phone number for DSP is 213.740.0776.

Note: This syllabus is subject to change as announced in class.

Course Schedule:

	Date	Assignment	Topic	Reading
1	5/22/17		1. Introduction, discuss class expectations, learning objectives and the overall scope for the course 2. Engineering Economy Principles and Wiley Plus Tutorial 3. Discuss SEAT 7-step framework (systematic economic analysis techniques) 4. Cash Flow Diagrams, conventions 5. Single cash flows • Future worth • Present worth	
2	5/29/17	HW1 (student survey due on 6/02/17)	• Multiple Cash Flows • Irregular series • Uniform series of cash flows • Gradient Series • Geometric Series	Chapter 1
3	6/5/17		1. Compounding Frequency 2. Periodic Interest Rate Approach 3. Effective and nominal interest rates 4. Equivalence 5. Interest Payments and Principal Payments 6. Bond Investment 7. Variable Interest Rates	Chapter 2 Chapter 3
4	6/12/17	HW2	1. Present Worth – Comparing Alternatives • Methods of comparing economic worth • Ranking and incremental methods • Equivalence of methods • Before-tax vs. After-tax analysis • Equal vs. Unequal lives • A single alternative 2. Present Worth Calculations 3. Benefit-Cost analysis 4. Discounted Payback 5. Capitalized Worth	Chapter 4
5	6/19/17	HW3	**Midterm Exam**	
6	6/26/17		1. Annual worth • Single alternative • Multiple alternatives 2. Future worth • Single alternative • Multiple alternatives • Portfolio analysis 3. Class exercises, examples	Chapter 5
7	7/3/17	HW4	Independence Day – Holiday (but still homework is due, sorry)	
8	7/10/17		1. Rate of Return	Chapter 6

			2. Internal Rate of Return • Single alternative • Multiple alternatives 3. External Rate of Return • Single alternative • Multiple alternatives	
9	7/17/17	HW5 HW6	1. Replacement analysis • Fundamentals • Cash flow and opportunity cost • Optimum replacement interval 2. Depreciation • Straight line and declining balance • Modified accelerated cost recovery system (MACRS)	Chapter 7 Chapter 8
10	7/24/17	HW7 HW8	1. Income Taxes • Corporate income taxes • After-tax analysis using retained earnings • After-tax analysis using borrowed capital 2. Inflation • The meaning and measure of inflation • Before-tax analysis • After-tax analysis • After-tax analysis with borrowed capital	Chapter 9 Chapter 10
11	7/31/17	HW9 HW10	1. Break Even, sensitivity analysis and risk analysis 2. Class summary, Final Exam Discussion	Chapter 11
12	8/7/17	HW11	*****Final Examination 6:00pm-9pm**	

Assignment Name and Description

Homework #1: • Assignment zero, and Chapter 01 Homework from Wiley Plus
Homework #2-11: • Chapter 02-11 Homework from Wiley Plus as specified above.
Group Project (10% of your grade): • Will be uploaded to Desire2Learn