

ENGR 360 Economic Analysis

Instructor

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Spring Semester 2018

Class time: Mon, Wed, Fri 12:30 pm – 1:20 pm
Class location: Albertson Building 101
Instructor's office hours: M, T, W 11:00 –12:00.
Or you can email me and I will set aside time.

Course Description

Economic analysis and comparison of engineering alternatives.
2 credits, prerequisite: junior standing or permission from the instructor.

Learning Objectives

Students who successfully complete this course will be able to:

1. Conduct economic analysis for capital investment decisions faced by engineers;
2. Compare alternatives using the following traditional economic analysis methods: a) present worth analysis, b) annual worth analysis, c) future worth analysis, d) internal rate of return analysis, and e) benefit-cost analysis;
3. Calculate capitalized worth;
4. Construct MARR choice tables;
5. Consider non-monetary consequences when comparing alternatives by using the following multiattribute analysis methods: a) dominance, b) satisficing, c) lexicography, d) non-dimensional scaling, and e) additive weight technique;
6. Consider risk and uncertainty when comparing alternatives through: a) breakeven analysis, b) sensitivity analysis, c) scenario analysis, and d) probabilistic analysis;
7. Calculate straight-line and MACRS depreciation;
8. Understand and appreciate the role of economic analysis in decision-making.

This course will prepare students for the engineering economy section of the Fundamentals of Engineering (FE) exam.

Class Materials and Website

The syllabus and schedule might change during the semester. The current version and additional materials are online:
<http://www.webpages.uidaho.edu/~mlowry/Teaching/syllabus.engr360.pdf>

Required Textbook

Engineering Economy, 16th Edition (2014, Pearson) by W. Sullivan, E. Wicks, and C. Koelling
<http://www.pearsonhighered.com/educator/product/Engineering-Economy/9780133439274.page>

Grading Criteria

Grades are posted on <https://bblearn.uidaho.edu/> and will be assigned according to the following criteria:

Participation in class or my office	2	points	1%
6 Homeworks	36	points	20%
3 Projects	30	points	17%
3 Exams	108	points	61%
<i>Total possible</i>	176	points	

***I will not accept late homework or projects. Homework and projects are due at the beginning of class.**

****Using homework, projects, or exams from previous semesters to study for exams, to help complete your assignments, or for any other purpose whatsoever is strictly prohibited. Violators will be failed. ****

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Schedule

Session	Date	Reading*	Discussion	Due*
	W 10-Jan		<i>No class, Instructor is at a conference</i>	
1	F 12-Jan	1.1 -1.6	Introduction	
	M 15-Jan		<i>No class, MLK Day</i>	
2	W 17-Jan	2.1, 4.1 - 4.5	CFDs and Time value of money	
3	F 19-Jan	4.6 - 4.9	Single payment and uniform series formulas	
4	M 22-Jan	4.11 - 4.12	Equivalence and gradient formulas	HW1
5	W 24-Jan	4.15 - 4.16	Nominal interest and continuous compounding	
6	F 26-Jan	4.17 - 4.19	Using Excel and Amortization	
7	M 29-Jan	8.1 -8.2	Inflation	HW2
	W 31-Jan	FE Ch. 51	Exam 1	P1
8	F 2-Feb	5.1 - 5.5, 6.1 - 6.4	Present, annual, and future worth analysis	
9	M 5-Feb	5.3.3	Capitalized worth	
10	W 7-Feb	5.6, 6.4.2	Internal rate of return analysis	HW3
11	F 9-Feb	5.6	Graphical analysis and MARR choice tables	
12	M 12-Feb	10.1 - 10.11	Benefit-cost analysis	
13	W 14-Feb	13.1-13.5	Project prioritization	HW4
	F 16-Feb	FE Ch. 53	Exam 2	P2
	M 19-Feb		<i>No class, President's Day</i>	
14	W 21-Feb	14.1 - 14.5	Non-monetary consequences	
15	F 23-Feb	14.6 - 14.8	Multiattribute analysis methods	
16	M 26-Feb	11.1 - 11.2	Breakeven analysis	
17	W 28-Feb	11.3 - 11.4	Sensitivity analysis and scenario analysis	HW5
18	F 2-Mar	12.1 - 12.7	Probabilistic analysis	
19	M 5-Mar	7.1 - 7.4	Taxes and depreciation	
20	W 7-Mar	7.6	Income Tax	HW6
	F 9-Mar	FE Ch. 52	Exam 3	P3

* All Readings, HW (homework), and P (projects) are due before class begins. *I will not accept homework or projects that are late.*

Homework

Some problems are easy and some are difficult, all are worth one point. For full credit, your work must be uncluttered, clearly written, and well organized; use a box, underline, or arrow to indicate the final solution. Do NOT email any part of HW1-HW5 (unless EO). Provide a hardcopy summary solution for all Excel problems (copy and paste).

HW 1. 4-1, 4-11, 4-13, 4-30, 4-34, 4-49

HW 2. 4-81, 4-94, 4-103, 4-118, 4-120, 4-132

HW 3. 5-4, 5-17, 5-27, 6-4, 6-7, 6-13 6-7 ignore IRR. 6-13 do EW ignoring "incremental" & note I called it *g* for *f*

HW 4. 5-64, 6-25, 6-71, 6-79, 10-11, 10-29 provide choice table for 6-71

HW 5. 14-10, 14-13, 11-1, 11-19, 11-26, 11-27 11-19b and 11-26 do 9 scenarios. 11-27 submit spiderplot

HW 6. [From handout](#): H6-1, H6-2, H6-3, H6-4, H6-5, H6-6 Submit hard copy summary and email to me your excel file.

Projects

Note that 4 out of 10 points on each project are for the quality of your report. Please refer to the example on the class webpage or consult the instructor for information about making professional, high quality reports. You can name and organize the sections of your report any way you want, but at least include an "Introduction" and "Conclusion."

[P1 Buying a house.pdf](#)

[P2 Deciding to buy or rent.pdf](#)

[P3 Choosing the best.pdf](#)

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Additional Material

Interest Tables

[Interest Tables pdf](#) (from a different textbook)

Project Report Example

[Professional Report Example.pdf](#)

Homework 6

[Probabilistic analysis handout.docx](#)

[HW6 problems.pdf](#)

[MCSim Instructions.doc](#)

[MCSim.zip](#)

You can also get the MCSim.xla add in from the creators at this web address:

<http://www3.wabash.edu/econometrics/EconometricsBook/Basic%20Tools/ExcelAddIns/MCSim.htm>

Excel Files

[Lecture excel files.zip](#)

Fundamentals of Engineering Readings and Practice Exams

[FE Ch. 51.pdf](#)

[FE Ch. 52.pdf](#)

[FE Ch. 53.pdf](#)

[FE Diagnostic.pdf](#)

Formula sheet you can use during the exams

[Engineering Economics Excerpt from FE Reference.pdf](#)

More Resources

[USDOT Economic Analysis Primer.pdf](#)

[Sullivan Powerpoint slides.zip](#)

PBS "The Ascent of Money" movie series

<http://www.pbs.org/wnet/ascentofmoney/>

Extra Information for Engineering Outreach

- Sometimes live lectures go over or end early, so check preceding and subsequent recordings for specific topics.
- Submit homework and projects on the due date on the syllabus by 1:30pm PST (in other words I should have your assignment by the time I get to my office after teaching the on-campus class). You can scan and email or if you are in Moscow you can send or drop assignments in my mailbox on my door or my mailbox in the CE office.
- Submit exams by 5:00pm PST the day after the exam occurs for the on-campus students. You will have a 3 day window to take the exams.
- Class participation points are earned through email correspondence (At least once during the semester send an email to ask me a question so that I know you're interested and engaged).
- Be sure to print and bring the formula sheet for the exams (Excerpt from FE Reference above)
- On-campus students can request to view a limited number of recorded sessions for \$10 each.

Student Conduct and Policies:

Each student is expected to assist in maintaining a classroom environment that is conducive to learning. In order to assure that all students have the opportunity to gain from time spent in class, unless otherwise approved by the instructor, students are prohibited from engaging in any other form of distraction. Inappropriate behavior in the classroom shall result, minimally, in a request to leave class.

- **Attendance.** Attendance at all course activities is expected. Make-ups will only be given with valid medical excuses or for documented extenuating circumstances. Missing more than one period in this class is considered excessive. Lastly, you are expected to arrive to class on time.
- **Deadlines.** Assignments must be turned in by the due date and time unless prior arrangements have been made. Late assignments will not be graded unless prior permission has been granted.
- **Classroom Engagement.** Use of personal phones, music players, tablets, iStuff, etc. is not permitted in class. This includes texting. Please place your ringer on silent before entering class. Reading or working on other materials while in this class is strongly discouraged.
- **Student Conduct:** All students are expected to honor the UI Student Code of Conduct. Violations include, but are not limited to: copying homework assignments completed by others, plagiarism, and cheating on exams. Please be aware that any violation of the UI Student Code of Conduct may result in a course grade of "F". [<http://www.uidaho.edu/DOS/judicialaffairs/studentcodeofconduct>]
- **Plagiarism:** Plagiarism occurs when you use but do not cite someone else's work, even if it is re-worded, or by not indicating that a passage (paragraph, sentence, or even a small part of sentence) is directly quoted even if the reference is cited. Following the structure or organization of someone else's work is also plagiarism. Students caught plagiarizing will be given a grade of "F".

Religious Accommodation:

A student who observes a religious holy day should make that intention known to the instructor prior to the absence.

University of Idaho Classroom Learning Civility Clause:

In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (885-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (885-4285).

DISABILITY SUPPORT SERVICES REASONABLE ACCOMMODATIONS STATEMENT:

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services, located in the Idaho Commons Building, Room 306, in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course. Contact DSS at 208-885-6307, email dss@uidaho.edu or go to www.uidaho.edu/dss.

London, September 19, 1772

Dear Sir,

In the Affair of so much Importance to you, wherein you ask my Advice, I cannot for want of sufficient Premises, advise you what to determine, but if you please I will tell you how.

When these difficult Cases occur, they are difficult chiefly because while we have them under Consideration all the Reasons pro and con are not present to the Mind at the same time; but sometimes one Set present themselves, and at other times another, the first being out of Sight. Hence the various Purposes or Inclinations that alternately prevail, and the Uncertainty that perplexes us.

To get over this, my Way is, to divide half a Sheet of Paper by a Line into two Columns, writing over the one Pro, and over the other Con. Then during three or four Days Consideration I put down under the different Heads short Hints of the different Motives that at different Times occur to me for or against the Measure. When I have thus got them all together in one View, I endeavour to estimate their respective Weights; and where I find two, one on each side, that seem equal, I strike them both out: If I find a Reason pro equal to some two Reasons con, I strike out the three. If I judge some two Reasons con equal to some three Reasons pro, I strike out the five; and thus proceeding I find at length where the Ballance lies; and if after a Day or two of farther Consideration nothing new that is of Importance occurs on either side, I come to a Determination accordingly.

And tho' the Weight of Reasons cannot be taken with the Precision of Algebraic Quantities, yet when each is thus considered separately and comparatively, and the whole lies before me, I think I can judge better, and am less likely to take a rash Step; and in fact I have found great Advantage from this kind of Equation, in what may be called Moral or Prudential Algebra.

Wishing sincerely that you may determine for the best, I am ever, my dear Friend,

Yours most affectionately

B. Franklin