

ENGR-155: Engineering Economic Analysis

UC Merced Fall 2018

Class Meets: Mondays & Wednesdays

Time: 12:00-1:15PM

Class Location: COB2 Room 140

Professor: Dr. Josué Medellín-Azuara

(jmedellin-azuara@ucmerced.edu)

Office: SE1 Room 214

Office Hours: Mondays 3-5 pm or by appointment only

Teaching Assistants

Louis Amegbletor

Julia Burmistrova

Shirin Mehrazi

Check CatCourses for TA's Office Hours time and location

Course Description:

The application of economic principles to the problems of engineering is the main focus of this course. During the semester, student will be introduced to the mathematical and conceptual basis on which project analysis is built. The techniques and tools necessary for making informed financial decisions in engineering practice will be discussed. Topics such as time value of money, interest, equivalence, cost-benefit analysis, depreciation, taxes, cash flow, and financial risk will be covered.

Required Materials:

- Textbook: Chan S. Park (2018). *Fundamentals of Engineering Economics* (4th Edition), Pearson Publishers.
- Clicker
- Scientific Calculator

*Students are encouraged to bring their laptops to class and also enroll in Excel Basics Workshops offered by the School of Engineering.

Course Learning Outcomes

By the conclusion of this course, students will be able to:

- Apply the basic theory and concepts of economics to analyze projects.
- Systematically make the informed, practical, and consistent decisions when evaluating projects.
- Demonstrate critical thinking when evaluating the economic aspects of different alternatives.
- Effectively communicate their thought process and final decisions
- Proficiently use the mathematical tools available within MS Excel to evaluate economic factors of a project.

Grade Distribution:

Participation	30 %	<u>2</u> point x <u>15</u> weeks = <u>30</u> points
Homework (5)	15 %	<u>3</u> points x <u>5</u> = <u>15</u> points
Midterm	15 %	15 points
Final	15 %	15 points
<u>Project</u>	<u>25 %</u>	<u>25</u> points
Total	100% or	100 points

Grading: The breakdown for grades is as follows (all numbers as percentages and absolute scale):

Excellent	A+ 95-100	A 93-94	A- 90-92
Good	B+ 87-89	B 83-86	B- 80-82
Fair	C+ 77-79	C 73-76	C- 70-72
Not Passing	D+ 67-69	D 63-66	D- 60-62
Not Passing	F 0-59		

Assignment Descriptions

Participation refers to *active* participation during class. This may be in the form of asking questions, responding to questions with a clicker, and/or working with group members and solving unannounced quizzes. Each week you can make up to two points in participation.

Homework: Across the semester you will be assigned an activity to complete outside of class. These assignments are related to, and facilitate learning of, the major topics we will be discussing.

Team Project: The purpose of the final project is to play the role of a group of consultants for an entity in solving a strategic economics engineering decision. Decisions include but are not limited to new product or service, equipment or process selection, cost reduction, equipment replacement, service or quality improvement. Entities can be a private firm, a local government agency, a special district, a non-profit or other sort of organization. The components of the project are: a selection of topic, a progress report, a spreadsheet and an individual final report. Further details will be provided on the third week of classes.

Class Expectations/Policies:

- Be on time. Attendance does not equal participation. In order to earn your participation points, you must ask and/or answer questions and engage in discussions. Clickers and other means to record for participation will be employed.
- Use of cellphone or other disruptive activities is not allowed. Please silence your phones during class and step outside if you need to accept an emergency call. Filming or recording class sessions requires consent from the instructor.
- All assignments (e.g., homework, reports, etc.) must be submitted in hard copy unless otherwise indicated.
- Late assignments receive **one third** of the credit, except in the case of a medical emergency. In such a case, a doctor's note or medical release or other documentation **must** be provided. Assignments can be turned in early.
- Exams may not be missed for any reason except for a medical emergency, in which case, a doctor's note or medical release **must** be provided.
- The preferred form of communication is CatCourses messaging.
- The syllabus may change, so please be aware of announcements in CatCourses.

Students with Disabilities

The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent learning, accessibility and diversity. The instructor is available to discuss appropriate academic accommodations that may be required for students with disabilities. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate

accommodations. Requests for academic accommodations are to be made during the first three weeks of the semester, except under unusual and/or unforeseen circumstances. If you need assistance or have questions, please contact Student Accessibility Services on campus.

Academic Integrity

- Every student in this course is expected to abide by the University of California Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
- Plagiarism is a type of academic misconduct. Please review the U.C. Merced Library webpage to learn more about what plagiarism is and how to avoid it.
http://libguides.ucmerced.edu/citing_sources/citing-sources_avoiding-plagiarism
- The U.C. Merced Library link above also contains information on citations.
- Here is information on common types of plagiarism:
<https://www.bowdoin.edu/studentaffairs/academic-honesty/common-types.shtml>
- References, also referred to as citations, are ways to document where you obtained content used in your work. This course will use the APA Style for references. You can locate more information on how to create references using the APA format using the Purdue Owl (Online Writing Lab).
https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html
- If you have any questions about plagiarism that arise, and you are uncertain, feel free to inquire with me about it.

Diversity and Inclusion

This class is conducted in accordance with the UC Merced Principles of Community, which includes the recognition and celebration of all identities, values, and beliefs. Discrimination on the basis of race, religion, sex, sexual orientation, gender identity, national origin, citizenship, documented status, or any other social identity will not be tolerated. All students are invited to discuss any situation they perceive as harmful or threatening with the instructor in the class or during office hours.

Acknowledgments

I am thankful for the great advice received from the Center for Engaged Teaching and Learning at UC Merced. Assistance of Selina Davila-Olivera in preparing class material is acknowledged. The instructor is also thankful for useful feedback from past students in the class, and to Dr. Alejandro Gutierrez for sharing past class material.

Course Schedule (subject to change please consult in CatCourses)

Week	Topic	Assignment	Due Date
8/20-8/26	Introduction/Syllabus. Overview and strategies for engineering economic decisions.	Read syllabus. Skim Chapter 1.	
8/27-9/2	Time value of money. Economic equivalence. Simple and compound interest.	Read Chapter 2.	
9/3-9/9	No Class Monday- Labor Day Topics on chapter 2. Use of Excel and Factor Tables.	Read Chapter 2. Homework 1 Assigned Final Project guidelines presented	Homework 1 due 9/12
9/10-9/16	Money Management. Interest rates Debt management. Inflation, equivalence under inflation.	Read Chapters 3 and 4. Homework 2 Assigned Project proposal and Homework 1 due	Project proposal due 9/12 Homework 2 due 9/19
9/17-9/23	Present-worth analysis. Screening methods. Comparing mutually exclusive projects.	Read chapter 5 Homework 2 due	Homework 2 9/19
9/24-9/30	Annual equivalence analysis. First review.	Read chapter 6. Homework 3 assigned.	
10/1-10/7	Rate of return analysis and first review.	Read chapter 7. Homework 3 due on 10/10 First exam- Monday 10/8	Homework 3 due 10/10
10/8-10/14	MIDTERM EXAM. Cost benefit analysis.	Read Chapter 8 Homework 3 due 10/10	10/10
10/15-10/21	Cost-benefit analysis continued. Depreciation and Taxes	Read chapter 9. Homework 4 assigned. Final Project Progress Report due 10/15	Progress Report due 10/15

Week	Topic	Assignment	Due Date
10/22-10/28	Cash-flow analysis. Incremental cash flow. Effects of inflation.	Read chapter 10. Homework 4 due 10/24	10/24
10/29-11/4	Project uncertainty. Project risk. Probability analysis.	Read chapter 11. Homework 5 assigned due 11/18	
11/5-11/11	Replacement decisions. Economic service life.	Read chapter 12.	
11/12-11/18	NO CLASS MONDAY Discussion in class final project, use of tools.	Homework 5 Due 11/18	11/18
11/19-11/23	Team Project Work NO CLASS WEDNESDAY.	Thanksgiving week. Work on project.	
11/26-12/2	Economic analysis project in-class presentations	Teams present final projects in class	
12/3-12/9	Final exam review. Work on final project. Evaluations.	<i>Project</i>	12/8 before midnight
12/14	FINAL EXAM 8AM-11AM COBS2 Room 140		