

IENG 377: Engineering Economy

Semester: Spring 2020

No. of credit hours: 3

Prerequisites: Engineering background or consent

Section / CRN: 001 / 12047

Class schedule: 10:00 – 10:50 AM / Monday, Wednesday, and Friday

Class location: Bennett Tower - Room G05

Course description: 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.

Textbook: Strategic Cost Fundamentals for Designers, Engineers, Technologists, Estimators, Project Managers, and Financial Analysts - Morgan & Claypool Publishers
As a WVU student you can get a free PDF copy of this book from the library:

<https://libwvu.on.worldcat.org/oclc/1041817820>

If you prefer paperback version, you can order this book at 25% discounted price using the code “WVU25”:

<https://www.morganclaypool.com/doi/abs/10.2200/S00846ED1V01Y201804ENG032>



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Office hours – Tuesday 11am - Noon / Thursday 1pm - 2pm

Student feedback: <https://forms.gle/tmiecmTEXkvFS29C8>

Expected Learning Outcomes:

- Student will be able to estimate benefits and costs and apply engineering economy formulas to determine if an investment is a good one for the organization. The student will also be able to apply engineering economy formulas to pick the best investment out of multiple alternatives within constraints.
 - ABET Outcome 1: An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Students will be able to demonstrate their ability to make an Engineering Economy case study presentation.
 - ABET Outcome 3: An ability to communicate effectively with a range of audiences.
- Students will be able to be part of a multidisciplinary team to solve an engineering economics problem.
 - ABET Outcome 5: An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Grading:

Exam 1	25%
Exam 2	25%
Final Exam	25%
Group Homework	12%
Group Project	13%
Attendance/Pop Quizzes (bonus)	3% (borderline grading)

Tentative Grading Scale:

90 – 100	→	A
80 – 89	→	B
70 – 79	→	C
60 – 69	→	D
0 – 59	→	F

Exams: You are allowed to bring a one-page (one-sided, letter size) formula sheet for each exam. You need to bring a calculator for the exams. All work must be shown in order to receive full credit. There will be **no makeup exams**. However, if you miss one of the first two exams due to serious illness (documented) or serious family emergency (documented), then you will take a **cumulative final exam**. More specifically, if a student misses an exam, the student must email me explaining why they will miss (or have missed) the exam within 24 hours before (or after the exam). There is no makeup (cumulative final) exam without a proper and certified excuse (sent to me via email). The regular final exam will be a 75-minute exam covering the most recent topics. In contrast, the **cumulative final exam** will be a 2-hour exam covering all topics. If you miss the first two exams, you will receive a zero on one of the exams and will need to take the cumulative final exam to make up for the other one. If you miss only the final exam, you will be required to take the cumulative final exam. **Exam dates are fixed and cannot be changed** (unless there is an unavoidable circumstance such as university announced adverse weather condition). Exam 1: 17-Feb, Exam 2: 25-Mar, and Final: 7-May 2020.

Group Homework Assignments: Homework assignments will be given to re-enforce your understanding of the concepts presented in class as well as to prepare you for exams. There will be

around eight homework assignments throughout the semester. Late submissions will not be accepted. Work should be submitted at the beginning of the class period.

Group Project: It will involve the use of 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. Project will be assigned around the fourth week of class, with specific milestones.

Group Formation Rules: Students will work on the project and homework assignments in groups of six members and should contain members from different majors. Students need to finalize their group by the end of the second week.

Attendance/Pop Quizzes: There will be a surprise quiz at the end of a few of the lectures. The quiz questions (MCQ or T/F) will be very easy and based on that day's lecture. The purpose of these quizzes is to stimulate your attentiveness during the lecture (since the questions will cover only that day's lecture) and to collect your attendance in a smart way. I will take the quizzes using an online platform (<https://kahoot.it/>). You have to write your first and last name correctly (during the quiz) in order to receive the bonus credits (up to 3% of your final grade for borderline grading only).

Academic Dishonesty: Cheating during any of the exams or quizzes will result in a failing grade (a grade of zero) on that exam or quiz and will be reported. Other acts of academic dishonesty could result in an "Unforgivable Failure of the Course." See following website for details: (<https://provost.wvu.edu/governance/academic-standards-resources>).

Smart Device Policy: The use of programmable calculators or smart devices (including smartphones, smart watches, tablets, cameras, wearable devices, etc.) on exams and quizzes is prohibited unless specifically indicated by the instructor.

Statement on Attendance: "Student attendance contributes significantly to academic success" and is mandatory. "Students are responsible for making instructors aware of anticipated absences due to Authorized University Activities as soon as possible to help facilitate the make-up process. Students must provide instructors a copy of the University documentation for the anticipated absences from class. Students are also encouraged to meet with their instructors at the beginning of the semester to discuss these anticipated absences. Students who fail to inform their instructors of their absence and provide official documentation prior to participation in a University Authorized Activity shall not be excused for that absence by the instructor. Students who know that they will be absent for more than 15% of class time are strongly encouraged to take the course at some other time when they will not be absent to this degree. Students who are absent from class for any reason are responsible for all missed work." In other words, if an emergency arises that requires an absence from a class, it is the student's responsibility to get the notes and all other information that was covered in class from a fellow student. In deciding whether to attend class, please do not ask the instructor if he will be covering anything important that day. The course is carefully planned out, and every lecture is important.

Communication: The WVU MIX email system will be used for all communication. The students are responsible for checking their MIX email regularly for information regarding assignments, lecture information, and any other important course related information. Students may be asked to print out information from the attachment in their email and bring it to class. Not all material will be sent in electronic form. Some material only in the form of hard copies will be distributed in class.

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

Student behavior: Students are expected to be attentive in class and not be disruptive when the instructor is teaching. This means no talking, laughing, or other similar disruptive behavior during the class period when the lecture is ongoing. Disruptive students will be warned and then if the behavior continues this will result in the student being removed from the class and referred to the Office of the Department Chair and/or Associate Dean for Academic Affairs.

Tentative Class Schedule

Introduction, Syllabus, & Basics: 13-Jan		
15-Jan	Ch 01 - Fundamental Terms and Concepts	Exam 1
17-Jan & 22-Jan	Ch 02 - Financial Statements and the Purcell Diagram	
24-Jan & 27-Jan	Ch 03 - Costs and Cost Estimating	
29-Jan & 31-Jan	Ch 04 - Breakeven Analysis	
3-Feb & 5-Feb	Ch 05 - Earned Value Management	
7-Feb & 10-Feb	Ch 06 - Concepts for Technical Economic Evaluations	
Project Assignment: 12-Feb		
Review Class: 14-Feb		
Exam 1: 17-Feb (Ch 01 to Ch 06)		
19-Feb	Ch 07 - Mathematical Relationships for Economic Calculations	Exam 2
21-Feb, 24-Feb, & 26-Feb	Ch 08 - Basic Economic Factors and Equations	
28-Feb, 2-Mar, & 4-Mar	Ch 09 - Gradient Economic Factors and Equations	
6-Mar & 9-Mar	Ch 10 - Depreciation Terms, Methods, and Systems	
11-Mar & 13-Mar	Ch 11 - Impact of Loans on Cash Flows, Taxes, and Profits	
Spring Break 14-Mar to 22-Mar		
Review Class: 23-Mar		
Exam 2: 25-Mar (Ch 07 to Ch 11)		
30-Mar, 1-Apr, & 3-Apr	Ch 12 - Basic Project Evaluation Techniques	Final Exam
6-Apr, 8-Apr, 10-Apr	Ch 13 - Advanced Project Evaluation Techniques	
13-Apr & 15-Apr	Ch 14 - Introduction to Risk Analysis	
20-Apr, 22-Apr, & 24-Apr	Ch 15 - Risk Analysis with Probability Considerations	
Project Due: 27-Apr		
Review Class: 01-May		
Final Exam: May 7 at 2pm (please cross-check)		