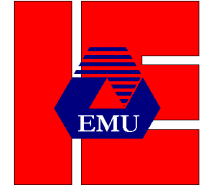




EASTERN MEDITERRANEAN UNIVERSITY

Department of Industrial Engineering



IENTG323/MANE323 - Engineering Economy

COURSE OUTLINE

COURSE CODE	IENG323/MANE323	COURSE LEVEL	Third year
COURSE TITLE	Engineering Economy	COURSE TYPE	Department Core
CREDIT VALUE	(4, 1, 0) 4	ECTS VALUE	6
PREREQUISITES	Junior Standing	SEMESTER and YEAR	SPRING 2022 - 2023

WEB LINK	http://ie.emu.edu.tr (click on the Instructors & Courses link)			
	Name (group)	e-mail	Office	Telephone
Instructor	Dr. Faramarz KHOSRAVI	Faramarz.khosravi@emu.edu.tr	C205	1587
Assistant(s)	Negar Akbarzadeh	Negar.akbarzadeh@emu.edu.tr	B107	3246
Course Schedule	Tuesdays 10:30-12:20; Thursdays 10:30-12:20; Fridays 12:30-13:20 Office Hour: Tuesdays 8:30-10:30			

COURSE DESCRIPTION

The purpose of this course is to give an introduction to economic analysis for decision making in engineering design, manufacturing equipment, and industrial projects. Subjects covered include interest, economic equivalence, time-value of money, project cash-flow analysis, decision making among alternatives, present worth, capitalized cost, equivalent-uniform, rate-of-return, benefit-cost ratio methods, replacement analysis, break-even analysis, sensitivity analysis, capital budgeting, inflation, elements of cost and cost estimation, payback analysis, methods of depreciation, after tax economic analysis, and computer applications in engineering economics.

AIMS & OBJECTIVES

The purpose of this course is to supplement engineering student's technical training with the knowledge and capability to perform financial analysis especially in the area of capital investment.

Course objectives (CO):

1. Cash flows, derivation and use of Engineering Economy Factors (P/F, P/A, F/A, P/G etc.)
2. Nominal and Effective interest rates
3. Evaluation of Alternatives (PW, Capitalized Cost, Payback Period, AW, Rate of Return, B/C Analysis)
4. Performing Replacement Study, Breakeven and Sensitivity Analysis
5. Considering Inflation in economic analysis
6. Use of basic Depreciation methods and basic Taxation calculations
7. Computer applications in Engineering Economy (MS Excel)
8. Preparing a Term Project (Working effectively in multidisciplinary teams, making an independent research, applying related techniques in real life environment, and writing and presenting a technical report on the results)

GENERAL LEARNING OUTCOMES (COMPETENCES)

On successful completion of this course, all students will have developed **knowledge** and **understanding** of:

- The fundamental concepts of engineering economy
- How to use engineering economy factors to account for the time value of money
- Service, revenue, mutually exclusive and independent alternatives
- How to consider inflation in an engineering economy analysis
- Depreciation and after tax economic analysis
- The assumptions that form the basis of methods applied

On successful completion of this course, all students will have developed **their skills in**:

- Economic analyses of alternatives using present worth, annual worth, future worth and rate of return methods
- Selecting and applying a suitable technique for the comparison of mutually exclusive alternatives
- Selecting and applying a suitable technique for the evaluation of independent alternatives
- Identifying relevant data to successfully perform an engineering economy study
- Evaluation of public projects using the benefit/cost ratio method
- Performing replacement study among an existing asset or system and its possible alternatives
- Determining the level of activity necessary or the value of a parameter to breakeven
- Using computer software for engineering economy analysis

On successful completion of this course, all students will have developed their **appreciation** of, and respect for **values and attitudes** to:

- The role of engineering economy in the decision making process
- The importance of accuracy in estimating costs and revenue and sensitivity analysis to these values
- Consider limitations of the analyses by taking into account the realistic constraints such as environmental, social, political and ethical
- Understand the impact of engineering solutions in global, environmental and societal context
- Professional and ethical responsibility

LEARNING TEACHING METHODS

The function of teaching is to enable students to learn. Therefore students are required to read the chapters of the textbook before coming to class.

TERM PROJECT

Students will be given a Term Project; Project Reports should be prepared according to the project guidelines (which can be found under the following web site <http://ie.emu.edu.tr/reportw/?sub=CO>). Each report must contain at least Title Page, Table of Contents, List of Tables, List of Figures, List of Symbols/Abbreviations, Main Body of the Text, References, and Appendices. The projects must be emailed latest on **June 6, 2023 Tuesday** before 5:00 pm to the course instructor (***The project will be accepted only in editable Word file format***). The **presentation** of the project will be done on Thursday, the 8th of June. Detailed schedule on presentations will be announced. Late submissions will be penalized by 50 percent per day.

METHOD OF ASSESSMENT

All Examinations will be based on lectures, discussions, textbook and assigned work.

Quizzes: There will be **four** quizzes designed to test familiarity and basic understanding of various topics. There will be no quiz make-ups.

Midterm Exam: The midterm exam will be held in the week designated by the university administration. It will cover all of the material up to the date of examination.

Final Exam: The final exam includes all course materials that are presented after the midterm.

Make-up Exams: Make-up examinations will only be offered to students who provided adequate documentation for the reason of their absence within **four** working days at the latest after the examination date. University regulations apply for Graduation Make-Up exam.

Note 1: The students need a calculator so they should bring their calculators to quizzes and other exams.

Note 2: The voluntary presentation has up to (5%) bonus. The subjects will be chosen by the student and approved by the instructor.

Note 3: A makeup for the quizzes will be held at the end of the semester (before the final exam). Students can choose only one of the quizzes and retake it.

Any objection to the grade or mark should be made latest within a week following its announcement.

Grading Policy:

Lab	5 %
Quizzes	20 % (4 Quizzes – announced)
Midterm Exam	20 %
Term Project	25 %
Final Exam	30 %

Note that the instructor reserves the right to modify these percentages in case it is found necessary. You will be informed from the changes, if any.

ATTENDANCE & NG Grade

Attendance will be taken every lecture but will not be included in the letter grade calculations. Note that university regulations allow instructors to give a grade of **NG** (Nil Grade) to a student whose absenteeism is more than 30% of the lecture/lab hours and/or who do not complete sufficient work that are included in the assessment of the course.

TEXTBOOK/S

Leland T. Blank, Anthony J. Tarquin “*Engineering Economy*” 8th edition, McGraw-Hill International Edition, 2017.

References:

William G.Sullivan, Elin M. Wicks and James T. Luxhoj “*Engineering Economy*” 14th edn, Prentice Hall, 2009

Chan S. Park, “*Fundamentals of Engineering Economy*” 2nd edn, Prentice Hall, 2009

Joseph C. Hartman, “*Engineering Economy and the Decision Making Process*” Prentice Hall, 2007

Class Schedule	Tutorial Schedule	Laboratory Schedule	Presentation
4 hours of lecture per week by the instructor	1 hour of tutorial every week by the course assistant(s)	At least 2 sessions of lab + Quiz (lab dates will be announced)	Term project presentations (as a group) at the end of the semester

COURSE CONTENT

Week	Topics
1	Foundations of engineering economy
2	Factors: how time and interest affect money
3 – 4	Combining factors; Nominal and effective interest rates
5	Present-worth and capitalized cost evaluations
6	Equivalent-annual worth analysis / Lab applications
7	Rate of return analysis of single alternative/ Lab applications
8	Rate of return evaluations for multiple alternatives / Lab applications
9 - 10	MIDTERM Exam
11	Benefit cost analysis and public sector economics
12	Replacement analysis
13	Breakeven analysis / Sensitivity analysis; Effects of inflation
14	Methods of depreciation & Basic taxation and after tax economic analysis
15	Project Presentation

Contribution of the Course to meeting the requirements of Criterion 5

Mathematics and Basic Sciences: 0
 Engineering Science : 4
 General Education : 0

Relationship of Course to Student Outcomes

Student Outcomes	Level of Contribution		
	No	Moderate	High
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(3) an ability to communicate effectively with a range of audiences	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(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	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACADEMIC HONESTY - PLAGIARISM

Cheating is copying from others or providing information, written or oral, to others. Plagiarism is copying without acknowledgement from other people's work. According to university by laws cheating and plagiarism are serious offences punishable with disciplinary action ranging from simple failure from the exam or project, to more serious action (letter of official warning suspension from the University for up to One Semester). Disciplinary action is written in student records and may appear in student transcripts.

PLEASE KEEP THIS COURSE OUTLINE FOR FUTURE REFERENCE AS IT CONTAINS IMPORTANT INFORMATION