



Engineering Economics

Course Code:	ECO130	Semester:	8 th
Credit Hours:	2+0	Prerequisite Codes:	Nil
Instructor:	Mr. Muhammad Yousaf	Class	BESE-5AB
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Lecture Days:	Wednesday & Thursday	E-mail:	muhammad.yousaf@seecs.edu.pk
Class Room:	CR,s: 2,10	Consulting Hours:	Tuesday 2:00 to 5:00
Knowledge Group:	Humanities & Sciences	Updates on LMS:	After every lecture

Course Description:

This course deals with the thought processes, concepts, methods and knowledge bases used by engineers to cost engineering projects and to evaluate the merit of making a particular investment, and to choose the best of a series of alternative investments to achieve a desired objective.

Course Objectives:

The course objective is that its successful completion should develop understanding of Engineering Economics and its application to electrical engineering. Further, it should lay down the analyzing and evaluating different projects through techniques.

Main Topics to be Covered:

1. Introduction to Economics vs. Engineering economics,
2. Basic cost concepts like fixed, variable, average, marginal, sunk costs,
3. Time value of money and discounted cash flow calculations,
4. Identifying and defining alternatives; present worth comparisons; equivalent annual worth comparisons; rate of return comparisons, break-even analysis, cost-benefit analysis,
5. Public sector engineering economy and Private sector engineering economy

Course Learning Outcomes (CLOs):

At the end of the course the students will be able to:	PLO	BT Level*
1. Understanding the concept of Engineering Economics and Economics.	1	C-2
2. Analyzing and comparing different projects using concept of cost, revenue and profit through applying maxima and minima.	2	C-4
3. Create and evaluate an environment of working of these projects in the public and private sectors.	11	C-5,6
* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A=Affective domain		



Mapping of CLOs to Program Learning Outcomes

PLOs/CLOs	CLO1	CLO2	CLO3
PLO 1 (Engineering Knowledge)	√		
PLO 2 (Problem Analysis)		√	
PLO 3 (Design/Development of Solutions)			
PLO 4 (Investigation)			
PLO 5 (Modern tool usage)			
PLO 6 (The Engineer and Society)			
PLO 7 (Environment and Sustainability)			
PLO 8 (Ethics)			
PLO 9 (Individual and Team Work)			
PLO 10 (Communication)			
PLO 11 (Lifelong Learning)			√
PLO 12 (Project Management)			

Mapping of CLOs to Assessment Modules and Weightages (In accordance with NUST statutes)

To be filled in at the end of the course.	
Assessments/CLOs	
Quizzes: 15%	
Assignments: 10%	
OHT-1: 15%	
OHT-2: 15%	
End Semester Exam: 45%	
Total : 100 %	

Books:

Text Book:	<ul style="list-style-type: none"> Donald E. Newman, <i>Engineering Economic Analysis</i>, 6th Ed.
Reference Book(s):	<ul style="list-style-type: none"> Contemporary Engineering Economics: by Park et al, Pearson Principles of Economics by Samuelsson Applied Mathematics for Business Economics and the Social Sciences by Frank S Budnick

Week No	Topics
1	Introduction to engineering economics
2	Economics vs. Engineering economics; typical problems addressed by engineering economy studies - public sector, private sector, personal; engineering economics studies,
3	Basic terms and concepts of cost - fixed costs, variable costs, average cost, marginal cost and revenue.
4	Demand, Supply, and Equilibrium in the market
5	Consumption Theory, Production Theory



6	OHT-1
7	Time value of money: What is interest; simple interest; compound interest - nominal vs. effective interest;
8	Time value of money: Continuous compounding; time-value equivalencies
9	Public Sector Engineering Economy: Introduction of the public sector, Surplus, Balance Budget and Deficit Budget, Financial Management Process, Debt Recycle Theory
10	Public Sector Engineering Economy: Sources and Costs of capital in public Sector; the discount rate question
11	Private sector engineering economy: sources and costs of capital; example applications
12	OHT-2
13	Private sector engineering economy: Income tax considerations; incentives for private sector investment
14	Comparing alternatives :Identifying and defining alternatives; Present Worth Comparisons;
15	Comparing alternatives : Equivalent Annual Worth Comparisons; Rate of Return Comparisons
16	Discounted cash flow calculations: compound interest factors; the functional notation system; cash flow diagrams; solving interest problems
17	Break-even analysis, Profit, Depreciation, Sunk costs; Typical characteristics of cost functions;
18	Final Exam

Grading Policy:

Quiz Policy:	The quizzes will be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion.
Assignment Policy:	In order to develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams.
Plagiarism:	SEECs maintains a zero tolerance policy towards plagiarism. While collaboration in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SEECs plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action.



PLO Description

- (i) **Engineering Knowledge:** An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- (ii) **Problem Analysis:** An ability to identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- (iii) **Design/Development of Solutions:** An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- (iv) **Investigation:** An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
- (v) **Modern Tool Usage:** An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
- (vi) **The Engineer and Society:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.
- (vii) **Environment and Sustainability:** An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
- (viii) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- (ix) **Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.
- (x) **Communication:** An ability to communicate effectively, orally as well as in writing, on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- (xi) **Project Management:** An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.
- (xii) **Lifelong Learning:** An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.