

Title: Engineering Economics

Code Number: HS2205

Credit Hours: 2 (2+0)

Prerequisites: Nil

Semester: 4th

Course Objectives

The course will enable students to:

1. Gain expertise in making strategic economic decisions in engineering projects, enabling them to align project goals with financial and economic objectives.
2. Able to evaluate project cash flows, understanding the time value of money and the impact of cash flow patterns on project viability.
3. Recognize the economic uncertainties, employing risk assessment and management techniques to make informed engineering decisions.
4. Analyze costs and assess the financial viability of engineering projects, contributing effectively to the economic decision-making processes within their organizations.

Contents

Unit 1: Engineering Economics

1. Role of engineers in business
2. Economic decisions v/s design decisions
3. Large scale engineering projects and types of strategic economic decisions
4. Fundamental principles of engineering economics

Unit 2: Interest Rate and Economic Equivalence

1. Interest: The Cost of Money
2. Economic Equivalence
3. Development of Formulas for Equivalence Calculation
4. Unconventional Equivalence Calculations

Unit 3: Understanding Money and Its Management

1. Nominal and Effective Interest Rates
2. Equivalence Calculations with Effective Interest Rates and with
3. Continuous Payments
4. Changing Interest Rates
5. Debt Management
6. Investing in Financial Assets

Unit 4: Present-Worth Analysis

1. Project Cash Flows
2. Initial Project Screening Methods: payback Screening and Discounted Cash Flow Analysis
3. Variations of Present-Worth Analysis
4. Comparing Mutually Exclusive Alternatives

Unit 5: Annual Equivalent-Worth Analysis

1. Annual Equivalent-Worth Criterion

2. Capital Costs versus Operating Costs
3. Applying Annual-Worth Analysis
4. Life-Cycle Cost Analysis
5. Design Economies

Unit 6: Rate-of-Return Analysis

1. Rate of Return and Methods of Finding It
2. Internal Rate-of-Return Criterion
3. Mutually Exclusive Alternatives

Unit 7: Cost Concepts Relevant to Decision Making

1. General Cost Terms; Classifying Costs for Financial Statements
2. Cost Classifications for Predicting Cost Behavior
3. Future Costs for Business Decisions
4. Estimating Profit from Production

Unit 8: Depreciation and Corporate Taxes

1. Asset Depreciation: Economic versus Accounting
2. Book and Tax Depreciation Methods (MACRS)
3. Depletion
4. Income Tax Rate to be used in Economic Analysis
5. The Need for cash Flow in Engineering Economic Analysis

Unit 9: Developing Project Cash Flows

1. Cost-Benefit Estimation for Engineering Projects
2. Developing Cash Flow Statements

Unit 10: Project Risk and Uncertainty

1. Origins of Project Risk
2. Methods of Describing Project Risk: Sensitivity, Break-Even and Scenario Analysis

Unit 11: Special Topics in Engineering Economics

1. Replacement Decisions
2. Capital Budgeting Decisions
3. Economic Analysis in the Service Sector

Teaching-Learning Strategies:

Lectures (audio/video aids), written assignments/quizzes, tutorials, case studies relevant to engineering disciplines, semester project, guest speaker, industrial/field visits, group discussion, report writing.

Assignments/Types and Number with calendar:

A minimum of four assignments to be submitted before the written exams for each term.

Assessment and Examinations:

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2.	Sessional Assessment	25%	It is continuous assessment. It includes: classroom participation, attendance, assignments and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3.	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

Recommended Books:

1. Contemporary Engineering Economics by Chan S. Park, latest edition, Pearson ISBN: 9780134105598
2. Engineering Economic Analysis by Donal G. Newnan, Jerome P. Lavelle, Ted G. Eschenbach, latest edition, Oxford University Press, ISBN: 978- 0199339273
3. Engineering Economy by Leland T. Blank and Anthony Tarquin.