



MANIPAL UNIVERSITY JAIPUR

School of Automobile, Mechanical, and Mechatronics Engineering

Department of Mechanical Engineering
Course Hand-out

Engineering Economics| MEE 2001 | 3 Credits | 3 0 0 3

Session: Aug 24 – Dec 24 | Faculty: Dr Ashok Kumar Sharma/ Dr Ravi Kant Gupta/ Dr Subrata Bandhu Ghosh/ Dr Rahul Goyal/ Dr Ashish Goyal/ Dr Rakesh Kumar/ Dr Vinod Singh Yadav/ Dr Anurag Joshi/ Dr Vijay Shankar Kumawat/ Dr Shyam Sunder Sharma/ Dr Rahul Khatri/ Dr Sumit Taneja | Class: III Semester (BTech IoT – A, B,C,D/ CCE – A,B,C/ DS- A,B,C,D,E,F,G/ IT – A,B,C,D,E/ SAMME/SCCE

A. Introduction: The Department of Mechanical Engineering offers the course Engineering Economics, where students from a wide range of disciplines can gain knowledge of economics as it applies to the engineering profession. This course would help students by teaching them the basics of economics and cost analysis as they relate to engineering projects. By learning how to assess cost and income data and make economic decisions, students will be better equipped to defend or reject alternatives and projects based on sound economic reasoning after finishing this course.

B. Course Outcomes: At the end of the course, students will be able to

1. Describe various economic decision-making concepts and types of estimates.
2. Assess the financial viability of engineering projects.
3. Discuss budget and budgetary control concepts.
4. Analyse for replacement analysis and break-even analysis.
5. Estimate the projects for economic feasibility by risk analysis to enhance entrepreneurship skills.

C. Program Outcomes and Program Specific Outcomes

- [PO.1]. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- [PO.2]. Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- [PO.3]. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- [PO.4]. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- [PO.5]. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- [PO.6]. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice
- [PO.7]. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
- [PO.8]. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practices
- [PO.9]. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

- [PO.10]. Communication:** Communicate effectively 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
- [PO.11]. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
- [PO.12]. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

[PSO.1].

Model and analyse of Mechanical Engineering systems and components.

[PSO.2].

Design and performance evaluation of energy systems.

[PSO.3].

Testing of materials and analysis of manufacturing processes for mechanical engineering applications.

D. Assessment Rubrics:

Criteria	Description	Maximum Marks
Internal Assessment (Summative)	Sessional Exam	30
	In class Quizzes and Assignments, Activity feedbacks (CWS)	30
End Term Exam (Summative)	End Term Exam	40
Total		100
Attendance (Formative)	A student must have maintained a 75% attendance rate in order to sit for the final test at the conclusion of the semester. The 25% allowance covers all leaves, not just medical ones.	

E. Syllabus

F. Concept and Value Analysis, Economic Decision Making, Types of Estimates, Accounting and Control, Elements of Cost, Prime Cost, Overheads, Types of Cost, Process Cost & Cost of Production, Break Even Analysis, Inventory Control & Management, EOQ, Financial Analysis, Simple payback, Return on Investment, NPV (Net Present Value), IRR (Internal rate of Return), Life Cycle Cost Method, Sensitivity Analysis, Project Financing Options. Budget and Budgetary Control, Concept of Budgeting, Type of Budgets. Risk - Risk vs Return, System Concept and Value Analysis, System Analysis & System Engineering, Value Analysis. Replacement Analysis, Depreciation, Network Analysis, Network Techniques, PERT (Programme evaluation and review technique), CPM (Critical Path Method).

G. Text Books

T1. R. Panneerselvam, *Engineering Economics*, Prentice Hall of India.

T2. J.L. Riggs, D.D. Bedworth and S.U. Randhawa, *Engineering Economics*, McGraw Hill Education.

T3. P.L. Mehta, *Managerial Economics*, Sultan Chand & Sons.

H. Reference Books

R1. E.L. Grant, W.G. Ireson and R.S. Leavenworth, *Principles of Engineering Economic Analysis*, John Wiley.

R2. G.J. Tiesen, W.J. Fabrycky and H.G. Tiesen, *Engineering Economy*, Prentice Hall of India.

R3. L. Blank and A. Tarquin, *Engineering Economy*, McGraw Hill Education.

Lecture	Topics	Session Outcomes	Mode of Delivery	Corresponding CO	Mode of Assessing the Outcome
1.	Introduction to Concept and Value Analysis	Understand the basic concepts and significance of value analysis.	Lecture, Practice questions	ME2001.1 ME2001.2	Quiz I Assignment Mid Term End Term
2.	Economic Decision Making	Learn the principles of economic decision-making in engineering.	Lecture, Practice questions	ME2001.1 ME2001.2	Quiz I Assignment Mid Term End Term
3.	Types of Estimates	Identify different types of cost estimates and their applications.	Lecture, Practice questions	ME2001.1 ME2001.2	Quiz I Assignment Mid Term End Term
4.	Accounting and Control	Understand basic accounting principles and their role in financial control.	Lecture, Practice questions	ME2001.1 ME2001.2	Quiz I Assignment Mid Term End Term
5.	Elements of Cost	Recognize the various elements that constitute cost in production.	Lecture, Practice questions	ME2001.1 ME2001.2	Quiz I Assignment Mid Term End Term
6.	Prime Cost	Differentiate between prime cost and other types of cost.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
7.	Overheads	Analyze the significance of overheads in total cost.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
8.	Types of Cost	Identify various types of cost and their implications.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
9.	Process Cost & Cost of Production	Understand process costing and its role in determining the cost of production.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
10.	Break Even Analysis	Perform break-even analysis and understand its implications	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term

		for decision making.			
11.	Inventory Control & Management	Learn techniques for effective inventory control and management.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
12.	EOQ (Economic Order Quantity)	Calculate the EOQ and understand its application in inventory management.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
13.	Financial Analysis	Develop skills for analyzing financial statements and performance.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
14.	Simple Payback	Understand and calculate the simple payback period for investments.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
15.	Return on Investment (ROI)	Calculate ROI and understand its significance in evaluating investments.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
16.	NPV (Net Present Value)	Calculate NPV and understand its use in financial decision-making.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
17.	IRR (Internal Rate of Return)	Determine IRR and its role in comparing investment opportunities.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
18.	Life Cycle Cost Method	Analyze costs using the life cycle cost method.	Lecture, Practice questions	ME2001.2	Quiz I Assignment Mid Term End Term
19.	Sensitivity Analysis	Perform sensitivity analysis to assess risk and uncertainty.	In class practice questions	ME2001.2	Quiz II Assignment Mid Term End Term
20.	Project Options Financing	Identify and evaluate various project financing options.	Lecture, Practice questions	ME2001.2	Quiz II Assignment Mid Term End Term

21.	Budget and Budgetary Control	Understand the concepts of budgeting and budgetary control.	Lecture, Practice questions	ME2001.2	Quiz II Assignment Mid Term End Term
22.	Concept of Budgeting	Learn different types of budgets and their applications.	Lecture, Practice questions	ME2001.2	Quiz II Assignment Mid Term End Term
23.	Type of Budgets	Analyze various types of budgets and their purposes.	Lecture, Practice questions	ME2001.2	Quiz II Assignment Mid Term End Term
24.	Risk - Risk vs Return	Understand the relationship between risk and return in financial decisions.	Lecture, Practice questions	ME2001.2	Quiz II Assignment Mid Term End Term
25.	System Concept and Value Analysis	Explore system concepts and their application in value analysis.	Lecture, Practice questions	ME2001.3	Quiz II Assignment Mid Term End Term
26.	System Analysis & System Engineering	Learn techniques for system analysis and system engineering.	Lecture, Practice questions	ME2001.3	Quiz II Assignment Mid Term End Term
27.	Value Analysis	Apply value analysis techniques to improve cost-efficiency.	Lecture, Practice questions	ME2001.3	Quiz II Assignment Mid Term End Term
28.	Replacement Analysis	Understand and perform replacement analysis for equipment and assets.	Lecture, Practice questions	ME2001.4	Quiz II Assignment Mid Term End Term
29.	Depreciation	Calculate depreciation and understand its impact on financial statements.	Lecture, Practice questions	ME2001.4	Quiz II Assignment Mid Term End Term
30.	Network Analysis	Develop skills in network analysis for project management.	Lecture, Practice questions	ME2001.5	Quiz II Assignment Mid Term End Term
31.	Network Techniques	Explore various network techniques and their applications.	Lecture, Practice questions	ME2001.5	Quiz II Assignment Mid Term End Term

32.	PERT (Programme Evaluation and Review Technique)	Understand and apply PERT in project management.	Lecture, Practice questions	ME2001.5	Quiz II Assignment Mid Term End Term
33.	CPM (Critical Path Method)	Apply CPM techniques to identify the critical path in project schedules.	Lecture, Practice questions	ME2001.5	Quiz II Assignment Mid Term End Term
34.	Case Studies and Applications	Analyze real-world case studies to apply the concepts learned.	Lecture, Practice questions	ME2001.5	Quiz II Assignment End Term
35.	Review and Assessment	Review key concepts and assess understanding through discussions and quizzes.	Lecture, Practice questions	ME2001.5	Quiz II Assignment End Term

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