MANIPAL INSTITUTE OF TECHNOLOGY

BENGALURU

(A constituent unit of MAHE, Manipal)

B.Tech. Third Year (VI Sem): Department of Mechanical & Industrial Engineering

Course Handout

Session (Semester): Jan 2024 to May 2024

Branch: CSE, AI, IT, CYS

Class: Theory Course

Course Name (Code): Engineering Economics & Financial Management (HUM_3151)

Contact Hours/Week:

L	T	P	C
2	1	0	3

Course Coordinator: Dr. Din Bandhu

Course Instructor: Dr. Din Bandhu

A. Introduction: This course is a comprehensive and dynamic exploration of the fundamental principles and practices that govern economics in today's business landscape. Designed to equip students with essential skills and knowledge, this course delves into the core concepts and functions of engineering economics, providing a solid foundation for aspiring engineers and management professionals. Through a well-rounded and interactive curriculum, it fosters the development of students' critical thinking, problem-solving, and communication abilities. By the end of the course, graduates are equipped to navigate the complexities of economics and financial management, adeptly lead teams, and contribute positively to the success of their organizations in an ethical and responsible manner.

B. Assessment Rubrics:

Criteria	Description	Maximum Marks
Internal Assessment (Summative)	In-sessional Exam (Close Book)	30
	In class Quizzes and Assignments, Activity feedbacks (Accumulated and Averaged) *	20
End Term Exam (Summative)	End Term Exam (Close Book) As per MAHE-MIT Manipal guidelines	50
	Total	100
Attendance (Formative)	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	
Quiz- 1 no.: MCQ- 10 marks In-sessional Exam- 1x30 marks =30 marks Assignments- 1x10 marks=10 marks		

C. Syllabus

Total contact hours: 36

Time Value of money: Time Value of Money, Interest Factors for Discrete Compounding, Nominal & Effective Interest Rates, Present and future worth of Single, Uniform, and Gradient cash flow. Related problems and case studies.

Economic Analysis of Alternatives: Bases for Comparison of Alternatives, Present worth amount, Capitalized Equivalent Amount, Annual Equivalent Amount, Future Worth Amount, Capital Recovery with Return, Rate of Return Method, Incremental Approach for Economic Analysis of Alternatives, Replacement analysis. Break Even Analysis for Single Product and Multi Product Firms, Break Even Analysis for Evaluation of Investment Alternatives. Minimum Cost Analysis.

Depreciation: Physical & Functional Depreciation, Methods of Depreciation - Straight Line, Declining Balance, Double-Declining balance method, Case Study.

Financial Statement Analysis: Balance Sheet and Profit & Loss Statement, Meaning & Contents. Ratio Analysis, Financial Ratios such as Liquidity Ratios, Leverage Ratios, Turn over Ratios, and Profitability Ratios, Drawbacks of Financial Statement Analysis.

Project Risk: Safety and Risk, Assessment of Risk and Safety, Case study, Risk Benefit Analysis and Reducing Risk

D. Textbooks

1. Chan S. Park, Contemporary Engineering Economics, 4th Edition, Pearson Prentice Hall, 2007.
2. Thuesen G. J, Engineering Economics, Prentice Hall of India, New Delhi, 2005.

E. Reference Books

1. Blank Leland T. and Tarquin Anthony J., Engineering Economy, McGraw Hill, Delhi, 2002.
2. Prasanna Chandra, Fundamentals of Financial Management, Tata McGraw Hill, Delhi, 2006.

F. Course Outcomes: Upon successful completion of this course, students will be able to:

[CO.1]	compute the worth of money at various points of time.
[CO.2]	apply various Depreciation methods in determining the value of an asset.
[CO.3]	describe and apply the basic techniques of financial statement analysis.
[CO.4]	evaluate the replacement of an existing asset based on standard replacement analysis techniques.
[CO.5]	evaluate the best alternative in Engineering Economics problems considering risk and safety.

G. Program Outcomes and Program Specific Outcomes

[PO.1]. **Engineering Knowledge:** Apply 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 specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

[PO.4]. **Conduct investigations** of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of 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 modelling to complex engineering activities with an under- standing of the limitations.

[PO.6]. **The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to professional engineering practice.

[PO.7]. **Environment and Sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

[PO.8]. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

[PO.9]. **Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary 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 engineering and management principles and apply these to owners 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.

H. Lecture Plan:

Lec. No	Topics	Corresponding CO
L0	Discussion on Vision, Mission, PEO, PO/PSO and Course Outline, Course Plan, Assessment Plan	-
L1	Time value of money meaning and importance, Interest meaning and types	CO.1
L2	Time value of money meaning and importance, Interest meaning and types	CO.1
T1	Interest factors for discrete compounding, Problems	CO.1
L3	Time value of money meaning and importance, Interest meaning and types	CO.1
L4	Interest factors for discrete compounding, Problems	CO.1
T2	Arithmetic gradient series factor, Problems	CO.1

L5	Application numerical on seven interest factors	CO.1
L6	Nominal and effective interest rate, Problems	CO.1
T3	Nominal and effective interest rate, Problems	CO.1
L7	Application numerical with nominal and effective interest rate	CO.1
L8	Economic evaluation of alternatives: Bases for comparison of alternatives, Importance and assumptions, Problems	CO.1
T4	Economic evaluation of alternatives: Present Worth Method - LCM method and Study period method, Problems	CO.5
L9	Economic evaluation of alternatives: Bases for comparison of alternatives, Importance and assumptions, Problems	CO.5
L10	Economic evaluation of alternatives: Capitalized equivalent amount	CO.5
T5	Economic evaluation of alternatives: Annual worth method and its importance, Determining Annual equivalent amount, Problems	CO.5
L11	Economic evaluation of alternatives: Capital recovery with return, Application numerical on annual worth method	CO.5
L12	Economic evaluation of alternatives: Rate of return method	CO.5
T6	Economic evaluation of alternatives: Rate of return method	CO.5
L13	Economic evaluation of alternatives: Rate of return method, Application based numerical	CO.5
L14	Replacement Analysis: Reasons, Evaluation of replacement alternatives	CO.4
T7	Replacement Analysis: Evaluation of replacement alternatives with unequal lives Replacement Analysis: Economic life of an asset, Application based numerical	CO.4
L15	Replacement Analysis: Economic life of an asset, Application based numerical	CO.4
L16	Depreciation: Meaning, Physical and functional depreciation, Methods of depreciation	CO.2
T8	Depreciation: Methods of depreciation with numerical	CO.2
L17	Depreciation: Methods of depreciation with numerical	CO.2

L18	Break-even Analysis: Meaning, Assumptions and Applications, Break even analysis for single product and multi product firms	CO.5
T9	Break-even Analysis: Break even analysis for evaluation of investment alternatives, minimum cost analysis.	CO.5
L19	Break-even Analysis: Break even analysis for evaluation of investment alternatives, minimum cost analysis.	CO.5
Financial Management		
L20	Financial Management: Nature and objectives, Scope and functions	CO.3
T10	Financial Statement Analysis: Introduction, Types, and importance.	CO.3
L21	Financial Statement Analysis: Understanding the financial statement	CO.3
L22	Financial Statement Analysis: Ratio analysis, Problems	CO.3
T11	Financial Statement Analysis: Ratio analysis, Problems	CO.3
L23	Financial Statement Analysis: Ratio analysis, Problems	CO.3
L24	Safety and Risk, Assessment of Safety and Risk	CO.5
T12	Risk Benefit Analysis and Reducing Risk.	CO.5

I. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES											
		PO 01	PO 02	PO 03	PO 04	PO 05	PO 06	PO 07	PO 08	PO 09	PO 10	PO 11	PO 12
CO.1	Demonstrate comprehensive knowledge and understanding of the fundamental principles, concepts, and functions of management	1					1		3	3	2	3	1
CO.2	Classify and evaluate various managerial techniques, decision-making processes, and leadership styles in real-world scenarios	1					1		3	3	2	3	1
CO.3	Interpret information from different management theories and models to design strategic plans, organizational structures, and effective managerial practices	1					1		3	3	2	3	1
CO.4	Summarize complex management concepts effectively and develop leadership qualities essential for motivating and guiding teams towards organizational success.	1					1		3	3	2	3	1

Note: CO to PO & PSO mapping level (1 – low, 2- moderate and 3 – substantial).