



# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering**

**Subject Code: 3144201**

**Semester – IV**

**Subject Name: Engineering Economics**

**Prerequisite:** NA

**Rationale:** Engineering economics is a field that addresses the dynamic environment of economic calculations and principles through the prism of engineering. It is a fundamental skill that all successful engineering firms employ to retain competitive advantage and market share. The basic purpose of this course is to provide a sound understanding of concepts and principles of engineering economy and to develop proficiency with methods for making rational decisions regarding problems likely to be encountered in professional practice.

### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

### Content:

Sr. No.	Content	Total Hrs
1	<b>Introduction to Economics</b> - Flow in an economy, Law of supply and demand, Fixed, Variable, Marginal & Average Costs, Sunk Costs, Opportunity Costs, Recurring and Nonrecurring Costs, Incremental Costs, Cash Costs vs Book Costs, Concept of Engineering Economics – Engineering efficiency, Economic efficiency, Scope of engineering economics – Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Opportunity cost, Process planning.	8
2	<b>Cash Flow</b> - Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annual equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method, Benefit-Cost Ratio Analysis, Sensitivity and Break-even analysis – V ratio, Examples in all the methods.	8
3	<b>Inflation And Price Change</b> - Definition, Effects, Causes, Price Change with Indexes, Types of indexes, Composite vs Commodity Indexes, Use of Price Indexes in Engineering Economic Analysis, Cash Flows that inflate at different Rates. Case Study.	8
4	<b>Worth Analysis:</b> End-Of-Year Convention, Viewpoint of Economic Analysis Studies, Borrowed Money Viewpoint, Effect of Inflation & Deflation, Taxes, Economic Criteria, Applying Present Worth Techniques,  Multiple Alternatives, Future Worth Analysis.	6



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5	<b>Replacement and Maintenance analysis</b> - Types of maintenance, types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset – capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which fail completely.	6
6	<b>Depreciation</b> - Introduction, Straight line method of depreciation, declining balance method of depreciation-Sum of years digits method of depreciation, sinking fund method of depreciation/ Annuity method of depreciation	4
7	<b>Corporate Social Responsibility (CSR) &amp; Environmental, Social and Governance (ESG)</b> - meaning, importance, business ethics, ESG factors, measurement criteria.	6

### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	25	20	---	---	---

**Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)**

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Reference Books:

1. Principle of Engineering Economic Analysis by John A. White, Kenneth E. Case, David B. Pratt, John Wiley
2. Economics for Engineers 4e by James L. Riggs, David D. Bedworth, Sabah U. Randhawa, Tata McGraw-Hill
3. Engineering Economy by Sullivan and Wicks, Pearson
4. Engineering Economics by R. Paneerseeivan, PHI
5. Engineering Economics Analysis by Donald Newnan, Ted Eschembach, Jerome Lavelle, OUP
6. Engineering Economics Analysis, Michael R Lindeburg, Professional Pub

### Course Outcomes: Students will be able to

Sr. No.	CO Statement	Weightage (%)
1	Describe the principles of economics that govern the operation of any organization under diverse market conditions.	25
2	Comprehend macroeconomic principles and decision making in diverse	25



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	business set up.	
3	Explain the Inflation & Price Change as well as Present Worth Analysis.	25
4	Learn an importance of CSR and ESG for sustainable growth.	15
5	Apply the principles of economics through various case studies.	10