GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering
Level: PG
Subject Code: ME03000081
Subject Name: Economics of Energy Generation and Supply

w. e. f. Academic Year:	2024-25
Semester:	3
Category of the Course:	MOPEC

Prerequisite:	Nil
Rationale:	Nil

Course Outcome:

After completing the course, students should be able to:

Sr. No.	CO statement
CO-1	Comprehend the concepts of energy sources, global and Indian energy scenarios, and reforms in the energy sector.
CO-2	Apply various techniques for energy demand forecasting, such as the end-use method and scenario approach.
CO-3	Analyze the economic opportunities and challenges associated with energy efficiency and demand-side management implementation.
CO-4	Analyze the economic implications of fossil fuel production strategies and develop recommendations for optimizing investment decisions.

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total Hrs	%Weightage
1	**Energy Scenario:** Energy sources, the global and Indian energy scenarios, reforms in the energy sector, the intersection of energy and the environment, initiatives in energy conservation, and strategies for enhancing energy security.	04	10

2	**Energy Demand analysis and forecasting:** Evolution of Demand Analysis, Understanding Energy Demand Decisions, Economic Basis of Energy Demand, Varied Approaches to Energy Demand Analysis: Factor Analysis, Econometric Approach. Techniques for Energy Demand Forecasting: Econometric Approach, End-Use Method, Input–Output Model, Scenario Approach, Artificial Neural Networks, Hybrid Approach	**10**	**30**
3	**Energy Demand Management:** Introduction to Demand-side Management (DSM), Justification and Evolution of DSM, Load Management Techniques: Direct Load Control, Indirect Load Control. Energy Efficiency Opportunities and Economics, Assessing Cost Effectiveness of DSM: Participant Test, Ratepayer Impact Measure, Total Resource Cost Test, Utility Cost Test	**08**	**20**
4	**Economics of Fossil Fuel Supply**: Introduction to Fossil Fuel Economics, Field Development Strategies, Production Processes and Technologies, Understanding the Economics of Fossil Fuel Production, Techniques for Supply Forecasting	**06**	**15**
5	**Economics of Electricity Supply**: Introduction to the Economics of Electricity Supply: Exploring Fundamental Concepts, Economic Dispatch: Optimizing Generation for Cost Efficiency, Unit Commitment: Planning the Operation of Power Plants for Maximum Economic Benefit, Investment Decisions in the Electricity Sector: Evaluating Costs and Benefits for Future Infrastructure Development	**07**	**15**
6	**Economics of Renewable Energy Supply**: Exploring Renewable Energy Sources for Electricity Generation, Understanding the Drivers Behind Renewable Energy Adoption, Economic Considerations in the Deployment of Renewable Energy Technologies	**08**	**15**
TOTAL		**45**	**100**

Reference Books:

1. S. C. Bhattacharya, "Energy Economics: Concepts, Issues, Markets, and Governance," Springer, 2011.
2. W. C. Turner, S. Doty, "Energy Management Handbook," Fairmont Press & CRC Press, 2012.
3. B. L. Capehart, W. C. Turner, W. J. Kennedy, "Guide to Energy Management," Fairmont Press & CRC Press, 2011.
4. A. Thumann, D. P. Mehta, "Handbook of Energy Engineering," Fairmont Press & CRC Press, 2013.

5. J. Evans, L. C. Hunt, "International Handbook on the Economics of Energy," Edward Elgar Publishing Limited, 2011.
6. Bureau of Energy Efficiency, "Books on Energy Management & Auditing," Bureau of Energy Efficiency, Volume 1, 2, 3, & 4. Available at: http://beeindia.in/

List of Open-Source Software/Learning Websites:

- E-materials available on the website of the Bureau of Energy Efficiency: Bureau of Energy Efficiency

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