GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering, Level: PG

Electrical Vehicle Technology

Course / Subject Code: 3736401

Course / Subject Name: ECONOMICS OF ENERGY GENERATION & SUPPLY

w. e. f. Academic Year:	2023-24
Semester:	III
Category of the Course:	Open Elective

Prerequisite:	NA
Rationale:	NA

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Comprehend the concepts of energy sources, global and Indian energy scenarios, and reforms in the energy sector.	R
02	Apply various techniques for energy demand forecasting, such as the end-use method and scenario approach.	R U
03	Analyze the economic opportunities and challenges associated with energy efficiency and demand-side management implementation.	R A
04	Analyze the economic implications of fossil fuel production strategies and develop recommendations for optimizing investment decisions	R N

**Revised Bloom's Taxonomy (RBT)*

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	0	3	70	30	-	-	100

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	**Energy Scenario:** Energy sources, the global and Indian energy scenarios, reforms in the	**04**	**10**

	energy sector, the intersection of energy and the environment, initiatives in energy conservation, and strategies for enhancing energy security.		
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	**06**	**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	**06**	**15**
	Total		**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
40	20	20	20		

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:
(a) 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.

(b) Open source software and website:

1. http://beeindia.in/

Suggested Course Practical List: NA

List of Laboratory/Learning Resources Required: NA

Semester ___	**Course Name (Course Code:)**		
	POs		
Course Outcomes	PO1	PO2	PO3
CO1			
CO2			
CO3			

*Legend: '**3**' for high, '**2**' for medium, '**1**' for low and '**-**' for no correlation of each CO with PO.*

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