GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3143508
Semester – IV
Subject Name: Energy resources and Management

Type of course: Humanities and Social Science

Prerequisite: A good fundamental backup of basics of energy sources for environmental science and technology.

Rationale: The main objective of this subject is to make students aware about the basics of energy resources and its management for environmental science and technology.

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)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Introduction to Energy sources and their availability, Solar Radiation and its measurement-Introduction, Solar radiation at the Earth's surface, Solar radiation measurement, Solar Energy collectors and its type, Solar energy storage and systems, Application of solar energy.	08
2	Wind Energy – Introduction, basic principle of wind energy conversion, classification Wind energy conversion systems, Types of Wind machines, Environmental aspects	06
3	Energy from Biomass: Introduction, Biomass conversion technologies, Biogas generation, Biomass as a source of Energy, Thermal gasification of Biomass, Pyrolysis	06
4	Geothermal energy: Introduction, Estimation of thermal power, Geothermal sources, Prime movers for geothermal energy conversion, advantages and disadvantages of geothermal energy, Energy from Oceans: Introduction, Ocean Thermal Electric conversion, Energy from tides, Ocean waves	08
5	Energy Management: Introduction, Energy planning, Energy staffing, Energy organization, Energy requirement, Energy costing, Energy Budgeting, Energy Monitoring,	08

	Environmental pollution due to energy use, Categories of energy audit, Types of Energy audit, Measuring and detection instruments for energy survey.	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**20**	**10**	**10**	**05**	**05**

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. Non-conventional Energy sources, G.D Rai, Khanna Publishers.
2. Energy Engineering and Management, Amlan Chakrabarti, PHI Publication
3. Energy Technology, S.Rao and Dr BB Parulekar, Khanna Publishers.
4. Alternate Energy, Dr NK Giri, Khanna Publishers.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	To list the sources of energy	10
CO-2	To classify the energy systems	15
CO-3	To apply the basic fundamentals of science for energy calculation.	10
CO-4	To outline the system of energy management.	15
CO-5	To explain the energy conservation in industries	10
CO-6	To summarize the application of various energy sources	10