

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VII
FOOD PROCESSING TECHNOLOGY

Subject Name: **Environmental Engineering and Renewable Energy**
 Subject Code: **171406**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	2	5	70	30	30	20

Sr. No	Course Content	Total Hrs.
1.	Environmental Pollution: Introduction, types of pollution (Air, Water and Ground).	03
2.	Air Pollution and Control: Characteristics of air pollutants, their effects, composition, sampling, measurement and legislation, devices and equipment for prevention, control and monitoring. Global warming and green house effect, acid rain, ozone layer depletion.	08
3.	Water Pollution Control: Industrial and domestic waste water characteristics, concept of organic pollution and its impact on stream water quality. Waste water primary, secondary and tertiary treatments. Physical, chemical and biological treatment methods. Concept of BOD and COD, activated sludge process, trickling filters, aerated lagoons, waste stabilization ponds, up flow anaerobic sludge blanket process (USABP). Regulatory and legislative compliance. Economics of effluent treatment plant (ETP).	12
4.	Hazardous Solid & Liquid Wastes: Guidelines for handling, disposal and incineration.	03
5.	Energy Scenario: Energy resources and solution to energy crisis. Measurement of energy, calorific value of fuels, conversion and efficiency, proximate and ultimate analysis, numerical calculations.	08

6.	<p>Renewable Energy:</p> <p>Definition and Importance.</p> <p>(i) Solar Energy: Solar energy and its measurement, solar energy devices like solar cooker, solar refrigeration, solar dryer, solar pond, solar water heater, solar photovoltaic cell etc.</p> <p>(ii) Wind energy, geothermal energy, sea and tidal energy, nuclear energy.</p> <p>(iii) Bio-energy: Bio-mass availability and its characteristics, energy from biomass, combustion and gasification, bio-gas plants, bio-diesel, concept of carbon credits.</p>	10
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Reference Books:

1. Engineering Chemistry by Dr.O.P.Agrawal Khanna Publisher Delhi.
2. Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company.
3. Environmental Engineering by Dr.C.S.Rao.
4. Waste water treatment engineering by Metcalf & Eddy.
5. Food Processing Waste Management by Green J.H. AVI Publications.
6. Solar Energy Fundamentals and Applications, by Garg & Prakash, CBS Publications