GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL ENGINEERING (13)

ENVIRONMENTAL RESOURCES

SUBJECT CODE: 2141308

B.E. 4TH SEMESTER

Type of course: Basic sciences

Prerequisite: Basics of Environmental studies

Rationale: To make students aware regarding finite environmental resources**.**

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	2	0	5	70	20	10	30	0	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Water Resources: Global water distribution, Assessment of water resources, Water budget of India, water requirements: Domestic, Agriculture, Industry, water uses and consumption, water scarcity, water management & sustainable water use in India, water conservation in industry, agriculture and homes, Rain water harvesting. Desalination of sea water Recycling & Reuse of waste water.	04	10
2	Food Resources: Sources of food, measures of food availability, limits to food production, food production & environment, -agriculture: Environmental impacts, -Domesticated animals, -Aqua culture.	02	4
3	Energy Resources: Energy Basics, Energy Scenario for Renewable & Non-renewable energy resources: Global & India, Non Renewable resources: Estimation of stock and reserves : Static Reserve Index, Exponential Reserve Index, Conventional Fossil fuels: Coal, Oil and Natural gas , Nuclear fuels, Alternative Energy sources: How it works and citing criteria, Solar Energy: Solar Cell and Solar Panel, Hydro power, Tidal energy, Wind energy, Geothermal energy, prospects and potential of different alternative energy sources.	08	19
4	Forests and Wildlife: Types of forest, importance of forest, deforestation, desertification, causes and consequences, social forestry.	06	14
5	Biodiversity: Importance of biodiversity, decline of biodiversity, reasons of the decline, consequences of losing biodiversity, steps to protect biodiversity	04	10
6	Population: Population theories: Malthusian theory, Optimum Theory, Demographic transition Theory,	10	23

	Population dynamics: instantaneous rate of increase, basic equation of population dynamics, growth rate equation, the exponential growth (application & properties), Doubling time: concept & application, Population forecasting, Demographic projections & population structure (world & India) : population profiles, age structure diagrams, Population explosions: causes & consequences, Remedial measures.		
7	Environmental Ethics and Politics: Pollution control policies, GNP and Quality of Life, Science-technology & laws, Global commons- tragedy of the commons, Feeding the rich & over consumerism, Environment & ethics. ,Environmental Movements(National and International.	04	10
8	Global warming and Climate change: Role of CO_2, Methane, Nitrous oxide, and Choloroflorocarbons in climate change, Carbon footprint, CDM.	04	10

Suggested Specification table with Marks (Theory):

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

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate 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. Eco science, Population, Resources and Environment by Ehrlich and Ehrlich (W.H. Free man & Company San Fransico1977)
2. Essentials of Environment by Gilbert Master (3^{rd} Edition- Prentice hall, New Jersey.)
3. Basics of Environmental Studies by Prof. Dr. N.S. Varandani (Books India Publication)

Course Outcome:

After learning the course the students should be able to:

1. Discuss the concern and appreciate importance of depletion of resources and their sustainability.
2. Organize and use environmental resources optimally and in sustainable manner.
3. Disseminates learnt information related to the Subject orally and in written form through presentation and reports.
4. Forecast the population using different population forecasting formula and apply the population theories.

List of Tutorials:

1. Tutorials based on water and food resources
2. Assignment on Energy resources.
3. Definition of terms and questions based on forest and wild life.
4. Assignment on population theories and numerical on population forecasting.
5. Definition of terms relating to environmental ethics.
6. Assignment based on global problems.

Active Learning Assignments (ALA) : Preparation of power-point slides: which may include videos, animations, pictures, graphics for better understanding of theory and practical work. The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus can be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of faculty and the department.