

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ENVIRONMENTAL SCIENCE

1<sup>st</sup> Year

**Type of course:** Mandatory Course

**Prerequisite:** Interest in natural systems sustaining the life on the earth.

**Rationale:** To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

### Teaching and Examination Scheme :

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

### Content:

Sr. No.	Content	Total Hrs	% Weightage
<b>1</b>	<b>INTRODUCTION TO ENVIRONMENT</b> Definition, principles and scope of Environmental Science. Impacts of technology on Environment, Environmental Degradation, Importance for different engineering disciplines	02	8
<b>2</b>	<b>ENVIRONMENTAL POLLUTION</b> a) Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution, Classification of water pollutants, Effects of water pollutants b) Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO <sub>2</sub> , NO <sub>x</sub> , Auto exhaust, Effects of common air pollutants c) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects d) Solid Waste: Generation and management e) Bio-medical Waste: Generation and management f) E-waste: Generation and management	14	44
<b>3</b>	<b>GLOBAL ENVIRONMENTAL ISSUES</b> Sustainable Development, Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer, Carbon Footprint, Cleaner Development Mechanism (CDM), International Steps for Mitigating Global Change	06	24
<b>4</b>	<b>BASIC CONCEPT OF GREEN BUILDING AND SMART CITIES</b> Green Building: Introduction, Objectives, Fundamental Principles, Benefits of Green Building, Examples of Green Building Smart Cities: Concept	04	16

<b>5</b>	<b>CONCEPT OF 4R's</b> Principles, Application of 4R's	02	8
----------	---	----	---

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
<b>20</b>	<b>20</b>	<b>10</b>	<b>10</b>	<b>10</b>	

**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. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
2. Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP -Lambert Academic Publishing , Germany
3. Environmental Studies by Anindita Basak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd Pearson
4. Textbook of Environmental Studies by Deeksha Dave & S S Kateva , Cengage Publishers.
5. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
6. Environmental Studies by R. Rajagopalan, Oxford University Press
7. Environmental Studies by Benny Joseph, TMH publishers
8. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
9. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

**Course Outcome:**

After learning the course the students should be able to:

1. Understand the scope and importance of environmental science.
2. Identify different types of environmental pollution and its management.
3. Develop the awareness about global environmental issues.
4. Understand the concept and benefits of Green Building & Smart Cities.
5. Understand the concept of 4R's & its application.

**List of Tutorials: Based on**

1. Introduction to Environment
2. Water Pollution
3. Air Pollution
4. Noise Pollution
5. Solid Waste
6. Bio-medical Waste
7. E-waste
8. Global Environmental Issues

9. Concept of Green Building
10. Concept of Smart Cities
11. Concept of 4R's

**List of Open Source Software/learning website: MOEF, NPTEL**