



**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**Bachelor of Engineering**  
**Subject Code: 3110007**

**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	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	0	0	100

**Content:**

Sr. No.	Content	Total Hrs	% Weightage
1	<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
2	<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
3	<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



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<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>40</b>	<b>40</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</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:**

Sr. No.	CO statement	Marks % weightage
CO-1	Identify the types of pollution in society along with their sources	45
CO-2	Realize the global environmental issues	25
CO-3	Conceptualize the principles of Green Buildings and Smart cities	15
CO-4	Implement the concept of recycle and reuse in all fields of engineering	15



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**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**