

# GUJARAT TECHNOLOGICAL UNIVERSITY

## ENVIRONMENTAL STUDIES

**SUBJECT CODE: 2110007**

**B.E. 1<sup>ST</sup> YEAR**

**Type of course:** Applied Science

**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<br>(E)        | PA<br>(M) | ESE<br>Pr/Viva (V) | PA<br>(I) |             |
| 3               | 0 | 0 | 3       | 70                | 30*       | 0                  | 0         | 100         |

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

### Contents:

| Sr. No.  | Topics   | Teaching Hrs. | Module Weightage |
|--|--|---------------|------------------|
| <b>UNIT I: ENVIRONMENT AND NATURAL SYSTEMS</b> |  |               |                  |
| <b>1</b>                                       | <b>Introduction to Environment and Environmental Studies:</b><br>Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System   | 02            | 6%               |
| <b>2</b>                                       | <b>Ecology and Ecosystems:</b><br>Introduction: Ecology- Objectives and Classification , Concept of an ecosystem- structure and functions of ecosystem<br>Components of ecosystem- Producers, Consumers, Decomposers<br>Bio-Geo- Chemical Cycles- Hydrologic Cycle, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs ,Ecological Pyramids<br>Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem,<br>Aquatic Ecosystem, Estuarine Ecosystem. | 04            | 11%              |
| <b>3</b>                                       | <b>Natural Resources:</b><br><b>a.</b> Renewable and Nonrenewable resources, exploitation and conservation, Role of individual in conservation of natural resources.<br><b>b.</b> Water resources: Water sources- Surface and Ground water   | 05            | 14%              |

|   |  |    |      |
|---|--|----|------|
|   | <p>sources, Indian and Global scenario.</p> <p>c. Land as a resource, social issues</p> <p>d. Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects, remedial measures.</p> <p>e. Food resources: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects of Agriculture.</p>   |    |      |
| <b>UNIT II: HUMAN POPULATION AND ENVIRONMENTAL POLLUTION</b>                                      |  |    |      |
| <b>4</b>  | <p><b>Human Population and Environment:</b><br/>Population Growth, World and Indian scenario, Population and Environmental Degradation, Malthusian theory, Optimum theory, Population explosion – Causes, Effects and Control.<br/><b>Urbanization:</b> Urban population growth and Environmental problems</p>   | 03 | 8%   |
| <b>5</b>  | <p><b>Environmental pollution:</b><br/><b>Types of Environmental Pollution:</b></p> <p>a) <b>Water Pollution:</b> Introduction – Water Quality Standards, Sources of Water Pollution: Industrial ,Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication</p> <p>b) Marine pollution-</p> <p>c) <b>Air Pollution:</b> 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>, Natural &amp; Anthropogenic Sources, Effects of common air pollutants</p> <p>d) <b>Land Pollution:</b> Land uses ,Land degradation: causes, effects and control, soil erosion</p> <p>e) <b>Noise Pollution:</b> Introduction, Sound and Noise, Noise measurements, Causes and Effects</p> <p>f) <b>Thermal Pollution:</b> Causes and effects</p> <p>g) <b>Role of individual in the prevention of pollution</b></p> | 08 | 22 % |
| <b>UNIT III: ENERGY AND GLOBAL ENVIRONMENTAL ISSUES</b>   |  |    |      |
| <b>6</b>  | <p><b>Energy Resources and Global Environmental Issues</b><br/><b>Energy resources:</b> Global and Indian energy demand scenario, Future Projections, Conventional and Non-conventional sources of energy, Advantages and Limitations, Utilization, Exploitation and related Environmental problems, Environmental implications of Non conventional Energy Sources.<br/><b>Global Environmental Issues:</b> Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer</p>   | 06 | 17 % |
| <b>UNIT IV: ENVIRONMENTAL LEGISLATION AND GUJARAT'S INITIATIVES FOR ENVIRONMENTAL PROTECTION:</b> |  |    |      |
| <b>7</b>  | <p><b>Environmental Acts and Regulations:</b> List of prevalent Environmental Acts, Brief description related to the purpose with at least five important provisions Water (Prevention and control</p>   | 04 | 11%  |

|  |   |    |     |
|--|---|----|-----|
|  | <p>of pollution) Act 1974, Air (Prevention and control of pollution) Act 1981, Environmental Protection Act, 1986</p> <p>Organization and Role of Institutions of Gujarat like Gujarat Pollution Control Board, Gujarat Environmental Management Institute, Gujarat Ecology Commission, Gujarat Institute of Desert Ecology, Department of Environment and Forest, Department of Climate Change, Gujarat State Disaster Management Authority.</p> <p>Environmental Awareness: Role of Non-Government Organizations.</p> <p>Environmental Ethics: Environmental Ethics, Objectives of ethics, Ethical theories, Code of Ethics, Importance and limitations of ethics, Environmental Ethics in India.</p> |    |     |
| <b>UNIT : V Environment education videos to supplement the class-room teaching</b> |   | 04 | 11% |

**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:**

1. After learning the course the students should be able to
2. Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment.
3. Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard.
4. Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.
5. To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention.
6. Identify different types of environmental pollution and control measures.
7. To correlate the exploitation and utilization of conventional and non-conventional resources.

**Major Equipments:** Multi media projector with computer

\*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding of environmental issues – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Environmental Studies is 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 the faculty, Department and College on the first slide. The best three works should be sent to [achievements@gtu.edu.in](mailto:achievements@gtu.edu.in).