

SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

II B. TECH – II SEMESTER

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16SAH212 ENVIRONMENTAL SCIENCE

(Common to All Branches)

Course Objectives:

Through the course sequence in Environmental Science, students will be able to:

- Recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment.
- Develop analytical skills, critical thinking, and demonstrate problem-solving skills using scientific techniques.
- Demonstrate the knowledge and training for entering post graduate or professional colleges, or the job market.
- Demonstrate their ability to communicate effectively in written and oral form, demonstrating the ability to create an appropriate annotated bibliography and the ability to use effective presentation skills.
- Develop a sense of community responsibility by becoming aware of scientific issues in the larger social context.
- Demonstrate interpretative skills including the ability to analyze data statistically, assess reliability, interpret results and draw reasonable conclusions.
- Develop standards of professional behavior that include rules of ethics and etiquette

UNIT – 1: Introduction to Environmental Science and Natural Resources

Introduction: Definition - Scope and importance of environment - Need for public awareness - Natural Resources: Forest resources: Use and over-exploitation - Deforestation - Conservation of forests.

Mineral resources: Use and exploitation - Environmental effects of extracting mineral resources - Case studies.

Energy resources: Conventional energy resources - Natural gas and Nuclear fuels - Non-conventional energy resources - Solar energy - Wind energy - Tidal energy - Geothermal energy and Biogas energy - Use of alternate energy sources - Case studies.

UNIT – 2: Ecosystem and Biodiversity

Ecosystem: Concept of an ecosystem - Structure and function of an ecosystem - Energy flow in the ecosystem - Food chains - Food webs - Ecological pyramids - Types - Characteristic features - Structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (Ponds - Streams - Lakes - Rivers - Oceans - Estuaries).

Biodiversity: Introduction to biodiversity - Genetic - Species and Ecosystem diversity - Value of biodiversity: Consumptive value - Productive value - Social value - Ethical value - Aesthetic and Option values - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT – 3: Pollution and Waste Management

Definition - Causes - Effects - Control measures of pollution.

Air Pollution: Types of pollutants - Their sources and impacts - Air pollution control

Noise Pollution: Impacts of noise - Permissible limits of noise pollution - Measurement of noise - Control of noise pollution.

Soil Pollution: Causes of soil degradation - Excessive use of fertilizers - Problems with pesticide use - Excess salt and water.

Solid waste management: Characteristics - Generation - Collection and transportation of solid wastes - Engineered systems for solid waste management (reuse, recycle, energy recovery, treatment and disposal).

UNIT – 4: Social Issues and the Environment

Water conservation measures - Rain water harvesting and water shed management - Resettlement and rehabilitation of people - Its problems and concerns - Case studies - Role of NGO's - Climate change - Global warming (Green house effect) - Ozone layer depletion - Acid rain - Nuclear accidents.

Sustainable development: Definition - Objectives - Environmental dimensions of sustainable development

UNIT– 5: Environmental Legislation and Human Population

Environmental acts: The water (Prevention and control of pollution) Act - The air (Prevention and control of pollution) act - The wild life (protection) act - The forest conservation act - The environmental protection act.

Case studies: Chipko movement - Narmada bachao andolan - Silent valley project - Chernobyl nuclear disaster - and Bhopal gas tragedy

Population growth: Variation among nations - Population explosion - Value education - HIV/AIDS - Role of information technology in environment and human health - Case studies.

Field Work

Visit to a local area to document environmental assets: River/ Forest/ Grasslands/ Mountains

Visit to local polluted site: Urban/ Rural/ Industrial/ Agriculture

Study of simple ecosystems: Pond/ River/ Hill slope etc.

Course Outcomes:

- Understand the natural environment and its relationships with human activities.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems.
- Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data.
- Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environment.

Text books:

1. Text book of Environmental Studies, 4/e, 2012, C.P. Kaushik and Anubha Kaushik, New Age International (P) Ltd., Publishers, New Delhi.
2. Text book of Environmental Studies, 1/e, 2008, Erach Bharucha, University Press (India) Private Ltd. Hyderabad.

Reference books:

1. Environmental Studies-From Crisis to Cure, 2/e, 2012, R. Rajagopalan, Oxford University Press , New Delhi.
2. A Text Book of Environmental science and Technology ,1/e, 2008, Dr.M.Anji Reddy, B.S. Publications, Hyderabad.

3. Principles of Environmental Science and Engineering, 1/e, 2005, Keerthinarayana and Daniel Yesudiam, Hi-Tech Publications , Chennai.
4. Glimpses of Environment , 1/e, 2005, Dr. KVSG Murali Krishna, Environmental Protection Society, Kakinada, India.
5. Environmental Studies, 1/e, 2009, Anindita Basak , Pearson Education, New Delhi.

SITMAS, CHITTOOR