

**1/4 B.Tech. SCOND SEMESTER
ENVIRONMENTAL SCIENCES**

CS 2T5

Required

Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Course context and Overview: Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them.

Prerequisites: -

Objectives:

1. To develop an awareness, knowledge, and appreciation for the natural environment.
2. To cultivate curiosity, critical reasoning, and evaluation skills.
3. Individuals, organizations and authorities are three different levels of actors with significant but different influence on the environment.
4. Environmental education could be seen as the answer to the question about what we should do or ought to do.
5. Upbringing and education play fundamental roles in how a person decides to live her life.
6. The Environmental ethics of sustainable development starts with the concept that we have moral duties to the people of future generations.
7. Environmental ethics are the set of values we have and how we reflect upon them and how we apply them.
8. Environmental education needs to start at an early age to touch your belief system.
9. To be effective environmental education should be combined with environmental communication.
10. The study of environment related behaviour has its historic roots in studies of health related behavior.

Learning Outcomes:

The student will be able to

1. Knowledge of impact of development and appreciation for the local and natural history of the area.
2. Hope for the better feature of the environment in the India which is based on many positive factors like biodiversity, successive use of renewable energy resources and other resources, increasing number of peoples movements focusing on environment.
3. Creating awareness among the youth on the various environmental concerns important in the long term interest of the society (Management plans & laws).

Develops skills required for research and analyze environmental issues scientifically and learn how to use those skills in field situations for sustainable environment.

UNIT – I

Ecosystems

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Definition, Scope and importance, Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids, Flow of energy, Bio-geochemical cycles, Bio-magnification, Ecosystem values, Services and carrying capacity.

UNIT – II

Natural Resources:

Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people.

Water resources - Use and over utilization of surface and ground water–Floods, drought, conflicts over water, dams – benefits and problems.

Mineral resources: Use and exploitation problems, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Organic Farming, Bio fertilizers and Bio-pesticides.

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies.

Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT - III

Biodiversity and its conservation:

Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic, option values and ecosystem service values. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - IV

Environmental Pollution: Definition, Cause, effects and control measures of:

1. Air pollution
2. Water pollution
3. Soil pollution
4. Marine pollution
5. Noise pollution
6. Thermal pollution
7. Nuclear hazards- and

Monitoring and Management of pollution

Solid waste Management: classification and characters of solid waste, factors affecting waste generation, collection and disposal of solid waste. E-waste and management.

UNIT – V

Global Environmental problems and Global efforts:

Green house effect, Green house gasses, Global warming, Climate change and their impacts on human environment, ozone layer depletion. International conventions / protocols: Earth summit, Kyoto protocol & Montreal protocol.

UNIT – VI

Environmental Impact Assessment & Management plans, Environmental Law: Definition of impact, Classification of impacts, Impacts of different components such as: human health, resources, air, water, flora & fauna. Environment management plans (EMP): Technological solutions for pollution control, Green-belt-development, Rain water harvesting, Remote sensing and GIS methods. Environmental law (Air, Water, Wild life, Forest Acts): Objectives of Acts, Institutional arrangements for Implementation and Regulation.

UNIT - VII

Towards Sustainable Future: From Unsustainable to Sustainable development, Population and its explosion, Urban problems related to energy, Consumerism and waste products, Role of IT in Environment and human health. Value Education. HIV/AIDS, Environmental ethics , Concept of green buildings and Clean Development Mechanism.

UNIT -

VIII Field

work:

Visit to a local area to document environmental assets River /forest grassland/hill/mountain - Visit to a local polluted site Urban/Rural/industrial/ Agricultural Study of common plants, insects, birds. -Study of simple ecosystems pond, river, hill slopes, etc.

Learning Resources

Text Books:

1. Erach Bharucha, 2010 “Text Book of Environmental Studies”, University Grants Commission, Universities Press (India) Pvt.Ltd., Hyderabad
2. Text Book of Environmental Sciences and Technology by M. Anji Reddy, BS Publications.

Reference:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Text Book of Environmental Science and Engineering by G.Tyler Miller Jr,2006 Cengage learning
3. Text Book of Environmental Studies from Crisis to Cure by R. RajaGopalan.
4. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada