22BEAS105 ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT

Hours Per Week :

L	T	P	C
2	0	2	3

PREREQUISITE KNOWLEDGE: Basics of importance of natural resources, ecosystems, biodiversity and disaster management.

COURSE DESCRIPTION AND OBJECTIVES:

The objective of this course is to focus on environmental issues and develop critical thinking skills, analyze the problems and create sustainable solutions. It identifies the problems of biodiversity and ecosystem and create solutions to conserve them. It provides training on modern analytical techniques for environmental analysis. It helps to ensure skills and abilities to analyze the impacts of disaster and apply strategies and methods to design, implement and evaluate research on disasters.

Source: https://www.aimsindia.com/blog/world-environment-day-protect-our-environment-and-protect-our-health/

MODULE- 1

UNIT-1   **8L+0T+8P=16 Hours**

NATURAL RESOURCES:

Scope and importance. Natural Resources: Renewable and non-renewable resources Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

UNIT-2   **8L+0T+8P=16 Hours**

BIODIVERSITY:

Role of an individual in conservation. of natural resources. Equitable use of resources for sustainable lifestyles. Ecosystems: Concept, Structure, function, Producers, consumers, decomposers, Energy flow, ecological succession, food chains, food webs, ecological pyramids. Introduction, types, characteristic features, structure and function of the forest, grassland, desert and aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity and its conservation: Introduction, definition, genetic, species & ecosystem diversity and bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. 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.

PRACTICES:

- Case Studies and 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 and study of simple ecosystems-pond, river, hill slopes, etc.
- Expected impact of climate change on agricultural production and water resources.

MODULE- 2

UNIT-1   **8L+0T+8P=16 Hours**

ENVIRONMENTAL POLLUTION:

Environmental Pollution: definition, cause, effects and control measures of a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Social Issues and the Environment from Unsustainable to Sustainable development, Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.

UNIT-2   **8L+0T+8P=16 Hours**

HUMAN POPULATION AND THE ENVIRONMENT:

Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Disaster Management: Natural Disasters and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community-based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

PRACTICES:

- Mitigation Strategies.
- Economics of climate change.
- Disaster Management introduction.
- Natural and Manmade Disaster Studies.
- Informatics for Disaster Management.
- Quantitative Techniques for Disaster Management Environmental Impact Assessment (EIA) and Disaster Management.
- Disaster Management Policy Environmental Modelling.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the basic concepts of natural resource utilization and sustainable agriculture for the purpose of food security and environmental protection.	Apply	1	1, 2, 3, 9
2	Analyze the pollutants in air, water and soil samples and suggest remediation measures.	Analyze	1	1, 2, 9, 12
3	Analyze various risks, relief needs, and lessons learned from previous disasters and formulate strategies of mitigation measures in future scenario.	Analyze	2	1, 2, 9, 12
4	Evaluate current events and public information related to biodiversity conservation especially for solving problems related to wildlife and ecosystems.	Evaluate	2	1, 2, 9, 12

TEXT BOOKS:

1. Bharucha Erach. Text Book of "Environmental Studies for Undergraduate Courses, 2005. University Grants Commission" University Press, Hyderabad.
2. Sharma J P. "Introduction to Environment Science", Lakshmi Publications, 2005.
3. Chary Manohar and Jaya Ram Reddy. "Principles of Environmental Studies", B S Publishers, Hyderabad, 2005

REFERENCE BOOKS:

1. Kaul S N, Ashuthosh Gautam "Water and Waste Water Analysis" Days Publishing House, Delhi, 2006.
2. Gupta P K. "Methods in Environmental Analysis – Water. Soil and Air" Agro bios, Jodhpur, 2004.
3. Climate change, Adaptation and mitigation of climate change-Scientific Technical Analysis Cambridge University Press, Cambridge, 1995.
4. Sharma, R.K. & Sharma, G. "Natural Disaster. APH Publishing Corporation" New Delhi, 2005.
5. Husain Majid, "Environment and Ecology: Biodiversity, Climate Change and Disaster Management" online book, 2003.