ENVIRONMENTAL SCIENCE

Course Code: KG21MC613

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B. Tech. III Year II - Semester

Prerequisites:

1. Knowledge of basic chemistry
2. Basic concepts of electro chemistry and polymers

Course Objectives: The objectives of this course for the student are to:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

Course Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT-I

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

Activities: Planting tree saplings – Forest resources; knowing the water sources of your local – documentation of the rivers of your state Food resources - Observe your personal diet for a week (Sunday - Saturday). Just record whatever you eat / drink and the amount. Rainwater conservation – Creating rainwater collection / storage pits in the nearby schools / villages

UNIT-II

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnifications, ecosystem value, services and carrying capacity, Field visits.

Activities: Nature selfie – photographs of the surroundings. Eco - friendly models – e.g., Clay moulded idols with seeds in it – Upon dissolution, sprouting of seeds are seen. 'Ganesh Chaturthi'

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

Activities: Visit to local national park, sanctuary or zoo – Photographic shooting of wildlife (flora and fauna). Biodiversity register – Prepare a list of the flora and fauna observed in the campus

UNIT-IV

Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of

pollution, drinking water quality standards. **Pollution control technologies**: Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation.

Activities: Solid Waste Management activity: Inventory of waste generation and their types Collection of recyclable wastes – old newspapers and books, records – recycle the paper waste with ITC under WoW scheme – Getting certificate as Corporate Social Responsibility – Getting books and stationery – distribute to the needy. Establishment of Vermi Compost pit and reaping the compost

UNIT-V

Environmental Policy, Legislation & EIA: Introduction to Environmental Protection act. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment. **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics. Concept of Green Building.

Activities: Case study on urbanization of our city.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.