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| **Course Code** | **Course Name** | **L-T-P** | **Credits** |
| CK102 | Environmental Studies | 2-0-1 | 3 |

COURSE OUTLINE **Environmental Studies**

**Module 1: Introduction to environmental studies**

Multidisciplinary nature of environmental studies

Concept of sustainability and sustainable development

Components of environment - atmosphere, hydrosphere, lithosphere and biosphere.

Scope and importance;

**Module 2: Ecosystems**

What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:

food chain, food web and ecological succession. Case studies of the following Ecosystems:

1. Forest ecosystem
2. Grassland ecosystem
3. Desert ecosystem
4. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

**Module 3: Natural Resources: Renewable and Non-renewable Resources**

* Land Resources and land use change; Land degradation, soil erosion and desertification.
* Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
* Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
* Heating of earth and circulation of air; air mass formation and precipitation.
* Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

**Module 4: Biodiversity and Conservation**

* Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hotspots
* India as a mega-biodiversity nation; Endangered and endemic species of India
* Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
* Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value**.**

 **Module 5: Environmental pollution**

* Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution
* Nuclear hazards and human health risks
* Solid waste management: Control measures of urban and industrial waste.
* Pollution - case studies.

 **Module 6: Environmental Policies & Practices**

* Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
* Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation
Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).
* Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context

**Module 7**: **Human Communities and the Environmen**t

* Human population and growth: Impacts on environment,
* human health and welfares.
* Carbon foot-print.
* Resettlement and rehabilitation of project affected persons; case studies.
* Disaster management: floods, earthquakes, cyclones and landslides.
* Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.
* Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
* Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

**Module 8: Field work**

* Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
* Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
* Study of common plants, insects, birds and basic principles of identification.
* Study of simple ecosystems-pond, river, Delhi Ridge, etc.

**Suggested Reading:**

1. World Commission on environment and Development. 1987. Our Common Future. Oxford University Press.
2. R. Rajagopalan (2018), Environment Studies: from crisis to cure, Oxford Publishing House
3. R. Rajagopalan (2019) Environment & Ecology, Oakridge publication