

Department of Environmental Sciences

SEMESTER -I

ENS-101

FUNDAMENTALS OF ECOLOGY

M.M. 70

- Unit -I Introduction to ecology and environmental sciences: Definition, Objectives, subdivisions and scope. Basic ecological tools and techniques. Relation between ecology and environmental sciences. General concepts of level of organization, Biosphere, Autecology and Synecology.
- Unit- II Environment and abiotic components of ecosystem: Atmosphere, lithosphere and hydrosphere. Abiotic environmental factors (temperature, light, water etc.), Different environmental laws and limiting factors (Liebig's law of minimum, Shelford's law of Tolerance, Combined concept of limiting Factors).
- Unit -III Biotic components of ecosystem: Biotic community (General characteristics of a community, Interdependence in a community and community metabolism) and ecological niche (concept, definition and types of niche, Gause's Principle), ecological succession and community evolution. Population ecology: Population characteristics and regulation of population size. Inter and intra specific interaction (Positive and negative interaction). Ecological genetics, Quantitative analysis of plant community, Quadrates, Frequency, Density, Important value Index (IV I).
- Unit -IV Dynamics of Ecosystems: Bio-geochemical cycle. Food chain and energy flow in ecosystems. Concepts of productivity and standing crops, ecological indicators, Ecological efficiencies, edge effect.
- Unit -V Diversity of Ecosystems: Bio geography and different ecosystems of the world (Lake, Pond, marine, estuarine and terrestrial ecosystems)

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Department of Environmental Sciences

SEMESTER -I

ENS-102

NATURAL RESOURCE CONSERVATION AND MANAGEMENT

M.M 70

- Unit -I Natural resources: Concept and classification and natural resources, Management of water resources — Concept and classification (Globe water balance, Ice sheets and fluctuation of sea levels, Human use of surface and ground water, Ground water pollution). Integrated water resources management. Watershed management; National lake and river conservation programme.
- Unit -II Mineral resources and Environment: Resources and reserves. Resource cycle. Mineral and population, Ocean as new area for exploration of mineral resources. Ocean ore and recycling of resources. Mineral Resources of Antarctica: metallic and non metallic deposits.
- Unit -III Soil management: soil loss & soil erosion. Conservation and management strategies. Role of organic matter and its maintenance, diagnosis of nutrient deficiencies. Remedial measures and management techniques.
- Unit -IV Energy resources: solar radiation and its spectral characteristics, Fossil fuels classification, composition, physico-chemical characteristics and energy content of coal, petroleum and natural gas. Principles of generation of hydroelectric power, tidal, ocean thermal energy conversion, wind, geothermal energy, solar collectors, photovoltaic, solar ponds, nuclear energy- fusion and fission: magneto hydrodynamic power, bioenergy-energy from biomass and biogas, anaerobic digestion, energy use pattern in different parts of world.
- Unit -V Forest management: Forest- land use changes in India- future demands of forest lands. Captive plantation, community forest management, forest rehabilitation, urban forestry, Protected area management and conservation. Integrated development programme in forest area,

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Department of Environmental Sciences

SEMESTER -I

ENS-103

FOREST AND WILDLIFE ECOLOGY

M.M. 70

- Unit-I Forest types, organization and productivity: Major types and composition of forests of India, structural organization of forest ecosystems, Primary production in different ecosystems and methods of measurement of primary production, Social forestry: Objectives, scope and necessity, agro forestry, Extension forestry, Eucalyptus dilemma, People's participation, Role of NGO's.
- Unit- II Silvicultural practices: Silvicultural principles, different silvicultural practices, impact of deforestation and shifting cultivation on forest ecosystems. Forest management: Objectives and principles, techniques, sustainable yield relation, biodiversity and Forest.
- Unit- III Values of wild life. Wildlife census methods (waterhole survey, point count and line transect methods, pug marks count method, King's census method), Components of wildlife habitat (Cover, Food, Water and Space), Common flora and fauna of India.
- Unit- IV Indian wildlife (Introduction, distribution of wildlife in ecological subdivision of India), IUCN Categories, National Parks, Wildlife Sanctuaries, Biosphere Reserves and Zoos in India, Gene pool. Habit, Habitat and breeding biology of few mammals (viz. Elephant, Tiger) and birds (viz. Weaver bird, Oriental Magpie Robin). Wildlife protection: wild life and range management, management of Forest Fire, Role of NGO's in wildlife and forest conservation, Agenda-21.
- Unit- V Reasons for wildlife depletion (Habitat destruction, Commercial wildlife exploitation, Overgrazing etc.), Eco-tourism management, Measurement for wildlife conservation (Ecological basis, Policies and programmes of wild life conservation and management), Special projects for endangered species (Project tiger, Gir lion Sanctuary Project, Sea turtle, Crocodile breeding project, Project Hangul), International trade of wildlife, Animal cruelty: causes and prevention.

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Department of Environmental Sciences

SEMESTER -I

ENS-104

GENERAL ENVIRONMENTAL ASPECTS

M.M. 70

- UNIT -I Evolution, Origin of life and Speciation, Human ecology and human settlement, Environmental Education and Awareness, Environmental Management: meaning and need.
- UNIT -II Convention on Conservation of Antarctic marine living resources (1980), Treaty on principles governing the activities of state in the exploration and use of outer space (1967). The citizens convention on biodiversity/biological (1992), International convention on the high seas, fishing and living resources (1958), Intervention of oil pollution casualties (1969).
- UNIT -III Environment issues in India viz. Narmada dam, Tehri dam, Chipko movement, Beej Bachao Andolan, Green revolution, Silent valley movement, Urja gram, CNG implementation in Delhi. Formation and reclamation of wastelands: User, Alkaline and Saline soil. Epidemiological issues: Goiter, Fluoriasis and Arsenic poisoning.
- UNIT -IV Environmental priorities in India, Sustainable development: concept, objectives and principles. Challenges for sustainable development: Social, Political and Economic considerations, Role of individual and community in Sustainable development. Urban and rural planning, power generation, fly ash: utilization of fly ash, disposal & Recycling Resettlement and rehabilitation process.
- UNIT -V Wetlands conservation, Water crisis and rainwater harvesting, Water conservation, Coastal management: Concept scope uses and strategies. Desertification and its control, Coral reef conservation.

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