

BIODIVERSITY ADD-ON COURSE

(COMMON FOR FIRST AND SECOND YEAR)

1. Basic Concepts of Biodiversity

Introduction to the Concept of Biodiversity. Levels of biological Diversity. Biogeographic Zones of India. Global Biodiversity Hotspots. Biodiversity Hotspots in India. India as a Mega-Biodiversity Nation. Threats to Biodiversity and Causes of Biodiversity Loss. Biodiversity Conservation. Biodiversity Services. Taxonomy and its Relevance to Biodiversity Studies,

2. Floral Diversity

Introduction to Various Plant Groups (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms). Taxonomy-A Brief Introduction to plant nomenclature. Brief Introduction to Plant Classification. Plant Identification (Taxonomic Literature, Herbaria, Virtual Herbaria, Botanical Gardens, Identification Keys, etc.). Online Plant Databases. Phytogeographical Regions of India. Vegetation Types in India with Special reference to Himachal Pradesh. Floral Diversity in Himachal Pradesh. IUCN Threat Categories. Endemism in Indian Flora with special emphasis on Flowering Plants and the Himalaya

3. Faunal Diversity

Faunal diversity profile of India (focusing on specific ecosystems aquatic and terrestrial and also biogeographic regions). Animal distribution and zoogeography. Species concepts, Morphospecies/ Recognisable Taxonomic Units (RTUs), Molecular taxonomy, Integrative taxonomy. Taxonomic collections, descriptions, identification keys, species checklists and their relevance. Concept of Rare, Threatened and Endangered fauna. Ecologically and economically important fauna- both beneficial and harmful

4. Ecosystems

Ecosystems-Concept and Structure. Energy Flow in Ecosystems, Food Chains and Webs. Ecosystem Services. Major Ecosystems with Special reference to Himachal Pradesh: Terrestrial (Forest, Grasslands) Ecosystem, Wetlands Ecosystem, Mountain Ecosystem, Cold Desert Ecosystem

5. Field Surveys, Collection, Preservation, Identification and analysis of Flora & Fauna

Field surveys, collection, preservation and curation of fauna, with special focus on major invertebrate and vertebrate phyla. Labelling and documenting collection data, cataloguing, databasing and maintenance of collections/museum specimens. Morphology of flowering plants (vegetative and reproductive parts) and acquainting botanical terms. Method of dissecting floral parts and observation. Introduction to local flora with their local and botanical names. Collection of plants and field data. Method of poisoning, mounting and preservation of plant specimens (herbarium/museum). Incorporation and curation of specimens (herbarium/museum). Method of identification using Floras/Revisions/Monographs. Preparing artificial keys for identification

6. Economic Plant Resources

Cereal and Pseudo-cereal Crops of Himachal Pradesh. Common Pulse Crops of Himachal Pradesh. Vegetable Crops and Wild Vegetables in H.P. Fruit Crops and Wild Edible Fruits of Himachal Pradesh. Medicinal Plants with Special Reference to Himachal Pradesh.

7. Traditional Knowledge/ Ethnobiology

Concept of Traditional Knowledge and Ethnobotany. Traditional Indian Medicinal Systems. Medicinal Plants in Folklores in Himachal Pradesh. Indigenous Tribal Communities in Himachal Pradesh and Their Traditional Knowledge with special reference to plants. Role of Ethnobotany in Modern Medicine. Biopiracy and Intellectual Property Rights. Protection of Interests of Ethnic Groups and Sharing of Wealth (with Ethnic Communities) Concept with examples. Sacred Groves and Plant Conservation

8. Biodiversity for Sustainable Development

Biological resources, Forest and Biodiversity Laws in India. Institutional framework under the Biological Diversity Act 2002. Role of State Biodiversity Boards and Biodiversity Management Committees in under the Biological Diversity Act 2002. Methodology and preparation of PBR. Fauna and Flora documentation (wild as well as domesticated, including aquatic-both freshwater and marine). Traditional knowledge documentation in PBR. Landscape, lifescape, waterscape and soil types documentation in PBR. Data collection on socio-economic and other institutions/facilities.

9. Threats to Biodiversity and Conservation of Biodiversity

Major threats to biodiversity and impact of pollution on biodiversity components. In-situ and ex-situ conservation, keystone species, IUCN Threatened Categorization. Protected Area Network in India and Himachal Pradesh.

10. Basics of Computer Skills and GIS

Fundamental of Computer, MS Office, Internet and Email. Cleaner Production/Waste Minimization: Concept & Principles. Introduction to Geographical Information Systems, GPS coordinates. Introduction to Google Earth and GIS Software - ArcGIS, QGIS and Google Earth. Use of Mobile android applications in collecting data for mapping. Open Street Maps (OSM)