

ELECTIVE COURSES

COURSE-FOREST ECOLOGY (MSCBOT-607)

Syllabus:

- **Introduction of forest ecosystem:** Forest ecology and forest ecosystem, Importance of forests in environment conservation, Wildlife biodiversity and Climate change, Primary productivity and Detritus Pool- Solar radiation and energy units, Concepts of Primary productivity.
- **Primary productivity:** Photosynthetic pathways and their significance, photosynthetic capacity; distribution of biomass; Allocation of Net Primary Production and accumulation of biomass; measurement of biomass and primary productivity in forest ecosystem of the world; plant biomass and turnover; efficiency of energy captured, Human Use of Productivity- Environment factors and productivity.
- **Litter fall in Forest Ecosystem:** Determining litter fall, factors affecting it; Forest litter; type of litter; Coarse woody debris; Forest floor litter mass.
- **Detritus Pathway of Energy Flow and Decomposition Processes:** Decomposers organisms and their trophic interactions; decomposition processes; Measurement of Litter Decomposition; Decomposition rate.
- **Nutrient Cycling in Forest Ecosystems:** The nutrient cycle models in forest ecosystem.
- **Ecosystem Inputs of Nutrients:** Atmosphere, Weathering of rock minerals, Hydrologic inputs, Biological inputs, Biotic accumulation and storage of Nutrients in plants; Nutrient outputs (Ecosystem losses), Stream water losses, losses to the atmosphere; Nutrient losses due to fire, Nutrient losses in forest harvest.
- **Intra-System Cycle-** Availability of Nutrients in soil solution; Nutrient supply and uptake, Role of mycorrhizae in nutrient cycling; Nutrient concentration and storage in vegetation, Nutrient reabsorption; Nutrient return from vegetation to soil; Decomposition and Nutrient release, Nutrient use efficiency, Nutrient conserving adaption in oligotrophic soil; Effects of N and P enrichment on biodiversity.
- **Forest Hydrology:** Impact of forest on precipitation apportionment, Water discharge from watersheds, Role of water in nutrients cycling.
- **Succession and Major Forest types of India:** An idea of forest succession with focus on Himalayan forest ecosystem, Attributes of species of different successional stages; Recovery measures of disturbed sites and species selection for disturbed sites in Himalaya, **Major Forest types of India:** Forest classification of India; Forest of Himalaya with particular reference to Sal, Pine and Oak forests.
- **Global Climate Changes and Forests**

- **Man and Forests:** Commercial exploitation of forest, Shifting Agriculture; Settled Agriculture; Structure and Functioning of Central Himalayan Agro-ecosystem. Regeneration status of major Forests trees acute vs chronic Human disturbance; shifting cultivation

Unit Schedule

Block-1-Forest Ecology and Forest Ecosystem

Unit 1- General Aspects of Forests

Unit 2- Formulation of primary productivity

Unit 3- Litter fall in Forest Ecosystem

Block-2-Energy Flow and Nutrient Dynamic

Unit-4- Detritus pathway of Energy Flow and Decomposition Processes

Unit-5- Nutrient Cycling in Forest Ecosystems

Unit-6- Ecosystem Inputs of Nutrients

Unit-7-Intra-system cycle

Unit-8- Forest Hydrology

Block-3-Succession, Global climate change

Unit-9- Succession

Unit-10-Major forest types of India

Unit-11- Global Climate Changes and Forests

Unit-12- Man and Forests