

DEPARTMENT OF FORESTRY

**Post Graduate Diploma in Mountain
Ecosystem and Climate Change**

(Semester System)

SYLLABUS

KUMAUN UNIVERSITY

NAINITAL

Post Graduate Diploma in Mountain Ecosystem and Climate Change

Course Outline

I Semester		
S. No.	Paper	Marks
1.	I- Mountain Ecosystem	100 (ext.75+ int.25)
2.	II- Natural Resources	100 (ext.75+ int.25)
3.	III- Climate Change: An overview	100 (ext.75+ int.25)
4.	IV- Biodiversity and Ecosystem Services	100 (ext.75+ int.25)
5.	V- Field Assessment Report and Practical	100 (ext.75+ int.25)
Total Marks		500

II Semester		
S. No.	Paper	Marks
1.	I- Soil and Water Conservation	100 (ext.75+ int.25)
2.	II- Forest Fire and Ecosystem Restoration	100 (ext.75+ int.25)
3.	III- Role of Women in Environmental Conservation	100 (ext.75+ int.25)
4.	IV- Analytic Technique	100 (ext.75+ int.25)
5.	V- Dissertation, Fieldwork and Practical	100 (ext.75+ int.25)
Total Marks		500

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The Syllabus

SEMESTER - I

PAPER I: MOUNTAIN ECOSYSTEMS

Concept, ecosystem structure, ecosystem function, ecosystem boundary, ecosystem processes, Mountain and Uplands- An Introduction, Characterization of Mountain Ecosystem, past environmental change in mountain and uplands, possible future changes in Mountain Environment; Mountain system and adjacent plains, interrelations between mountains and people; India's environmental issues; Environment impact assessment, Ecosystem health and biological integrity.

PAPER II: NATURAL RESOURCES

Biogeography and ecology, Mountain resources- forest, grassland, alpine meadow, water, livestock; Human dimension in ecology-dependence of hill communities on forests, major non timber forests products, value addition, reasons for depletion of resources, programme on sustainable development, ecology and resource conservation linkages, Natural resource-based industries.

PAPER III: CLIMATE CHANGE: AN OVERVIEW

Science of climate change-Greenhouse effect, greenhouse gases, CO₂ fertilization effects on plants, possible effects of global warming, tools to study the climate change, approaches to deal with global warming. Climate change mitigation- International initiative for mitigating global climate change, India's initiative for mitigating climate change, impact of climate change in the mountain regions, aerosols and land use changes mixing local level knowledge with scientific know how to develop adaptive strategies against climate change, Scientific methods for assessing Carbon accumulation in forests and soil, impact of climate change on glacial-ecology. Role of national and international organizations in policy, planning and sustainable development.

PAPER IV: BIODIVERSITY AND ECOSYSTEM SERVICES

Biodiversity, global accumulation of biodiversity, levels of biodiversity, biodiversity and livelihood, Agro biodiversity, hotspots of biodiversity, disturbance, climate change and biodiversity, biodiversity assessment and inventory, threats and conservation of biodiversity, India's biodiversity and its conservation, International efforts for conserving biodiversity, nature and status of invasive species, vulnerability of ecosystem to invasion, impact of invasive species, International initiative for control of invasive species. Ecosystem services of biodiversity.

PAPER V: FIELD ASSESSMENT REPORT AND PRACTICAL

Visit to alpine areas, glaciers, forest types, rural communities, attachment with industries, NGOs, semi-government agencies/ institutions.

SEMESTER - II

PAPER I: SOIL AND WATER CONSERVATION

Component of soil, soil development, soil profile, pedogenic regimes, soil classification and properties, biodiversity of soil organisms, impact of soil loss, soil conservation measures in the hills-local and scientific methods, water, water scarcity, water conservation measures, local know how available, integrating local and scientific knowledge to develop adaptation strategies.

PAPER II: FOREST FIRE AND ECOSYSTEM RESTORATION

Global warming and forest fires, shift in time of fires, impact of fire on the livelihood of locals, types of fire, effect of fire on air, effect of fire on flora and fauna, practical value of fire, preventive measures, impact on soil and water, remedial measures. Wastelands, mining, quarrying, degradation hazards and their mitigation, measures of ecosystem restoration.

PAPER III: ROLE OF WOMEN IN ENVIRONMENTAL CONSERVATION

Involvement of women in forest conservation strategies. Van panchayat of Uttarakhand and role of women in conservation, developing case studies on successful stories for replication, brief history and recent development in ecological restoration, restoration terms and definition, strategies of restoration, restoration plan and rehabilitative measures, examples of ecosystem restoration (terrestrial and aquatic), Natural resource conservation.

PAPER IV: ANALYTIC TECHNIQUES

Vegetation analysis- density, frequency, abundance. IVI, species richness and diversity. Climatic parameters- rainfall and effect of temperature, humidity and effect of snow and frost on vegetation Soil physical and chemical properties- soil texture, moisture, porosity etc, carbon, nitrogen, phosphorus, calcium etc. Ecosystem restoration. Water monitoring GIS and Remote sensing techniques and use of GIS.

PAPER V: DISSERTATION, FIELDWORK AND PRACTICAL

The dissertation topic will be given by the concern teacher to the student in the field of forest ecology, biodiversity, agroforestry, ecotourism, physiology, forest management (community and government owned forests), NTFP's, soil and water conservation, forest fire and role of women in environmental conservation in mountain region and project report/field training including practical works will be given to the students so that the skill, entrepreneurship and value addition related task could be developed.
