

DEPARTMENT OF FORESTRY, WILDLIFE AND ENVIRONMENTAL SCIENCES
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)

Course Structure of Ph.D. Program in Forestry and Environmental Sciences

Paper	Title of the Paper	Marks	Credit	Hours/Week
Paper I	Research Methodology	100	04	04
Paper II	Forest Ecosystem Management	100	04	04
Paper III	Forest Measurements and Tree Improvement	100	04	04
Total		300	12	12

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Syllabus

Ph.D. Course Work of Forestry and Environmental Sciences

Paper I Research methodology

Unit-I

- Data entry and computation, statistical analysis (LSD, Correlation, regression, ANOVA), Statistical software (SPSS), RS & GIS softwares (ERDAS, ArcGIS, QGIS, 21st Century).

Unit-II

- Types of survey, inventory making, sampling designs.
- Instrumentation- Working principles and functions of surveying and analytical instruments used in forestry and environmental sciences research, (CHNS, Spectrophotometer, Nitrogen Analyzer, Air pollution monitoring systems, Whether monitoring station) working plan and resources survey.

Unit- III

- Identification of research problems, preparation of synopsis, review of literature, research paper writing, study of scientific databases, citation index.
- Experimental designs, methods of data collection, tabulation, data analysis and interpretation.

Unit-IV

- Environmental impact assessment, Air pollution tolerance index assessment, Meteorological data collection, Wildlife census, tranquilizer drugs, radio collaring, forensic test of parts of wildlife.

Paper - II Forest Eco-system management

Unit-I

- Indian and world Forestry systems, evolution of forest and bio-diversity assessment and conservation techniques.
- Criteria and indicators of sustainable forest management, community forest management.
- Conservation forestry- National Parks, biosphere reserves, centuries, arboretum, arboretum management, animal census, wildlife crime mitigation measures, forensic probes in wildlife litigation cases, human animal conflicts mitigation measures.

Unit-II

- Wood formation in trees, composite and improved wood, certification of wood.
- Natural resources economics and policy, value addition and marketing of important commercial non-wood forest products (Lemon grass, Khas grass, tendu

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leaf, Lac and medicinal plants (*Celastrus peniculata*, *Santalum album*, *Pterocorpu santalinus*)

Unit-III

- Forest services, environment and climate change, national action plan on climate change, green India mission, international negotiation and treaties on climate change, ISFR reports, carbon stocks in India's forest and soil, goals of sustainable development, soil, plant and liter analysis.
- Forest soils and tree growth, sustainable management of soil resources.

Unit-IV

- Forest protection- disease and pest in forest trees, forest fire, integrated pest management, bio-control methods.

Paper - III Forest Measurements and Tree Improvement

Unit- I

- Forest genetics and tree breeding, selection and breeding for tree improvement, forest genetic resources of Chhattisgarh.
- Seed viability and its testing, cryopreservation, transgenic trees, molecular markers.

Unit- II

- Carbon fixation, water absorption and transport, ascent of sap, nitrogen fixation, water stress and mineral stress physiology.

Unit-III

- Measurements of diameter, height, canopy, volume, biomass, mapping of vegetation, land use and land cover, and water bodies through RS & GIS, carbon stock assessment in soil and vegetation.

Unit- IV

- Actonorhizal and mycorrhizal technology, Nursery practices of Shisham, Eucalyptus, *Termanilia*, Bamboo, Lemon grass, Khas grass and medicinal plants (van tulsi, Alo-vera, Safed musli).

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