DEPARTMENT OF FORESTRY

B. Sc. Forestry (TDC)

(Semester System)

SYLLABUS

3-Year Programme

(02-Paper Pattern)

To be applicable from, July 2019

KUMAUN UNIVERSITY

NAINITAL

B. SC. FORESTRY
Course Outline

I Semester	
	Max. Marks: 200
Paper I: Forest Ecology and Biodiversity	80(60+20)
Paper II: Silviculture and Silvicultural Systems	80(60+20)
Practical	40(30+10)
Total	**200**

II Semester	
	Max. Marks: 200
Paper I: Forest Mensuration and Biostatistics	80(60+20)
Paper II: Forest Management	80(60+20)
Practical	40(30+10)
Total	**200**

III Semester	
	Max. Marks: 200
Paper I: Nursery Management	80(60+20)
Paper II: Plantation Technology and Tree Improvement	80(60+20)
Practical	40(30+10)
Total	**200**

IV Semester	
	Max. Marks: 200
Paper I: Forest Protection	80(60+20)
Paper II: Forest Utilization	80(60+20)
Practical	40(30+10)
Total	**200**

V Semester	
	Max. Marks: 200
Paper I: Wildlife Management and Ecotourism	80(60+20)
Paper II: Agroforestry and Social Forestry	80(60+20)
Practical	40(30+10)
Total	**200**

VI Semester	
	Max. Marks: 200
Paper I: Forest Policies and Laws	80(60+20)
Paper II: Wood Science and Technology	80(60+20)
Practical	40(30+10)
Total	**200**

SEMESTER – I

Paper I (6103) - Forest Ecology and Biodiversity

1. Definition, division, scope and importance of ecology in forestry and basic concept of forest ecology.
2. Ecosystem- structure, components and important ecosystems, forest grassland, desert and pond ecosystem.
3. Ecological energetic- concepts of energy flow, tropic structure, food chain, food web and ecological pyramids.
4. Forest population, population size and regulation, structure and communities- vegetational analysis, biomass, productivity, litter production and forest floor mass and concept of niche, nutrient cycling and nutrient use efficiency.
5. Climatic factors- Solar radiation, temperature, precipitation (rainfall, snow and frost) and frost damage, moisture, atmospheric humidity and wind.
6. Topographic factors, Edaphic factors, Biotic factors- influence of plants.
7. Competition, parasite, epiphytes, climbers, weeds, and influence of wild animals, influence of man and his domestic animals.
8. Plant Succession- causes, mechanism of succession, kind of succession, primary succession, secondary succession and concept of climax.
9. Definitions, scope and importance of biodiversity, Biological Diversity Act, 2002.
10. Regions of biodiversity. Assessment of biodiversity, threats to biodiversity: Ex- situ and in-situ conservation and hotspot areas.

Paper II (6104) – Silviculture and Silvicultural Systems

1. Definition, objectives, scope of silviculture and its branches.
2. Locality factors: climatic, edaphic, topography, and biotic influences of forest vegetation.
3. Form and growth trees- tree morphology: stem, root system, form of roots, adaptability and mycorrhizae, lignotubers, root nodules,
4. Tree growth: stages of growth, phenology, germination and establishment. Seasonal

progress of growth, height and diameter growth and reproduction.

5. Natural regeneration and methods of natural regeneration, Assisted Natural Regeneration (ANR).
6. Artificial regeneration and methods of artificial regeneration.
7. Forest types of India.
8. Definition and classification of systems. Clear felling systems, shelter wood system, uniform system, group system, irregular shelter wood systems, strip system, selection system, group selection system, accessory system, coppice system, coppice selection system, coppice with standard system.
9. Distribution, phenology of trees, growth characteristics, silvicultural characters, regeneration methods, management and economic importance of the following species: *Abies pindrow, Picea smithiana, Cedrus deodara, Pinus roxburghii, P. wallichiana, Quercus sp., Acacia nilotica, A. catechu, Dalbergia sissoo, Shorea robusta, Eucalyptus hybrid, Populus deltoids, Tectona grandis,* Bamboo spp.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

II SEMESTER

Paper I (6203) – Forest Mensuration and Biostatistics

1. Definition, importance and principles of measurements.
2. Diameter and girth measurements, place and standard rules of breast height measurement, bark thickness and instruments used.
3. Principles of height measurements, instruments used for measurement of height, height measurement under different field condition.
4. Metzger's theory of tree form, form factor, form quotient, form point.
5. Definition, object, and measurement of volume of felled and standing trees, classification and use of volume tables.
6. Object and methods of determination of age of standing and felled trees. Tree growth and growth curves, measurement of growth by increment boring, increment, increment percent for diameter and volume.
7. Collection, frequency distribution, diagrammatic and graphical representation of data statistical mean, mode, median, mean deviation, standard deviation and standard error, simple correlation and regressions.
8. Test of significance- based on normal, t and X^2 test
9. Sampling techniques – Simple, random, stratified and systematic sampling.

Paper II (6204) – Forest Management

1. Definition and scope, management of private forest vis-a-vis public forests, objects of management.
2. Forest organization: Geographical and ecological classification, functional classification, legal classification, territorial classification, administrative classification. Management Classification.
3. Sustained yield and arguments for and against sustained yield principles, increasing and progressive yield, CAI and MAI curves, increment percent.
4. Distribution of age classes and age gradation in even and uneven aged forest and growing stock.

5. Normal forest- basic factors of normality, kinds of abnormality in regular and irregular forest.
6. Yield regulation: Definition, principle and method of yield, area method. Von Mental Method for yield regulation.
7. Rotation: Definition and concept of rotation, types of rotation and conversion period.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

III SEMESTER

Paper I (6303) – Nursery Management

1. Definition, importance and objectives and types of nursery, nursery sites and area, seed bed, methods of sowing, quality of seeds, time of sowing.
2. Shading, watering and damping off, weeding, soil working and transplanting, and culling.
3. Plant containers, fertilizers and manures, micro-propagation and misting units etc.
4. Quality seed production – introduction, scope, seed sources, seedling established, seed biology and seed production.
5. History of forest seed production in India. Seed stands and seed orchards, collection methods, handling, storage and supply of seeds, seed testing.
6. Growth and growth regulators, relative growth rate, plant hormones- auxins, gibberellins, cytokininis and ethylene.

Paper II (6304) - Plantation Technology and Tree Improvement

1. Definition, aims and objective of plantation forestry. Plantation organization and structure.
2. Types of plantations, reasons for failure and remedial techniques.
3. Types and pattern of planting, stump planting, advantages of stump planting.
4. Pre-plantation practices: digging of pits and water conservation measures for different sites. Nurse crop, cover crops and mulching.
5. Afforestation of problematic sites: drought prone, arid, semi-arid zones, waterlogged, saline and alkaline land, sandy soils, denuded hills and suitable species for plantation in these sites.
6. Tree breeding: control pollination, hybridization, polyploidy and mutation.
7. Vegetative propagation, plus trees selection and progeny trials, Seed orchards, types and their management and seed production area.
8. Tending operation- weeding, cleaning and thinning.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

IV SEMESTER

Paper I (6403) - Forest Protection

1. Introduction of forest pathology and forest entomology.
2. Introduction of various plants pathogens fungi, bacteria, viruses etc. Symptomlogy and identification of plant diseases.
3. Classification of forest tree diseases and their control.
4. Common diseases in forest trees root rot, heart rot, wilt, stem canker, stem rust, die-back, galls, leaf spots, leaf blight, powdery mildew and leaf rust.
5. Nursery diseases. Diseases caused by phanerogamic plant parasite like *Dendrophthoe, Acanthobium, Loranthus* etc.
6. Principles of tree diseases control: cultural, chemical and biological control methods.
7. Protection against injuries to plants by -defoliating, sap sucking and mites, shoot, twig and root insects seed and cone insects, wood boring insects and gall markers.
8. Methods of control against insects and pests- silvicultural, biological and chemical.
9. Forest fire, encroachment, shifting cultivation, illicit felling, grazing/ browsing.

Paper II (6404) - Forest Utilization

1. Definition, scope and logging practices.
2. Felling, extraction, felling tools, season of felling, method of felling and conversion.
3. Transportation- major and minor transportation, storage and types of depots of timber, their management, extraction and disposal of timber.
4. Introduction, objectives and scope, Major and minor forest produce, Important commercial timber and its uses in different industries.
5. Minor forest products like grass oil, seed oil, tans and dyes, gum, resin, rubber, fibre and flosses, animals and minerals and other miscellaneous products.
6. Medicinal plants- drugs species, edible and poisons important medicine of Uttarakhand.
7. Important forest industries- Paper and pulp, cutch and katha, bidi, furniture, sport goods, pencils, toys, plywood and match.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

V SEMESTER

Paper I (6503) - Wildlife Management and Ecotourism

1. Conservation and restoration of Biodiversity and IUCN Red Data Book and Protected areas.
2. Biodiversity Conservation Bill, 2016.
3. Definition, concept and history of wildlife management in India, wildlife values and conflicts, NTCA, 2006.
4. Rare, threatened and endangered species of India. Protected area management -Wildlife Sanctuaries, National Parks, Zoological parks and Biosphere reserves, census methods, community reserve, game reserve.
5. Project tiger, project elephant. Description of Tiger, Lion, leopard, antelopes, Black Buck, Rhinoceroses, Elephant, Alligators. Wildlife (Protection) Act 1972 and its amendments.
6. Various Government and private agencies involved in wildlife conservation.

Paper II (6504) - Agroforestry and Social Forestry

1. Definition, objectives, scope and constrains of agroforestry.
2. Choice and characteristics of species for agroforestry. Multipurpose tree (MPTs) in Agroforestry, crop interaction, Soil Productivity aspect of Agroforestry and economic aspect of Agroforestry.
3. Agroforestry systems. Socio-economics and ecological aspect of Agroforestry. Management of trees in Agroforestry, diagnosis and design techniques, Lopping cycle fodder values of trees, alley and hedge cropping.
4. Introduction, objectives, concept, scope and types of social forestry and community forestry. Social forestry practices.
5. Income and employment, important social forestry tree species, types of participatory and community forestry, van-panchayat, van panchayat rules and modification.
6. Role of social and community forestry in rural economy and natural resources management.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

VI SEMESTER

Paper I (6603) - Forest Policies and Laws

1. Definition and components- atmosphere, hydrosphere, lithosphere and biosphere.
2. Natural resources and their management- forest, wildlife, water and land resources.
3. Definition and background of forest policy, laws and act.
4. National forest policy 1894, 1952, 1988 and its modification in brief Indian Forest Act 1927 and 2018, Forest Conservation Act 1980. Environmental (Protection) Act 1986.

Paper II (6604) - Wood Science and Technology

1. Gross structure of wood, cellular composition of bark, sap wood, heart wood and pith, early wood, growth rings, grain, texture and identification of wood.
2. Physical properties of wood: weight, density, reaction of heat, sound, light and electricity on wood, thermal expansion, moisture content, porosity, colour, and wood working qualities.
3. Mechanical properties of wood: factor influencing strength, hardness, flexibility, elasticity, fissility and combustibility.
4. Defects and abnormalities of wood: Natural defects, method of evaluation and measurement, influences of defects on conversion and utilization, defects during processing, manufacturing.
5. Composite wood and improved wood: plywood, laminated wood, core boards, sandwich boards, fibre board and particle board.
6. Seasoning of wood – principles and methods, air, solar and kiln seasoning.
7. Wood preservation: causes and methods, different preservatives and their properties.

Practical

- Practical will includes all the exercises as given by respective subject teachers covering both the theory papers.

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