National Education Policy-2020

Common Minimum Syllabus for Uttarakhand State Universities and Colleges

PROPOSED SYLLABUS OF FORESTRY

Effective from the academic session 2025-26

of

Four Years Undergraduate Programme/ HonoursProgramme/Master's in Forestry

DEPARTMENT OF FORESTRY

0EXPERT COMMITTEE

S.N.	NAME	DESIGNATION	DEPARTMENT	AFFILIATION
1.	PROF. JEET RAM	PROFESSOR AND HEAD	FORESTRY	KUMAUNUNIVERSITY, NAINITAL
2.	PROF. A. K. YADAVA	PROFESSOR AND HEAD	FORESTRY	SOBAN SINGH JEENA UNIVERSITY, ALMORA
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SYLLABUS PREPARATION COMMITTEE

S.N.	NAME	DESIGNATION	DEPARTMENT	AFFILIATION
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CONTENTS

List of Papers (DSC, GE, AEC, SEC, VAC) with Semester wise Titles for 'Forestry'					
Year	**Semester**	**Course**	**Paper Title**	**Theory/ Practical**	**Credits**
Undergraduate Certificate in Forestry					
FIRST YEAR	I	DSC	Introductory Forestry	Theory/Practical	3+1
		GE	Principles and Practices of Forestry	Theory/Practical	3+1
		AEC	Indian Language	Theory	2
		SEC	Nursery Technology (University Pool)	Theory	0+2
		VAC	Environmental Education	Theory	2
	II	DSC	Forest Ecology	Theory/Practical	3+1
		GE	Participatory Forest Management (University Pool)	Theory/Practical	3+1
		AEC	Indian Language	Theory	2
		SEC	Nursery Technology (University Pool)	Theory	0+2
		VAC	Environmental Education	Theory	2
Undergraduate Diploma in Forestry					
SECOND YEAR	III	DSC	Principles of Silviculture	Theory/Practical	3+1
		DSE/ GE	Forest Biodiversity and Conservation	Theory/Practical	3+1
		AEC	Indian Language	Theory	2
		SEC	Plantation Technology/IAPC (University Pool)	Theory	0+2
		VAC	Value addition to NTFP	Theory	2
	IV	DSC	Agroforestry	Theory/Practical	3+1
		DSE/ GE	Forest Protection	Theory/Practical	3+1
		AEC	Indian Language	Theory	2
		SEC	Plantation Technology/IAPC (University Pool)	Theory	0+2

		VAC	Value addition to NTFP'S	Theory	2
Bachelor of Forestry					
THIRD YEAR	V	DSC	Forest Mensuration	Theory/Practical	3+1
		DSE/GE	Watershed Management	Theory/Practical	3+1
		SEC	Propagation of Medicinal and Aromatic Plants/IAPC (University Pool)	Theory	0+2
	VI	DSC	Forest Management and Policies	Theory/Practical	3+1
		DSE/GE	Seed Science and Technology	Theory/Practical	3+1
		SEC	Propagation of Medicinal and Aromatic Plants/IAPC (University Pool)	Theory	0+2

Bachelor of Forestry with Honours					
FOURTH YEAR	VII	DSC	Advances in Forest Ecology	Theory/Practical	3+1
		DSE 1	Advances in Silviculture and Systems	Theory/Practical	3+1
		DSE 2	Remote Sensing and GIS	Theory/Practical	3+1
		DSE 3/	Forest Pathology	Theory/Practical	3+1
		GE 1	Environmental Audit and EIA	Theory/Practical	3+1
		GE 2	Forest Resource Assessment	Theory/Practical	3+1
		DISSERTATION	Dissertation on Major OR Dissertation on Minor or Academic Project/Entrepreneurship	Theory/Practical	4+2
	VIII	DSC	Forest Utilization	Theory/Practical	3+1
		DSE 1	Forest Entomology	Theory/Practical	3+1
		DSE 2	Advance Agroforestry	Theory/Practical	3+1
		DSE 3	Environmental Management	Theory/Practical	3+1
		GE1	Tree Physiology	Theory/Practical	3+1
		GE2	Dendrology	Theory/Practical	3+1
		DISSERTATION	Dissertation on Major OR Dissertation on Minor or AcademicProject/Entrepreneurship	Theory/Practical	4+2
Master's in Forestry					
FIFTH YEAR	IX	DSC	Forest Products and Industries	Theory/Practical	3+1
		DSE 1	Energy Plantation and Biofuels	Theory/Practical	3+1
		DSE 2	Natural Resources and Management	Theory/Practical	3+1
		DSE 3	Advances in Tree Seed Technology	Theory/Practical	3+1
		GE 1	World Forestry and Tribal development	Theory/Practical	3+1
		GE2	Analytical Technique	Theory/Practical	3+1
		DISSERTATION	Dissertation on Major OR	Theory/Practical	4+2

			Dissertation on Minor or Academic Project/Entrepreneurship		
	X	DSC	Forest Economics	Theory/Practical	3+1
		DSE 1	Research Methodology	Theory/Practical	3+1
		DSE 2	Biostatistics	Theory/Practical	3+1
		DSE 3	Forest Genetics and Tree Improvement	Theory/Practical	3+1
		GE1	Climate Change and Mitigation	Theory/Practical	3+1
		GE2	Fundamentals of Soil Science	Theory/Practical	3+1
		DISSERTATION	Dissertation on Major OR Dissertation on Minor or Academic Project/Entrepreneurship	Theory/Practical	4+2

ABILITY ENHANCEMENT COURSE (AEC) PREPARED FOR THE POOL OF COURSES

	Paper Title	Theory/Practical	Credits
Ability Enhancement Course (AEC)	Indian Language	Theory	2

VALUE ADDITION COURSE (VAC) PREPARED FOR THE POOL OF COURSES

	Paper Title	Theory/ Practical	Credits
Value Addition Course (VAC)	Environmental Education	Theory	2
Value Addition Course (VAC)	Non-Timber Forest Products	Theory	2

SKILL ENHANCEMENT COURSES (SEC) PREPARED FOR THE POOL OF COURSES

	Paper Title	Theory/ Practical	Credits
Skill Enhancement Courses (SEC)	Nursery Technology (University Pool)	Practical	0+2
Skill Enhancement Courses (SEC)/IAPC	Plantation Technology (University Pool)	Practical	0+2
Skill Enhancement Courses (SEC)/IAPC	Propagation of Medicinal and Aromatic Plants (University Pool)	Practical	0+2

Abbreviations-

DSC-Discipline Specific Course; DSE-Discipline Specific Electives;

GE-Generic Electives; AEC-Ability Enhancement Course; VAC-Value Addition Course

IAPC- Internship/Apprentice/Project/Community outreach

Programme Specific Outcomes (PSOs) (Undergraduate Programme) After this programme, the learners will be able to:	
PSO 1	It will impart basic knowledge and skills of forestry among the students.
PSO 2	It will inculcate forestry knowledge and practical skills among the students for diagnosis and analysis of existing problems in the fields of forestry and environment.
PSO 3	It will be helpful to produce trained forestry graduates to fill the requirements of different sectors, i.e., private, public, NGOs, and other organizations.
PSO 4	Assessment of various forestry problems and developing methods for their solutions.
PSO 5	Students will become forestry professionals and use their knowledge in research and technology.

Programme Specific Outcomes (PSOs)-MASTER'S IN FORESTRY After this programme, the learners will be able to:	
PSO 1	Students comprehend the numerous functions of forests, how to regenerate and conserve them, and how to prevent their destruction.
PSO 2	Students at an advanced level of knowledge in specific fields of forestry to continue graduate studies or meet professionals in various roles in the public and private sectors.

Department of Forestry

Semester - I

Undergraduate Certificate in Forestry

DISCIPLINE SPECIFIC COURSE (DSC)- Introductory Forestry

No. of Hours - 45

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC: Introductory Forestry	4	3	0	1	Passed Class XII	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course: DSC	**Course Title: Introductory Forestry**	
Course Outcomes: The student will impart Fundamental knowledge and skills of forest and forestry and its branches, forest acts and policies, forest and their branches, forest ecosystem, climate and environment, forest types and composition, tree morphology, tree measurement, and skills of plant management and protection.		

INTRODUCTORY FORESTRY		
Credits : 4		**Discipline Specific Course**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**
Unit	**Topic**	**No.ofHours**
Unit I	Definition and Introduction of forestry; Forest and plantation, Brief history of forestry; Branches of forestry; Legal classification of forests: reserved forest, protected forest, un-classified forest, village forest and community forest (Van Panchayat). Forest area and cover in the state, country, and world. Category of forest on the basis of origin, Primary forest and secondary forest; Importance of forests for community, environment, climate change and sustainable development. Forest of worlds	15
Unit II	Basic principles of silviculture: Introduction, definitions, objects, scope and importance; Regeneration of forests: natural and artificial regeneration of forest. Tree morphology, different forms and growth of trees, stem, root and other parts; Mycorrhiza, lignotubers and root nodules.	15
Unit III	Introduction and definitions of forest Mensuration; Principles of tree measurement: Height, diameter, circumference, basal area and volume; Tree measuring instruments in forestry: Christian's hypsometer, tree Caliper, Ravi multimeter, Abney's level, Haga altimeter, meter tape, wedge prism, weighing machine and Pressler's increment borer.	15
Unit IV	Basic principles of forest Management, Introduction, definition and scope of forest management, Participatory Forest Management (PFM) and Joint Forest Management (JFM). Forest products: Important timber and non-timber products. Forest Protection: Introduction and definition, important insects and pests of nurseries and trees, shifting cultivation, encroachment, illegal felling, grazing and forest fire.	15

Practical

1. Field visit in different forest sites.
2. Identification of tree species and their local and botanical name.
3. Introduction about instruments used in forestry (Christen's Hypsometer, tree caliper, Ravi multimeter, Abney's level, Haga altimeter, meter tape, Gunter chain, wedge prism, weighing machine, Pressler's increment borer, soil pH meter, soil thermometer, Swedish bark gauge, seed germinator, oven, balance etc.).
4. Measurement of tree height, diameter, basal area, circumference.
5. Nursery development, preparation of nursery layout, nursery beds, uses of different container, planting material seeds and vegetative parts, raising of plants of different tree species.

Suggested Readings:

1. Ecology and Environment by P.D. Sharma
2. Principles and Practices of Silviculture by L.S. Khanna
3. A text Book of Silviculture by A.P. Dwivedi
4. Forest Management by Ram Prakash
5. Forest Mensuration, A.N. Chaturvedi
6. Theory and Practices of Silviculture by L.S. Khanna
7. Forest of Himalaya by J.S. Singh and S.P. Singh
8. Plantation Forestry in India by R.K. Luna
9. Nursery and Plantation Practices by Vinod Kumar

Semester-I

Undergraduate Certificate in Forestry

GENERIC ELECTIVE (GE)-Principles and Practices of Forestry

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
GE:Principles and Practices of Forestry	4	3	0	1	Passed Class XII	Nil

Course Outcomes (CO): The student will impart Fundamental knowledge and skills of forest and forestry and its branches, forest acts and policies, forest and their branches, forest ecosystem, climate and environment, forest types and composition, tree morphology, tree measurement and skill of plant management and protection.

Unit	Topic	No .of Hours
Unit I	Forest and forestry, Definitions, Branches of forestry and their interrelationship, classification of forest and forestry, importance of forests, History of forestry development in India, and forest of world and India. Definition, concept, and types of social forestry, people participation, status of social forestry projects in different states of India.	15
Unit II	Introduction, the basic concept of ecology, definition of ecology, types of ecology, scope and importance of ecology in forestry, basic concept of habitats, and ecological niche. Concept and definition of an ecosystem, classification and distribution of ecosystem, structural component and important ecosystem (freshwater, marine water, forest, and desert ecosystem)	15
Unit III	Introduction, definition, objective and scope of forest mensuration, scale of mensuration (nominal, ordinal, interval and ratio scale) and units of measurement and standards of accuracy implied in their expression,	15
Unit IV	Introduction, definition and scope, peculiarities of forest management, principles of forest management and their applications and objects of management. Forest policy: definition, necessity and scope and legal and institutional approaches to forest resource management. National Forest Policies of India (1894, 1952, 1988). Indian Forest Act, 1927 and wildlife (Protection) Act, 1972	15

Practical

1. Field visit in different forest sites.
2. Identification of tree species and their local and botanical name.
3. Introduction about instruments used in forestry (Christien's Hypsometer, tree caliper, Ravi multimeter, Abney's level, Haga altimeter, meter tape, Gunter chain, wedge prism, weighing machine, Pressler's increment borer, soil pH meter, soil thermometer, Swedish bark gauge, seed germinator, oven, balance etc.).
4. Measurement of tree height, diameter, basal area, circumference.

Suggested Readings:

1. Ecology and Environment by P.D. Sharma
2. Principles and Practices of Silviculture by L.S. Khanna
3. A text Book of Silviculture by A.P. Dwivedi
4. Forest Management by Ram Prakash
5. Forest Mensuration, A.N. Chaturvedi
6. Forest of Himalaya by J.S. Singh and S.P. Singh
7. Plantation Forestry in India by R.K. Luna

Semester-I

Undergraduate Certificate in Forestry

Ability Enhancement Course (AEC)-Indian Language

No. of Hours- 45

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
AEC: Indian Language	2	2	0	0	Passed Class XII	Nil

Semester-I
Undergraduate Certificate in Forestry

Skill Enhancement Course (SEC)-Nursery Technology

No. of Hours-45

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisiteo fthe course(if any)
		Lecture	Tutorial	Practical/Practice		
SEC: Nursery Technology	2	0	0	2	Passed Class XII	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme:Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course:SEC	**CourseTitle: Nursery Technology**	
Course Outcomes: The study will learn about the different techniques of nursery raising of different forest tree species and their management.		
Credits:2		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Introduction and Types of nursery, Nursery planning and design, layout of nursery, Soil preparation, preparation of seed bed, size of seed bed**.** Pits digging of planting Seed sowing: methods of sowing, time of sowing. Growing media. Seed and vegetative propagation, Water and irrigation system. Identification of important useful tree species. Seed collection and germination, plus and elite trees, seedling development.	**15**
Unit II	Nursery cultural practices: Weeding, hoeing, irrigation, fertilization etc. and controlled measures, seedlinggradiness and hardening and transplanting; Nursery and tools, Plant containers; Potting media.	**15**

Suggested Reading:

1. Nursery and Plantation Practices by V. Kumar
2. Principles and Practices of Silviculture by L. S. Khanna
3. Plantation Forstry in India by R. K. Luna
4. Plant Nursery Management by P. K. Ray

Semester-I
Undergraduate Certificate in Forestry

Value Addition (VAC)-Environmental Education

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
VAC: **Environmental Education**	2	2	0	0	Passed Class XII	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course: VAC	**Course Title: Environmental Education**	
Course Outcomes: In this course, students will learn about the different aspects of environmental science, the current status of the environment, global warming, and sustainable development.		
Credits: 2	**Discipline Specific Course**	
Max. Marks: As Per Univ. rules	**Min. Passing Marks: As per Univ. rules**	

Unit	Topic	No. of Hours
Unit I	Introduction, definition and components- atmosphere, hydrosphere, lithosphere and biosphere. Natural resources and their management- Forest, wildlife, water, and land resources.	**15**
Unit II	Environmental pollution- Types of pollutants, control and prevention of air, water and noise pollution, Causes, source and control measures.	**15**

Suggested reading:

1. Ecology and Environment by P. D. Sharma
2. Environmental Laws and Policies in India by S. Devan
3. A Text Book of Environmental studies by D. K. Asthana and M. Asthana

Semester-II

Undergraduate Certificate in Forestry

DISCIPLINE SPECIFIC COURSE (DSC)-FOREST ECOLOGY

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisiteo fthe course(if any)
		Lecture	Tutorial	Practical/Practice		
DSC: Forest Ecology	4	3	0	1	Passed Class I Semester	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme:Undergraduate Certificate in Forestry	**Year: I**	**Semester:II Paper: DSC**
Subject:Forestry		
Course:DSC	**CourseTitle: Forest Ecology**	
Course Outcomes: Students will learn about the basic structure of the forest and their function for future management.		
Credits: 4		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Introduction and definition of ecology; Forest ecology: Definition and its importance in forest ecosystem management; structure and components of ecosystem, energy flow, Types of ecosystems: Forest, grassland, desert and aquatic ecosystem; Tropic structure, ecological pyramids, food chain, food web. Ecosystem function	**15**
Unit II	Introduction, definition, scope and importance of biodiversity; Threats and conservation of biodiversity; loss of biodiversity, Assessment of biodiversity, protected areas. Classification of forests Champion and Seth 1968. Biogeographical zones of India; Hotspot; Major biomes of the world.	**15**
Unit III	Locality factors-Climatic factors: Light, temperature, moisture, wind and their effects; Topographic factors: Altitude, slope, aspects and exposure and their effects; Edaphic factors and Biotic factors.	**15**

Unit IV	Forest vegetation: trees shrubs, herbs, epiphytes and parasites.Methods of forest vegetation analysis, Forest composition, distribution Succession: causes and mechanism of succession; Types of succession and concept of climax.	**15**

Practical

1. To determine the minimum size of quadrates.
2. To determine density of tree species in forest.
3. To determine frequency of tree species in forest.
4. To determine abundance and A/F ratio of tree species in forest.
5. To determine relative density, relative frequency and relative dominance and Important Value Index (IVI) of tree species in forest.
6. To determine basal area of tree species in forest.
7. To draw the population structure of tree species in forest.
8. To determine species diversity in forest by Shannon-Weiner Index, Simpson index.

Suggested Readings:

1. Ecology, Environmental Science and Conservation by J.S. Singh, S.P. Singh and S.R. Gupta
2. Ecology and Environment by P.D. Sharma
3. Fundamental of Ecology by E.P. Odum
4. Concept of Ecology by E.J. Kormondy
5. Ecology by M.P. Arora
6. Ecology by S.N. Jha
7. Concept of Modern Ecology by P.C. Tewari.

Semester-II

Undergraduate Certificate in Forestry

GENERIC ELECTIVE (GE)-Participatory Forest Management

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
GE: Participatory Forest Management	4	3	0	1	Passed Class I Semester	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: I**	**Semester: II Paper: GE**
Subject: Forestry		
Course:GE	**Course Title: Participatory Forest Management**	
Course Outcomes: Techniques for resolving conflicts and addressing competing interests among different stakeholders, including indigenous communities, government agencies, NGOs, and private sector actors. Understanding and promoting sustainable forest management practices that balance conservation goals with the socio-economic needs of local communities, such as agroforestry, selective logging, and non-timber forest product harvesting.		
Credits:4		**Generic Elective**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No.ofHours
Unit I	Concept, history, scope and types of participatory forest management, Joint Forest Management (JFM), Forest Development Agency (FDA), compensatory Afforestation Fund Management and Planning Authority (CAMPA).	**15**
Unit II	Community forestry, Van Panchayat, user groups and NGO's. Van-Panchayat rules and modification, Van –Panchayat in Uttarakhand, success and failure of JFM.	**15**
Unit III	Role of community in natural resource management (NRM). Objectives of PRA.	**15**
Unit IV	The Logic and merits of the PRA. Major methods of PRA. The fundamental concepts of PRA. Principles of PRA.	**15**

Practicals:

1. Preparation of micro-plan of a given village
2. Application of various appraisal methods in participatory projects
3. Case studies of JFMs

Suggested Readings:

1. Joint Forest Management in India by N. H. RavindraNath
2. Participatory Natural Resource Management by S. S. Negi
3. Participatory Rural Apprisal by A. Mukherjee

Semester-II

Undergraduate Certificate in Forestry

Ability Enhancement Course (AEC)-Indian Language

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre- requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
AEC: Indian Language	2	2	0	0	Passed Class ISemester	Nil

Semester-II

Undergraduate Certificate in Forestry

Skill Enhancement Course (SEC)- Nursery Technology

No. of Hours-45

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisiteo fthe course(if any)
		Lecture	Tutorial	Practical/Practice		
SEC: Nursery Technology	2	0	0	2	Passed Class Istsemester	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme:Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course:SEC	**CourseTitle: Nursery Technology**	
Course Outcomes: The study will learn about the different techniques of nursery raising of different forest tree species and their management.		
Credits:2		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Manuring (Organic compost/manure), Farm Yard Manure (FYM); Bio-fertilizers; Mycorrhiza and fertilizer application methods.	**15**
Unit II	Nursery visits, report preparation, preservation and viva-voce.	**15**

Suggested Reading:

5. Nursery and Plantation Practices by V. Kumar
6. Principles and Practices of Silviculture by L. S. Khanna
7. Plantation Forstry in India by R. K. Luna
8. Plant Nursery Management by P. K. Ray

Semester-II

Undergraduate Certificate in Forestry

Value Addition (VAC)-Environmental Education

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
VAC: Environmental Education	2	2	0	0	Passed Class Isemester	Nil

UNDERGRADUATE CERTIFICATE IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course: VAC	**Course Title: Environmental Education**	
Course Outcomes: In this course, students will learn about the different aspects of environmental science, the current status of the environment, global warming, and sustainable development.		
Credits: 2		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Acid rain; Global warming; Ozone layer depletion; Sewage and waste water management. Impact of different pollutions on humans and other organisms. Biological magnification; Toxins and Eutrophication. Causes of environmental degradation: Deforestation and anthropogenic pressure; Explosion of human population, ecological and economic issues; National and International conventions and summits and their major achievements;	**15**
Unit II	Environmental policy and legislation in Indian perspective; The Environment (Protection) Act 1986, The Water (Prevention and Control of Pollution) Act 1974, The Air (Prevention and Control of Pollution) Act 1981; Role of forest for sustainable environment	**15**

Suggested reading:

1. Ecology and Environment by P. D. Sharma
2. Environmental Laws and Policies in India by S. Devan
3. A Text Book of Environmental studies by D. K. Asthana and M. Asthana

Semester-III

Undergraduate Diploma in Forestry

DISCIPLINE SPECIFIC COURSE (DSC)-Principles of Silviculture

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC: Principles of Silviculture	4	3	0	1	Passed Class I Year	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Diploma in Forestry	**Year: II**	**Semester:III Paper: DSC**
Subject: Forestry		
Course: DSC	**Course Title: Principles of Silviculture**	
Course Outcomes: In this course student will learn about the regeneration, cultivation and establishment, development of tree species in natural and man-made forest for better stand development.		
Credits:4		**Discipline Specific Course**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As Per Univ.rules**

Unit	Topic	No. of Hours
Unit I	Introduction, definition, and scope of silviculture; Objects of silviculture; Silvicultural characteristics; Phenology and regeneration; Growth, management and economic of Conifers: *Abiespindrow, Piceasmithiana, Cedrusdeodara, Pinus*species, Broadleaf species: *Quercus*species, *Acacia catechu, Acacia nilotica, Dalbergiasissoo, Shorearobusta, Eucalyptus* species, *Populus*species, *Tectonagrandis, Casuarina equisetifolia*and Bamboo species., Exotics: Importance, role in forest economy, purpose of introduction, ecological factors, establishment and management of Eucalyptus, poplar and exotic conifers (*Pinusspp*).	15

Unit II	Forest Regeneration: Introduction, definition, and types of regeneration; Natural regeneration: Definition, methods of natural regeneration (from seeds and vegetative parts); Seed production; Seed dispersal; Seed germination; Seedling establishment; Assisted Natural Regeneration (ANR); Artificial regeneration: Definition and objectives; Essential preliminary considerations (choice of species, site selection, composition of the plantation, choice of sowing, planting staff and labour); Mechanization operations (soil preparation, ploughing, harrowing, ridging, pit digging, transport of items, protection from fire and irrigation); Regeneration through vegetative parts.	15
Unit III	Tending operations - weeding, cleaning, thinnings, definitions, objectives and methods, increment felling, and improvement felling. Pruning and lopping. Control of climbers and undesirable plants.	15
Unit IV	Classification of silviculture systems; Clear felling system, shelterwood system: Uniform system, group system, irregular shelterwood system, strip system, selection system, group selection system, accessory system, coppice system, coppice selection System, and coppice with standard system.	15

Practical

1. Identification of Forest (Local/regional) Tree Species
2. Study of tree morphology for forms growth and root systems.
3. Phenology and silviculture characteristics of selected tree species.
4. Germination of plants from seeds/vegetative parts.
5. Identification of mycorrhizal association of tree species.
6. Silviculture Systems.
7. Tending Operations.

Suggested Readings:

1. Principle and practice of silviculture by L.S. Khanna
2. A textbook of silviculture by A.P. Dwivedi
3. Manual of silviculture by W.M. Sunlich
4. Silviculture by R.D. Nyland
5. The practices of silviculture by D.M. Smith
6. Theory and practice of Indian silvicultural systems by L.S. Khanna
7. Silviculture of important Indian trees by R.S. Troup

Semester-III

Undergraduate Diploma in Forestry

DISCIPLINE SPECIFIC ELECTIVES (DSE) - Forest Biodiversity and Conservation

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSE: Forest Biodiversity and Conservation	4	3	0	1	Passed Class I Year	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Diploma in Forestry	**Year: II**	**Semester: III Paper: DSE**
Subject: Forestry		
Course: DSE	**CourseTitle: Forest Biodiversity and Conservation**	
Course Outcomes: To develop an understanding of students about ecological aspects of forests, conservation of forest resources & biodiversity, consequences of depleting biodiversity, and sustainable use of biodiversity.		
Credits:4	**Discipline Specific Elective**	

Max. Marks: As per Univ. rules		Min. Passing Marks: As per Univ. rules
Unit	**Topic**	**No. of Hours**
Unit I	Definition, concept of biodiversity, importance, use and threats to biodiversity; levels of biodiversity. Uses and threats to biodiversity. Causes of biodiversity loss and the IUCN red list.	**15**
Unit II	Assessment of biodiversity: Inventory, monitoring, REDD, REDD+. Natural resources: Types, degradation and conservation, In-situ and Ex-situ conservation, hotspot areas, protected area network: wildlife sanctuaries, national parks, biosphere reserves, zoos, botanical gardens, arboretum, etc., and conservation of sacred groves. Impact of climate change on biodiversity, climate change and threats to species and ecosystem, distribution and adaptation pattern of plants and animals, vulnerability to climate change.	**15**
Unit III	Role of community in biodiversity conservation; Indigenous knowledge of biodiversity; Biodiversity conservation and community development; Biodiversity and ecosystem services.	**15**
Unit IV	International efforts for conservation of biodiversity; International Union for Conservation of Nature and Natural Resources; United Nations Environmental Program; Convention on Biodiversity; World Heritage Convention; Conference on Parties; Convention on International Trade of Endangered Species (CITES), World Wide Fund for nature and natural resources.	**15**

Practical

1. Map preparation of world vegetation and mapping of different biogeographic regions of world and India.
2. Vegetational analysis of different plant communities.
3. Experiments on sapling methods used in ecological research.
4. Estimation of biomass and net primary productivity in different forest types.
5. Estimation of litter production and decomposition rate of different forest types.
6. Field inventory for biological diversity and determination of minimum size of sampling unit for trees, shrubs and herbs.
7. Collection, identification and herbarium preparation of plant species.
8. Calculation of different indices of biodiversity, evenness, concentration of dominance, similarity and α, β and γ diversity of a landscape index.
9. Visit to National Parks, wildlife sanctuaries, botanical gardens and arboretum.
10. List of IUCN indexed plants of India.

Suggested Readings:

1. Basic Ecology by E.P. Odum
2. Manual of Plant Ecology by K.C. Misra
3. Ecological Methods for Field and Laboratory Investigations by P. Michael
4. Tropical Forest Ecology: The Basis for Conservation and Management by F. Montagnini and C.F. Jordan
5. The Conservation of Plant Biodiversity by O.H. Frankel, A.H.D Brown and J.J Burdon
6. Forest Ecology of India by S.S. Sagwal

Semester-III

Undergraduate Diploma in Forestry

Ability Enhancement Course (AEC)-Indian Language

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
AEC: Indian Language	2	2	0	0	Passed Class Iyear	Nil

Semester-III

Undergraduate Diploma in Forestry

Skill Enhancement Course (SEC)-Plantation Technology/ IAPC

No.of Hours-60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
SEC: Plantation Technology/ IAPC	2	0	0	2	Passed Class Istyear	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: I**	**Semester: I** **Paper: DSC**
Subject: Forestry		
Course: SEC	**CourseTitle: Plantation Technology**	
Course Outcomes: Students will learn the practical aspects and knowledge about raising, care, development and use of tree species in a specific site and specific objectives.		
Credits:2		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Introduction of plantation, types of plantation, identification and selection of plantation sites, site preparation, and tree plantation techniques. Assessment of the quantity of raising the plantation. Assessment of planting material required under different planting material (seed/seedling/ETPs), planting patterns, and assessment of spacing under different planting patterns	**15**
Unit II	Plantation activities, fertilizer and soil management, weed, pest, and disease control: weed management, Integrated Pest and Disease Management.Value of plantation: ecological, social, and economic.	**15**

Suggested Readings:

1. Plantation Forestry in India by R. K. Luna
2. Nursery and Plantation Practices by V. Kumar

3. Alternative Energy Development and Management by S. A. Abbasi

Semester-III

Undergraduate Diploma in Forestry

Value addition Course (VAC) –Non-Timber Forest Products

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
VAC: Non-Timber Forest Products	2	2	0	0	Passed Class I year	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Diploma in Forestry	**Year: II**	**Semester: III Paper:VAC**
Subject: Forestry		
Course: VAC	**Course Title: Non-Timber Forest Products**	
Course Outcomes: In this course student will learn about the different non-timber forest product, their use and techniques of extraction of such product from forest species.		
Credits:2	**Discipline Specific Course**	
Max. Marks: As Per Univ. rules	**Min. Passing Marks: As per Univ. rules**	

Unit	Topic	No. of Hours
Unit I	Non-timber forest produce, definitions, General survey, types, Economic importance; Mode of collection, trade and marketing.	**15**
Unit II	Major NTFP and their uses: Fiber and flosses, grasses, bamboo, canes, essential oils, oil seed, tans & dye, gum, resins, drugs, spices, edible and wild plants.	**15**

Suggested Readings:

1. Forests: The Nonwood resources by A. P. Dwivedi
2. A hand book of Forest Utilization by T. Metha
3. Manual of Indian Forest Utilization by Trotter H. 1982
4. Forest Utilization by FRI, Dehradun
5. Forest Products and their Utilization by S. S. Negi

Semester-IV

Undergraduate Diploma in Forestry

DISCIPLINE SPECIFIC COURSE (DSC)- Agroforestry

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC: **Agroforestry**	**4**	**3**	**0**	**1**	**Passed Class III Semester**	**Nil**

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: ***Undergraduate Diploma in Forestry***	**Year: II**	**Semester:IV** **Paper: DSC**
Subject: Forestry		
Course: DSC	**Course Title: Agroforestry**	
Course Outcomes: To impart knowledge on recent developmentsin agroforestry models and their economics.		
Credits: 4		**Discipline Specific Course**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Introduction, definition, objectives, scope, and importance of agroforestry; History of agroforestry, traditional practices of agroforestry; Choice and characteristics of species for agroforestry; Multipurpose trees (MPTs) in Agroforestry; Potential and constraints of Agroforestry systems.	**15**
Unit II	Agroforestry systems: Forest-based agroforestry systems, agriculture-based agroforestry systems, and pasture-based agroforestry systems; Shifting cultivation; Taungya system; Alley cropping; Home gardens; Agri-silvicultural system; Agri-silvipastoral system; Agri-horticultural system; Agri-horti- pastoral system; Tree-crop interaction.	**15**
Unit III	Diagnosis and design techniques; Socio-economic and ecological aspect of agroforestry; Economic aspects of agroforestry; Cost, benefit, benefit-cost ratio; Land equivalent ratio (LER); Protein banks; Fodder species; Lopping cycle; Fodder values of trees; Alley cropping/hedge cropping; Ecological aspects of agroforestry; Species diversity of plant components; Soil fertility and productivity aspect; Soil and water conservation aspects in agroforestry.	**15**
Unit IV	Management of trees in agroforestry; Important tree species of agroforestry systems: Eucalyptus, poplar, Gmelina, Bamboo etc; Legume trees species: Subabul, Causaurina, Sesbenia, Grewia, Kachnar, Celtis, Ficusetc and important fruit plants; Tree crop interactions, selection of tree species for agroforestry, fodder, fuel and medicinal plants in agroforestry.	**15**

Practical

1. Survey and analysis of land use systems in the adjoining areas.
2. Design and plan of suitable models for improvement.
3. Mineral nutrient analysis of soil and plants.
4. Study of crop –weed association and fertilizer response in different crops. Preparation and application of herbicides.
5. Application of various methods in formulation and appraisal of agro-forestry projects.
6. Nutrient analysis of forages derived from fodder trees/shrubs. Digestibility of some agro- forestry forages.
7. Benefit-cost ratio estimation of agroforestry systems.
8. Case studies on harvesting, post-harvest management and marketing of agroforestry products.
9. Visit to nearby agroforestry practicing area and interaction with the practicing farmers.

Suggested Readings:

1. Plant Research and Agroforestry by P.A. Huxley.
2. Tropical Agroforestry by P. Huxley.
3. Carbon Sequestration Potential of Agroforestry Systems: Opportunities and challenges. Advance in Agro forestry by B.M. Kumar and P.K.R. Nair.
4. Ecological Methods for Field and Laboratory Investigations by P. Michael.
5. New Vistas in Agroforestry by P.K.R. Nair, M.R. Rao and L.E. Buck.
6. An Introduction to Agroforestry by P.K.R. Nair.
7. Agroforestry Systems in the Tropics P.K.R. Nair.
8. Agroforestry as a strategy for carbon sequestration by P.K.R. Nair, B.M. Kumar and D.N. Vimala.
9. Agroforestry: Potentials and Opportunities by P.S. Pathak and Newaj Ram

Semester- IV

Undergraduate Diploma in Forestry

SPECIFIC COURSE/GENERIC ELECTIVES (DSE/GE)-Forest Protection

No.ofHours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC/GE: Forest Protection	4	3	0	1	Passed class in III semester	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Diploma in Forestry	**Year: II**	**Semester: IV** **Paper: GE 2**
Subject: Forestry		
Course: DSC/GE	**Course Title: Forest Protection**	
Course Outcomes: In this course,students will become aware of different forest tree diseases and different methods to control them for better productivity and management of the forest.		
Credits:4	**Generic Elective**	
Max. Marks: As per Univ. rules	**Min. Passing Marks: As per Univ. rules**	

Unit	Topic	No. of Hours
Unit I	Introduction of forest pathology and forest entomology; Introduction of various plants pathogens: Fungi, bacteria, viruses etc; Symptomatology and identification of plant diseases.	**15**
Unit II	Classification of forest tree diseases and their control; 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; Nursery diseases and control measures of diseases.	**15**
Unit III	Forest insects and its effect on plants: defoliating, skeletonizers, shoot borers, wood borers, twig and root insects, seed and cone insects, and gall markers; Methods of control against insects and pests: Silvicultural, biological and chemical.	**15**
Unit IV	Forest fire; Encroachment; Shifting cultivation; Illicit felling; Grazing/ browsing.	**15**

Practical

1. Identification and symptoms of different forest tree diseases.
2. Various pathogenic and non-pathogenic diseases of forest tree species.
3. Forest fires and their types.
4. Various diseases of Sal, Shisham, Teak, Chir, Deodar, Eucalyptus and Khair.

Suggested Readings:

1. Forest protection by L.S. Khanna
2. Handbook of forest protection by S.S. Negi
3. Forest Entomology by K.C. Joshi
4. Forest fire by S.S. Negi
5. Forest fire control by R.K Luna

Semester-IV

Undergraduate Diploma in Forestry

Ability Enhancement Course (AEC)-Indian Language

No. of Hours - 45

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
AEC: Indian Language	2	2	0	0	Passed Class III Semester	Nil

Semester-IV

Undergraduate Diploma in Forestry

Skill Enhancement Course (SEC)-Plantation Technology/ IAPC

No.of Hours-60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
SEC: Plantation Technology/ IAPC	2	0	0	2	Passed Class III semester	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY		
Programme: Undergraduate Certificate in Forestry	**Year: II**	**Semester: IV** **Paper: SEC**
Subject: Forestry		
Course: SEC	**CourseTitle: Plantation Technology**	
Course Outcomes: Students will learn the practical aspects and knowledge about raising, care, development and use of tree species in a specific site and specific objectives.		
Credits:2		**Discipline Specific Course**
Max. Marks: As Per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Afforestation of problematic sites- drought prone, arid, marshy, saline land, sandy soil and suitable species for plantation of these sites. Failures of plantations- reason for failure and remedial techniques. Seed stands, seed collection, storage and supply of seeds.	**15**
Unit II	Important tree species of plantation i.e. native and exotic, broad leaves: Oak, Sal, Shisham, Acacia, Eucalyptus, Popular and Bamboo. Conifers: Chir-pine, Deodra, Surai.	**15**

Suggested Readings:

4. Plantation Forestry in India by R. K. Luna
5. Nursery and Plantation Practices by V. Kumar
6. Alternative Energy Development and Management by S. A. Abbasi

Semester-IV

Undergraduate Diploma Forestry

Value addition Course (VAC) –Value addition to NTFPs

No.of Hours-60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
VAC-Value addition to NTFPs	2	2	0	0	Passed Class III Semester	Nil

UNDERGRADUATE DIPLOMA IN FORESTRY

Programme: Undergraduate Diploma in Forestry	**Year: II**	**Semester: IV** **Paper: VAC**
Subject: Forestry		
Course: VAC	**Course Title: Value addition to NTFPs**	

Course Outcomes: In this course, the student will learn about the different non-timber forest product, their use and techniques of extraction of such products from forest species.

Credits:2	**Discipline Specific Course**
Max. Marks: As Per Univ. rules	**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit III	Forest based industries: Pulp and paper industry, katha& cutch, and sports goods.	**15**
Unit IV	Regulation of international timber trade; World Trade Organization; GATT and International Timber Trade Organization (ITTO).	**15**

Suggested Readings:

1. Forests: The Non- wood resources by A. P. Dwivedi
2. A hand book of Forest Utilization by T. Metha
3. Manual of Indian Forest Utilization by Trotter H. 1982
4. Forest Utilization by FRI, Dehradun
5. Forest Products and their Utilization by S. S. Negi

Semester-V

DISCIPLINE SPECIFIC COURSE (DSC)-Forest Mensuration

BACHELOR OF FORESTRY

No.of Hours-60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC:Forest Mensuration	4	3	0	1	Passed Class II Year (IV semester)	Nil

BACHELOR OF FORESTRY		
Programme: *Bachelor of Forestry*	**Year: III**	**Semester:V Paper DSC**
Subject: Forestry		
Course: DSC	**CourseTitle: Forest Mensuration**	
Course Outcomes: In this course, the student will get knowledge about the measurement of different standing and felled forest tree species, their use in different forest-based industries, and how to manage different forest and their category.		
Credits:4		**Discipline Specific Course**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No.ofHours
Unit I	Forest mensuration; Definition and objectives; Scales of measurement; Units of measurements; Precision, bias, and accuracy.	**15**
Unit II	Tree measurements: Diameter and girth measurements; Breast height measurements; Instruments used; Measurement of height; Definitions; Methods of measurement of height ocular; Non-instrumental and instrumental methods; Sources of error in height measurements of leaning trees.	**15**
Unit III	Tree stem form; Metzgr's theory; Form factor; Types of form factor; Form height; Form quotient; Form class; Volume measurements of standing trees fell tree and volume tables.	**15**
Unit IV	Determination of growth of trees; Diameter and height growth; Increment; Types of increment; CAI and MAI; Increment percent and instrument used; Stem density; Canopy density; Crown; Competition factor; Site quality.	**15**

Practical

1. Determination of length, measurements of diameter, girth and basal area of trees using calipers, tape, ruler, pentaprism, and tree caliper, etc.
2. Measurement of height using non-instrumental method.
3. Preparation and use of simple height measuring instruments: Christen's hypsometer, Smithies hypsometer.
4. Measurement of tree height using instrumental methods: Ravi Altimeter, Abney's level, Haga altimeter, relaskop, clinometer, blumeleiss, hypsometer, and laser hypsometer.
5. Volume determination of standing and felled trees.
6. Exercise on stump analysis.
7. Exercise on stem analysis, annual ring counting using ring borer.
8. Preparation of volume tables and local volume tables.

Suggested Readings:

1. Forest Mensuration and Biometry by A.N. Chaturvedi and L.S. Khanna
2. Forest mensuration: A Handbook for Practitioners by Forestry Commission Publications
3. Forest Mensuration by B. Husch, T.W. Beers and Kershaw
4. Forest Mensuration by V.A. Laar and A. Akca
5. Indian Forestry by K. Manikandan and S. Prabhu

Semester-V

Bachelor of Forestry

DISCIPLINE SPECIFIC ELECTIVES/ GENERIC ELECTIVE (DSE/GE)-Watershed Management

No. of Hours -60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSE/GE:Watershed Management	4	3	0	1	Passed Class II Year (IV semester)	Nil

BACHELOR IN FORESTRY		
Programme: *Bachelor in Forestry*	**Year: III**	**Semester: V** **Paper: DSE**
Subject: Forestry		
Course: DSE	**Course Title: Watershed Management**	

Course outcomes: Students will learn about the watershed, its types, their uses, and how to manage a watershed i particular region.

Credits:4	**Discipline Specific Elective**
Max. Marks: As per Univ. rules	**Min. Passing Marks: A per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Introduction, objectives and importance of watershed; Watershed characteristics; Degradation of watershed; Soil and water erosion and their conservation measures.	**15**
Unit II	Hazards in watershed: Flood, drought, sedimentation and their management; Monitoring and evaluation of watershed projects.	**15**
Unit III	Role of forests in watershed management; Role of community in watershed Management and PRA tools and techniques used for watershed development.	**15**
Unit IV	Methods of soil conservation: strip cropping, contour farming, conservation drainage, gully control, agroforestry.	**15**

Practical:

1. Soil testing and measurement of soil loss
2. Calculation of water storage capacity of soil
3. Measurement and estimation of run-off

Suggested Reading:

1. Watershed Management by M.E.M. Tidemen
2. Watershed Management by Chandrawati and J. Shagufta
3. Principles of Watershed Management by S. K. Dutta
4. Disaster Management by H. K. Gupta

Semester-V

BACHELOR OF FORESTRY

SKILL ENHANCEMENT COURSE (SEC)-Propagation of Medicinal and Aromatic Plants/ IAPC

No. of Hours-60 CREDIT

DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
SEC: Propagation of Medicinal and Aromatic Plants/ IAPC	2	0	0	2	Passed Class II Year (IV semester)	Nil

BACHELOR OF FORESTRY

Programme: Undergraduate Diploma in Forestry	**Year: III**	**Semester:V Paper: SEC**
Subject: Forestry		
Course: SEC	**Course Title: Propogation of Medicinal and Aromatic Plants**	
Course Outcomes: Students will learn the practical aspects and knowledge about different medicinal and aromatic plants, their distribution, habitat, importance, and use,especially those growing in the Himalayan region.		
Credits: 4		**Generic Elective**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Identification of medicinal and aromatic plants.Ecology and biology, propagation techniques of medicinal and aromatic plants (seed and vegetative parts), germinationcharacteristics, viability and plant percent, survival rate of selected medicinal and aromatic plants.	15
Unit II	Effect of growing media. Drug descriptors for medicinal and aromatic plants, Production, storage and marketing of medicinal and aromatic plants.Important constituents of medicinal and aromatic plants, different uses and benefits of medicinal and aromatic plants	15

Suggested Readings:

1. Medicinal and Aromatic Plants by Malhotra Publ. House
2. Reviews on Indian Medicinal Plants by A. K. Gupta & M. Sharma
3. Quality Standards of Indian Medicinal Plants by A. K. Gupta, N. Tandon& M. Sharma
4. Breeding research on aromatic and medicinal plants by C. B. Johnson & C. Franz
5. Agrotechniques of Medicinal Plants by R. Sharma
6. Role of Biotechnology in Medicinal and Aromatic Plants by I. Alikhan& A. Khanum

Semester-VI

Bachelorof Forestry

DISCIPLINE SPECIFIC COURSE (DSC)- Forest Management and Policies

No. of Hours - 60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSC: Forest Management and Policies	4	3	0	1	Passed Class II Year (V semester)	Nil

BACHELOR OF FORESTRY		
Programme: Bachelor of Forestry	**Year: III**	**Semester: VI Paper: DSC**
Subject: Forestry		
Course: DSC	**Course Title: Forest Management and Policies**	
Course Outcomes: In this course, students will learn about the forest, their types, classification based on classification, their different management strategies, and also different legislation and policies related to forests and wildlife.		
Credits: 4		**Discipline Specific Elective**
Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Definition, scope, objective, and principles of forest management; Classification of forests: Administrative, territorial, silviculture;	15

Unit II	Sustained yield: Definition, principles and limitations; Rotation: Definitions, various types of rotations, length of rotations, choice of type and kind of rotation; Normal forest: Definitions, basic factors of normality, kinds of abnormality in regular and irregular forest; CAI and MAI curves and increment percent. Distribution of age classes and age gradation in even and uneven aged forest and growing stock;	15
Unit III	Yield regulation: Definition, principle and method of yield, area method, and Von Mental method for yield regulation. Forest working plan- Preparation, working plan code, measurement of growing stock, case study of working plan of division	15
Unit IV	Forest policy: Relevance and scope; National Forest Policy-1894, 1952 and 1988; Forest laws; Indian Forest Act-1927; Forest Conservation Act-1980; General provision and silent features; Forest (Conservation) rules and amendments. Wildlife Protect Act-1972 and amendments; The Biological Diversity Act-2002; Environmental (Protection) Act 1986, National Green Tribunal Act-2010; Important forest rules and guidelines; Silent features and national biodiversity authority; Forest Right Act-2006.	15

Practical

1. Visit different forest divisions to study the various stand management aspects including thinning, felling, and sale of timber.
2. Study forest organizational setup and forest range administration including the booking of offenses.
3. Visit to forest plantation- Field Exercise for the estimation of actual growing stock volume.
4. Study the different field exercises for data collection for working plan.

Suggested Readings:

1. Essentials of Forest Management by S. Balakathiresan
2. Forest Management in India-Issues and Problems by V. Desai
3. Timber Management: A Quantitative Approach by Jerome. L. Cutteretal
4. National Working Plan Code by MoEFCC, New Delhi.
5. Forest Management, IBD, Dehradun.
6. Forest Management by P.R. Trivedi and K.N. Sudarshan
7. Forest Management by Ram Prakash.
8. Forest Policy and Law by A.N. Chautervedi
9. Forest Policy and Laws by S.S. Negi
10. Forest Laws and Policies in India by A.K. Poddar
11. Compilation of Forest Policy and Laws by C.A. Rahman
12. Indian Forest Act 1972 by Vinod Rishi
13. Legal forestry by S. Mehra.

Semester-VI

Bachelor of Forestry

DISCIPLINE SPECIFIC ELECTIVES/GENERIC ELECTIVE (DSE/GE)-Seed Science and Technology

No. of Hours-60 CREDIT

DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
DSE/GE: Seed Science and Technology	4	3	0	1	Passed Class II Year (V semester)	Nil

BACHELOR OF FORESTRY

Programme: Bachelor of Forestry	**Year: III**	**Semester:VI Paper: DSE**
Subject: Forestry		
Course: DSE	**CourseTitle: Seed Science and Technology**	

Course Outcomes: The course will equip the students regarding physical characteristics of seed, germination and treatment in seed, seed dormancy, seed viability test, seed quarantine, seed legislation, angiosperm and gymnosperm seed, and the importance of seed for regeneration of forests.

Credits: 4	**Discipline Specific Course**
Max. Marks: As per Univ. rules	**Min. Passing Marks: As per Univ. rules**

Unit	Topic	No. of Hours
Unit I	Definition of seed, classes-types of seed and its importance; Role of seed technology in nursery stock production; Production of quality seed; Seed biology and seed production, seed sources, seed collection and handling.	**15**
Unit II	Identification of seed collection areas seed orchards; Maintenance of genetic purity; Isolation and rouging; Seed source (provenance and stands)., Seed testing, seed storage, seed dormancy. Seed germination and seedling establishment. Seed certification and quarantine.	**15**

Unit III	Selection of seed tree (genotypic and phenotypic selection); Plus tree (pure stands, elite seed tree, isolated tree and their location); Seed Collection: Planning and organization, collection methods, factors affecting seed collection and seed maturity; Seed processing: Seed extraction, drying, blending, cleaning, grading, treating, bagging, labeling and storage; Orthodox, intermediate and recalcitrant seeds, precautions of handling of recalcitrant seeds, natural longevity of tree seeds, factors affecting longevity.	**15**
Unit IV	Seed Act and International seed testing agencies, seed requirement and exchange. Seed pathology, important seed insects and pests	**15**

Practical:

1. Collection, extraction and cleaning of fruits/seeds
2. Seed maturity indices in the given plants
3. Determination of seed size, weight, moisture content and purity of seed lots
4. Estimation of germination capacity and germination value, cutting excised embryo
5. TTZ test of viability estimation
6. Seed pathological test

Suggested Reading:

1. Forest tree improvement and seed technology by M. Dutta
2. Hand book of Seed Science and Technology.
3. An introduction of seed technology by J.R. Thompson.
4. Techniques in seed science and technology by P.K. Agrawal and M. Dadlani.
5. Principles of seed technology by P.K. Agrawal.
6. Seed Technology by R.L Agrawal.

Semester-VI

BACHELOR OF FORESTRY

SKILL ENHANCEMENT COURSE (SEC)-Propagation of Medicinal and Aromatic Plants/IAPC

No. of Hours-60

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

CourseTitle	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
SEC: **Propagation of Medicinal and Aromatic Plants/IAPC**	2	0	0	2	Passed Class II Year (V semester)	Nil

BACHELOR OF FORESTRY		
Programme: Undergraduate Diploma in Forestry	**Year: III**	**Semester:VI Paper: SEC**
Subject: Forestry		
Course: SEC	**Course Title: Propogation of Medicinal and Aromatic Plants**	
Course Outcomes: Students will learn the practical aspects and knowledge about different medicinal and aromatic plants, their distribution, habitat, importance, and use,especially those growing in the Himalayan region.		
Credits: 4		**Generic Elective**

Max. Marks: As per Univ. rules		**Min. Passing Marks: As per Univ. rules**
Unit	**Topic**	**No. of Hours**
Unit I	Assessment of population in natural habitat in major medicinal and aromatic plants. Calculation of species richness of diversity of medicinal plants in different forest types. Conservation of medicinal plants and its techniques: In situ, ex- situ and biotechnological.	15
Unit	Cultivation and propagation of medicinal and aromatic plants: *Valerianajatamasi, Viola species, Rauvolfiaserpentina, Ocimum sanctum, Phyllanthusemblica,* Terminalia	15

II	bellirica, Terminalia arjuna, Terminalia chebula, *Centellaasiatica, Berberis species, Asparagus officinalis, Tinosporacordifolia,Taxusbaccata, Vincarosa, Cymbopogon spp. Cedrusdeodara, Prunusarmenica*	

Suggested Readings:

1. Medicinal and Aromatic Plants by Malhotra Publ. House
2. Reviews on Indian Medicinal Plants by A. K. Gupta & M. Sharma
3. Quality Standards of Indian Medicinal Plants by A. K. Gupta, N. Tandon& M. Sharma
4. Breeding research on aromatic and medicinal plants by C. B. Johnson & C. Franz
5. Agrotechniques of Medicinal Plants by R. Sharma
6. Role of Biotechnology in Medicinal and Aromatic Plants by I. Alikhan& A. Khanum