

Program Outcomes (POs)
Program Specific Outcomes (PSO)
Course Outcomes (COs)



DEPARTMENT OF FORESTRY

**DOON (P.G.) COLLEGE OF AGRICULTURE SCIENCE AND TECHNOLOGY
SELAQUI, DEHRADUN, UTTARAKHAND.**

B.Sc. (Hons.) Forestry

Programme Summary Duration: 4 years

Eligibility 10+2 with at least 45% marks in PCB/PCM.

Program outcomes:

PO 1: To develop undergraduate level student strong competencies in the field of Forestry and its application in a technology-rich, interactive environment.

PO 2: To develop strong student skills in silvicultural activities, forest survey & mapping, forest management planning, forest operation, urban forestry, forest based industries development and value addition, IPR applications, natural resource management, environmental sustainability, socio economic stability, data collection and analysis by using new techniques and tools.

PO 3: To learn the ethnobotany along with medicinal and aromatic Plants and their uses and impacts on the tribal communities and remote villages using extension education concepts and the knowledge on traditional & well designed Agroforestry systems, techniques, management and their advantages over sole cropping land use systems.

PO 4: Apply knowledge and skill in the development of forest and forestry activities to compete for employment in Forestry and its allied disciplines to meet the fulfillment of government and industrial needs

PO 5: To gain the preliminary knowledge on geographical distribution of grasslands, forests and their classification in the India and in the world. Critical examination of the world forest sources, productivity potential and increment of world forests.

PO 6: To learn the principles and practices of Silviculture, silvicultural and dendrology knowledge i.e. origin, distribution, general description, phenology, silvicultural characters, regeneration methods, silvicultural systems, tending operations and economic importance of important conifer and broad leaved tree species of India & also the nursery techniques of these tree species.

PO 7: To learn the Forest management skills for best growth of any forest and also to get acquainted with the Forest policies and the laws.

PO 8: The skills on tree-seed collection, seed storage, seed testing for purity, viability, moisture, germination etc will be developed in this program.

PO 9: It imparts general idea about the use of wood as an engineering material for bridges, roads and building material.

PROGRAMME SPECIFIC OUTCOMES:

1. Students will be able to understand and explain different specializations of Forestry such as systematics, evolution, ecology, developmental biology, physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics, cell and molecular biology of plants, silvicultural practices.
2. Students will be trained in various uses of plant species as industrial resources or as support system for human livelihood and will be well versed with the use of transgenic technologies for both basic and applied research in plants.
3. Students will be able to identify various life forms of plants, design and execute experiments related to physiology, biochemistry, plant interactions with microbes and insects, morphology, anatomy, reproduction, genetics, microbiology and application of statistics to biological data.
4. They will be able to understand adaptation, development and behavior of different forms of plant life. The students will get an understanding of functioning of ecosystem.
5. Students will be able to demonstrate the experimental techniques and methods in Forestry and have innovative research ideas. .

B.Sc. (Hons.) Forestry
1st Semester

Introduction to Forestry

Course code: SOA/FC 101 T

Course outcomes-

CO.1. Students will understand recognize various harvesting, transportation, and processing systems used in the management of forest resources and production of forest products

CO.2. Students will understand develop and evaluate management plans with multiple objectives and constraints.

CO.3. Students will learn how to develop and apply silvicultural prescriptions appropriate to management objectives.

CO.4. Students will understand analyze forest inventory information and project future forest, stand, and tree conditions.

CO.5. After the end of the course, the students will be able to identify forest and other tree species, their distribution, and associated vegetation. They will also help to understand the components and dynamics of forest or different forest types.

Dendrology

Course code: SOA/FC 102 T

Course outcomes-

CO1: Students will learn about basic knowledge of plant morphology, physiology of different plant and tree species.

CO2: Students will learn the nomenclature and anatomy of various parts of higher plant.

CO3: Students will have the in-depth knowledge about plant taxonomy and plant identification.

Geology and Soil Science

Course code: SOA/FC 103 T

Course outcomes-

CO1: To be able about physical and chemical properties of soil and their effect on plant's health.

CO2: To aware the students about causes, effects and remedies to prevention and mitigation of soil pollution.

CO3: Knowledge about soil forming rocks and minerals, their weathering and soil forming processes and climatic factors affect them.

Plant Biochemistry**Course code: SOA/FC 104 T****Course outcomes-**

CO1 Students will be able to understand the various physiological life processes in plants

CO2 They will also gain about the various uptake and transport mechanisms in plants and are able to coordinate the various processes. They understand the role of various hormones, signaling compounds, thermodynamics and enzyme kinetics. During the course students will gain knowledge about various mechanisms such as channel or transport proteins involved in nutrient uptake in plants.

Communications Skills and Personality Development**Course code: SOA/FAECC 101 T****Course outcomes-**

CO1: The student will be able to gain the knowledge, value addition and its application in their area of interest.

CO2: The necessary skill will be enhanced related to selected subjects.

CO3: Future career development prospects among students will increase.

Introduction to Agronomy and Horticulture**Course code: SOA/FE 101 T****Course outcomes-**

CO1: Understand the important concepts on micro and macro economics.

CO2: To know the principles of economics, concepts like GDP, GNP inflection.

CO3: To acquire the practical exposure on application of economic principles related to agriculture.

Information and Communication Technology**Course code: SOA/FE 102 T****Course outcomes-**

CO1: To make the students aware of working with word processor, spreadsheet, presentation and using MS-Office package.

CO2: To explore the students on Internet searching, Online Database searching and Web Designing.

Forest Botany**Course code: SOA/FE 103 T****Course outcomes-**

CO1: Students will learn about basic knowledge of plant morphology, physiology of different plant and tree species.

CO2: Students will learn the nomenclature and anatomy of various parts of higher plant.

CO3: Students will have the in-depth knowledge about plant taxonomy and plant identification.

B.Sc. (Hons.) Forestry
2nd Semester

Plant Physiology

Course code: SOA/FC 106 T

Course outcomes-

CO1: Acquire basic skills on the plant taxonomy with special reference to angiosperms and gymnosperms.

CO2: Illustrate the types; merits and demerits of various system of classification.

CO3: Identify the angiosperms families with specific key characters; learn various advanced tools to study plant taxonomy.

Plant Cytology & Genetics

Course code: SOA/FC 107 T

Course outcomes-

CO1: Students will be enriched with theoretical and practical knowledge about plant cell, genetics and tree breeding programme.

CO2: Students will learn the structure and functions of plant cell.

CO3: Students will be able to understand the plant breeding programmes which will enhance their skill about future employment related to forestry.

CO4: Student will understand fertilization pattern of various tree species.

Theory and Practice of Silviculture

Course code: SOA/FC 108 T

Course outcomes-

CO1: Course will enrich the knowledge of students related to forest nursery production and forest types, different tree species and forest survey.

CO2: The course makes students to identify forest and tree species, their distribution, and vegetation structure.

CO3: Students will be able to conduct experiment on seed dormancy, forest regeneration survey and its analysis for vegetation.

CO4: Student will be able to perform cultural operations like tending operation, pruning, climber cutting etc. in a forest stand.

Forest Protection**Course code: SOA/FC 109 T****Course outcomes-**

CO1: Students will learn about forest tree diseases, insect and pest.

CO2: Students will be able to identify pest and disease in nursery, plantation and forest and suggest control measures.

CO3: Students will enable to recommend different chemicals and measures for disease control and forest species growth and development.

Statistical Methods & Experimental Designs**Course code: SOA/FAECC 102 T****Course outcomes-**

CO1: Students enable to exploit biostatistics in forestry and allied subjects.

CO2: Students friendly worksheet using excel sheet for analysis and data interpretation using computer based software.

CO3: Student will be efficient in data handing and graphic, and representation.

CO4: Subject will help in their professional development and career building.

Wood Anatomy**Course code: SOA/FE 106 T****Course outcomes-**

CO1: Students will gain the knowledge and skills necessary to prepare samples and to identify wood through optical microscopic analysis.

CO2: This course covers practical methods for wood identification, providing students with a comprehensive understanding of this important field.

Environmental Studies and Disaster Management**Course code: SOA/FE 107 T****Course outcomes-**

CO1: Students will understand, interpret and communicate the natural environment and its relationships with human activities.

CO2: Students will be able to investigate, characterize, analyze and judge human impacts on the environment.

B.Sc. (Hons.) Forestry
3rd Semester

Forest Survey and Engineering

Course code: SOA/FC 110T

Course outcomes-

CO1: Students will have practical knowledge about survey and engineering concepts related to forestry.

CO2: The students will learn the usage of survey tools and perform forest survey.

CO3: Students will develop skill on assessing quality of building materials, roads, and bridge.

Tree Improvement

Course code: SOA/FC 111T

Course outcomes-

CO1: Students will be well equipped about the general principles of plant and tree breeding, and plant genetic resources.

CO2: Students will be able to develop knowledge about forest genetics and tree breeding, quantitative analysis of genetic & phenotypic characteristics of forest resources

CO4: Students will be gain knowledge about the carbon fixation and seed viability of forest trees species.

Principles of Agroforestry

Course code: SOA/FC 112T

Course outcomes-

CO1: Students will get information on current scenario of agroforestry.

CO2: Student's will develop competencies on tree based farming and managements.

CO3: Students will be able to identify the potential areas for plantations and carbon sequestration calculation.

Forest Mensuration

Course code: SOA/FC 113T

Course outcomes-

CO1: Students will develop knowledge about tree measurements, forest inventory, and yield concepts.

CO2: Student's ability to observe individual trees and forest crops for future yield and carbon monetization.

CO3: Students will be able to develop and design forest resource inventories.

CO4: Future job prospects to forestry and allied sectors.

Soil Biology and Fertility

Course code: SOA/FSEC 101T

Course outcomes-

CO1: Students will relate soil fertility to physical, chemical, and biological processes;

CO2: Students will understand how soil conditions affect plant growth and the relations between soil chemistry and fertilizers. Emphasis is placed on factors affecting availability of nutrients and methods of measuring nutrient availability;

CO3: Students will understand how soil fertility can be managed and manipulated for applications in agriculture, horticulture, forestry, engineering, and for environmental protection.

Wildlife Biology, Ornithology and Herpetology

Course code: SOA/FE 109T

Course outcomes-

CO1: Student will gain knowledge of faunal diversity of different bio-geographical zones.

CO2: Student will be able to identify wildlife (mammals, reptiles, amphibian, avian and insects) in their natural habitat.

CO3: Students will understand the basic knowledge on mammalogy, ornithology and herpetology

CO4: Students will learn about man and wildlife conflict and also help in solving the related issues

Forest Ecology and Biodiversity

Course code: SOA/FE 110T

Course outcomes-

CO1: Students will develop in-depth knowledge about forest resource and biological diversity.

CO2: Students will learn the analytical measurement of floral and faunal diversity.

CO3: The student will be able to understand the different methods of biodiversity conservation method (In-situ and ex-situ) and management plan.

B.Sc. (Hons.) Forestry

4th Semester

Forest Management

Course code: SOA/FC 114T

Course outcomes-

CO1: Students will develop knowledge about recent advances in forest management.

CO2: Students will learn about estimation of forest tree volume, gender participation in forest management, community resources and joint forest management.

CO3: Students will develop how to develop and evaluate management plans in forestry.

Silviculture of Indian Trees

Course code: SOA/FC 115T

Course outcomes-

CO1: Students will understand the silvicultural characters and phenology of trees

CO2: Students will learn about the regeneration methods of trees

CO3: Students will establish a plantation of tree crop and understand the maintenance of plantations.

Wood Products and utilization

Course code: SOA/FC 116T

Course outcomes-

CO1: Students will learn about non-wood forest products and their utilization aspects.

CO2: Students will know that how tribal and local community utilizes the forest resources using indigenous knowledge.

CO3: Students will develop in-depth knowledge about major forest products and tribal economy and livelihood.

CO4: The students will improve the employability to industries.

Ethnobotany, Medicinal and Aromatic Plants

Course code: SOA/FC 117T

Course outcomes-

CO1: Students understanding and knowledge on various non-wood forest products and its value addition.

CO2: Students will analyze different forest products, value addition and their impact on tribal economy and livelihood.

CO3: Students will develop in-depth knowledge about major forest products and tribal economy and livelihood.

Nursery Management and Commercial Forestry

Course code: SOA/FSEC 102T

Course outcomes-

CO1: Course will enrich the knowledge of students related to forest nursery production and forest types, different tree species and forest survey.

CO2: Students will be able to identify pest and disease in nursery, plantation and forest and suggest control measures.

CO3: Student's will develop competencies on tree based farming and managements.

Tree Seed Technology

Course code: SOA/FE 112T

Course outcomes-

CO1: Students will get the in-depth knowledge about seeds of forest tree and method to maintain viability.

CO2: Students will get knowledge about seed, seed developments, types of seed, seed viability, seed treatment, dormancy, seed testing etc.

CO3: Students development for seed certification and handling and trading.

Rangeland Management and Livestock Management

Course code: SOA/FE 113T

Course outcomes-

CO1. Understand rangeland management operations.

CO2. Identify rangeland plants.

CO3. Gain a perspective of watershed management.

CO4. Discuss the management of rangeland resources.

CO5. Understand the process of rangeland evaluation through a broad understanding of monitoring and production of these rangelands.

Forest Tribology and Anthropology

Course code: SOA/FE 114T

Course outcomes-

CO1: The Basics explains and explores anthropological concepts and themes

CO2: Tribology is an important interdisciplinary field. It involves the design of components with static and dynamic contacts for a required performance and reliability.

B.Sc. (Hons.) Forestry 5th Semester

Climate Science

Course code: SOA/FC 118T

Course outcomes-

CO1: Students will understand the climate change pattern with reference to world forest.

CO2: Students will learn about about the world forest and its significance on climate change scenario.

CO3: Students will understand the world forest distribution with respect to climate.

Wood Science and Technology

Course code: SOA/FC 119T

Course outcomes-

CO1: Students will learn about detail physical characteristics and strength of wood.

CO2: The students will have practical knowledge about wood identification, wood degradation and protective measures for long term uses.

CO3: Students will learn about wood preservation techniques, seasoning methods and technology for making engineered woods.

Logging and Ergonomics

Course code: SOA/FC 120T

Course outcomes-

CO1: Students will be able to efficient in raw materials collection and processing of products with its marketing trading methods

CO2: Graduate is able to implement of industrial utilization related to forest resources and financial implications and marketing of finished forest based industries.

CO3: To develop man power equipped with latest techniques and knowledge for the sustainable utilization and management of forest based industries.

Experimental Learning- I

Course code: SOA/FC 121P

Course outcomes-

CO1: Skilled students will be performing field/laboratory based research work on different aspects of forestry and wildlife sciences.

CO2: Students will develop and enhance their experimentation skills.

CO3: Students will learn and get practical knowledge about Apiculture, silk rearing, and Ecotourism.

Entrepreneurship Development and Business Management

Course code: SOA/FSEC103T

Course outcomes-

CO1: Student exposure to different entrepreneurship related to forestry and allied sectors.

CO2: Student promotions towards establishing start-up in forestry field.

CO3: Student will be able to analyze marketing pattern with suitable application for forest product.

Forest Hydrology and watershed Management

Course code: SOA/FE 116T

Course outcomes-

CO1: Students will develop knowledge about recent advances in forest hydrology.

CO2: Students will gain knowledge about regional, national and global watersheds and its management action plan, water and soil conservation efforts.

CO3: Students will get expertise knowledge and skill related to the implementation of integrated watershed projects.

Forest Economics and Marketing

Course code: SOA/FE 117T

Course outcomes-

CO1: Students will get knowledge about the implementation of economics in forestry and its allied subjects.

CO2: The students will be able to know about the demand and supply of forest based industries and its diversification.

CO3: The subject knowledge will help the students for further career development.

Forest Extension and Community Forestry

Course code: SOA/FE 118T

Course outcomes-

CO1: Student will able to perform forestry extension and outreach programs.

CO2: Improvement in communication skills with stock holders and society.

CO3: Student contributes in transfer of technology from lab to land.

CO4: Student develops linkages with administration and local people for scheme penetration.

B.Sc. (Hons.) Forestry
6th Semester

Forest Laws, Legislation and Policies

Course code: SOA/FC 122T

Course outcomes-

CO1: Student will understand about the forest law and policies.

CO2: Student may contribute aware local people on forest rights and forest crimes.

CO3: Graduates will help to reduce wildlife crimes and work for the protection of wildlife.

Geomatics

Course code: SOA/FC 123T

Course outcomes-

CO1: Students will about the application of Remote Sensing and GIS technology in forestry, change detection studies as well as natural resource mapping.

CO2: Students will have the field exposure and use of GPS technique, and mapping.

CO3: To understand the application of remote sensing and GIS technique for the measurement and mapping of forest areas.

Restoration Ecology

Course code: SOA/FC 124T

Course outcomes-

CO1: Students will develop in-depth knowledge about forest resource and biological diversity.

CO2: Students will learn the analytical measurement of floral and faunal diversity.

CO3: The student will be able to understand the different methods of biodiversity conservation method (In-situ and ex-situ) and management plan.

Experimental Learning- II

Course code: SOA/FC 125 P

Course outcomes-

CO1: Skilled students will be performing field/laboratory based research work on different aspects of forestry, and wildlife sciences.

CO2: Students will develop and enhance their experimentation skills.

CO3: Students will learn and get practical knowledge about silk rearing, Apiculture and Ecotourism.

Plantation Forestry

Course code: SOA/FSEC 104 T

Course outcomes-

CO1: Students will develop knowledge about recent advances in Plantation Forestry.

CO2: Course will develop the ability of student in soil testing and site evaluation for establishing forest plantation.

CO3: Students will develop how to develop and manage plantation.

Non-Timber Forest Products, Marketing and Trade

Course code: SOA/FE 119T

Course outcomes-

CO1: Students will learn about non-wood forest products and their utilization aspects.

CO2: Students will know that how tribal and local community utilizes the forest resources using indigenous knowledge.

CO3: Students will develop in-depth knowledge about major forest products and tribal economy and livelihood.

CO4: The students will improve the employability to industries.

Certification of Forest Products

Course code: SOA/FE 120 T

Course outcomes-

CO1: Students will get the in-depth knowledge of forest certification and trading.

CO2: Students will learn forest certification and procedure of certification.

CO3: Students will develop how to develop and evaluate certification plans in forestry.

Recreation and Urban Forestry

Course code: SOA/FE 121 T

Course outcomes-

CO1: Students will get information on current scenario of Recreation and Urban forestry.

CO2: Student's will develop competencies on tree based farming and managements.

CO3: Students will be able to identify the potential areas for plantations and carbon sequestration calculation.

B.Sc. (Hons.) Forestry
7th Semester

FOREST RANGE TRAINING PROGRAMME

Course code: SOA/FC 127 P

Course Outcomes:

CO1: Students will be able to develop own nursery as an income generating source.

CO2: Student will be skilled in developing working plans and preparation of yield tables.

CO3: Student will develop confidence in students to perform regeneration survey layout plans and resource analysis.

INDUSTRIAL PLACEMENT

Course code: SOA/FC 128 P

Course Outcomes:

CO1: Students will be able to be efficient in raw materials collection and processing of products with its marketing trading methods

CO2: Graduate be able to implement of industrial utilization related to forest resources and financial implications and marketing of finished forest-based industries.

CO3: To provide exposure of working of others institution to students.

SOCIO-ECONOMIC SURVEY AND VILLAGE ATTACHMENT

Course code: SOA/FC 129 P

Course Outcomes:

CO1: Students will be able to apply field exposure for the sustainable management of village resources.

CO2: Student will be able to apply local Forestry approaches for social welfare.

CO3: Student will spread awareness and knowledge for villagers and help to perform extension work

PROJECT WORK AND DISSERTATION

Course code: SOA/FSEC 106 P

Course Outcomes:

CO1: Student will learn how to perform research work in forestry with proper solving approaches.

CO2: Graduates will be able to analyze problems and its solution with writing skill.

CO3: Skilled students will be performed field/laboratory based research work on different aspects of forestry, wildlife and environmental sciences and to improve their scientific writing skill.

B.Sc. (Hons.) Forestry
8th Semester

Forest Inventory and Yield Prediction

Course code: SOA/FC 130 T

Course Outcomes:

CO1: Students will develop knowledge about tree measurements, forest inventory, and yield concepts.

CO2: Student's ability to observe individual trees and forest crops for future yield and carbon monetization.

CO3: Students will be able to develop and design forest resource inventories.

CO4: Future job prospects to forestry and allied sectors.

Forest Biotechnology

Course code: SOA/FC 131 T

Course Outcomes:

CO1: Students will be well equipped about the general principles of plant and tree breeding, and plant genetic resources.

CO2: Skill related to practical aspects of biotechnology such as tissue culture, macro-propagation and use of transgenic technology will be gained by students.

CO3: Students will also have the practical exposure of the field of biodiversity conservation.

CO4: Students will enhance about the commercial aspects of biotechnology in forestry and related subjects.

Agroforestry systems and Management

Course code: SOA/FC 132 T

Course Outcomes:

CO1: Students will get information on current scenario of agroforestry and tree outside forests.

CO2: Student's will develop competencies on tree based farming and managements.

CO3: Students will be able to identify the potential areas for plantations and carbon sequestration calculation.

CO4: Students will be able to estimate the demand and requirement related to timber and non wood forests products for its industrial application

PROJECT WORK AND DISSERTATION

Course code: SOA/FSEC 108 P

Course Outcomes:

CO1: Student will learn how to perform research work in forestry with proper solving approaches.

CO2: Graduates will be able to analyze problems and its solution with writing skill.

CO3: Skilled students will be performed field/laboratory based research work on different aspects of forestry, wildlife and environmental sciences and to improve their scientific writing skill.

Wildlife Management**Course code: SOA/FE 122 T****Course Outcomes:**

CO1: Student will gain knowledge of faunal diversity of different bio-geographical zones.

CO2: Student will be able to identify wildlife (mammals, reptiles, amphibian, avian and insects) in their natural habitat.

CO3: Students will learn about management and conservation of protective and natural habitat.

CO4: Students will learn about man and wildlife conflict and also help in solving the related issues.

Agriculture Informatics**Course code: SOA/FE 123 T****Course Outcomes:**

CO:1. Understand analogy of computer

CO:2. Basic knowledge of MS Office

CO:3. Some basic knowledge of Internet and WWW

CO:4. Use of IT application and different IT tools in Agriculture

CO: 5. Use of Decision support systems, Agriculture Expert System and Soil Information Systems in Agriculture