

Program Outcomes (POs)

Program Specific Outcomes (PSO)

Course Outcomes (COs)



DEPARTMENT OF HORTICULTURE

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

DEPARTMENT OF HORTICULTURE
H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India-246 174
Course Curriculum for M. Sc. Horticulture/ M. Sc. (Ag.) Horticulture, 2011-12

M.Sc. Programme outcomes

1. To have a deep understanding of production technology, management and improvement of horticultural crops.
2. To be proficient in designing, conducting and analyzing horticultural research, utilizing modern techniques and tools to address complex problems of the field.
3. To be able to effectively communicate scientific information both orally and in writing and demonstrate leadership and management skills necessary for careers in academia, industry, or public service.
4. To evolve skilled human resources tailored to formulate, analyze, and resolve complex problems in horticultural crops related to propagation to post harvest.
5. To apply the knowledge and skills acquired to cater the needs of the industry, academia, research and the society for contributing to nation-building.
6. To provide and promote consultancy services in the fields of Horticultural research, training and dissemination of information and technology.
7. To utilize opportunities present in the market for the economic and social development of society through horticulture.

M.Sc. Programme specific outcomes

The course in Master's programme in Horticulture provides broad knowledge about core and elective courses viz., plant propagation and nursery management, advances in orchard management, systematic horticulture, advances in pomology of tropical and subtropical fruits, statistical methods and experimental designs, advances in temperate zone pomology, advances in olericulture, canopy management in fruits crops, biotechnology of horticultural crops, advances in breeding of fruits and plantation crops, advances in post-harvest technology and management of fruits and vegetables, protected cultivation of horticultural crops, advances in floriculture and landscaping, growth and development of plants, advances in breeding of vegetable crops, dry land horticulture, biotic and abiotic stress management in horticultural crops, advances in breeding of ornamental crops and organic horticulture.

This programme also provides elementary idea to carried out research work and complied all data in the form of thesis/manuscript.

Scope of M.Sc. Horticulture

Students with a degree in Horticulture enter a broad range of challenging and rewarding professional careers in production, management, marketing, education and research in both public and private sectors. Students often open their own business enterprises such as fruit/vegetable/flower production, landscape design/build and maintenance houses/companies, nurseries, greenhouses, garden centers and off-season cultivation. Because plants are everywhere and plant life is essential to human existence, careers for students with a degree in horticulture are likely to be available throughout the country and abroad.

Core Courses

Course No.	Course Title	Course Outcome
SOA/HC/PG 01	Plant Propagation and Nursery Management	<ul style="list-style-type: none"> ● Aware of various propagation methods, nursery layout, media-mixture and other nursery management practices to get quality planting material. ● Understand the concept of micro-propagation and handling of various equipment and tools involved in micropropagation. ● Learn the techniques of enhancing the seed germination and various factors which adversely affect the germination. ● Familiar about handling of various equipment's and tools used in propagation techniques.
SOA/HC/PG 02	Advances in Orchard Management	<ul style="list-style-type: none"> ● Understanding the purpose of maintaining orchards and to get acquaintance with different orchard floor management practices. ● Aware of weeds control, soil erosion, conserve soil moisture and <i>In-situ</i> conservation of water in the orchard. ● Explained about increase land use efficiency in tropical and sub-tropical fruits by inter-crops, multiple crops, multi-storied crops systems are followed for obtaining maximum income from the available land. ● Learn about different soil management practices on nutrient and water uptake by fruit plants in the orchard.
SOA/HC/PG 03	Systematic Horticulture	<ul style="list-style-type: none"> ● Understand the importance, scope and botanical terminology related to systematic horticulture. ● Explained the history of plant classification and systems of
		<p>classification like artificial, natural and modern systems and also nomenclature of plants.</p> <ul style="list-style-type: none"> ● Know the morphological description of important families of fruits, vegetables and ornamental crops.
SOA/HC/PG 04	Advances in Pomology: Tropical and Subtropical Fruits	<ul style="list-style-type: none"> ● Explained the prospects, scope and constraints of fruit industry in India. ● Know about the origin, distribution, area, production, taxonomy, classification, description of cultivars, nutrition, bearing habit, pollination and fruit set, use of bio-regulators, of tropical, sub-tropical and minor fruit crops ● Understand about various special problems and physiological disorders in the production of tropical, sub-tropical and minor fruit crops.
SOA/HC/PG 05	Advances in Medicinal, Aromatic and Spices Crops	<ul style="list-style-type: none"> ● To evaluate natural herbal products from an economic perspective. ● To use medicinal and aromatic herbs sustainably. ● To set up business related to medicinal and aromatic. ● To develop effective ideas related to collecting, processing and marketing herbal natural sources.
SOA/HC/PG 06	Statistical Methods and Experimental Designs	<ul style="list-style-type: none"> ● Learn about sampling theory, test of hypothesis and correlation. ● Understand about various experimental design of an experiment. ● Explained about analysis of covariance for reduction of experimental error in CRD, RBD and L. S. designs. ● Understand the factorial experiments- concept of factorial treatments, definition of main effects and interrelations, analysis of series using Yates method.

SOA/HC/PG 07	Advances in Temperate-Zone Pomology	<ul style="list-style-type: none"> ● Aware about scope, area and production of various temperate fruits and the peculiar characters as chilling requirement, dormancy etc. ● Explained about description of important cultivars, bearing habits, pollination and use of bio-regulators in pome, stones, nut and berries. ● Understand about phyiological disorder of various temperate fruit crops.
SOA/HC/PG 08	Advances in Olericulture	<ul style="list-style-type: none"> ● Familiar regarding introduction, types of vegetable farming, vegetable forcing, use of bioregulators and also principles of vegetable seed production. ● Know about origin and distribution, area and production, taxonomy, classification and description of cultivars, use of bioregulators, seed production, specific problems and physiological disorders of solanaceous vegetables, root vegetables, cole vegetables, peas, french bean, onion, garlic, cucurbits, spinach, amaranthus, okra and sweet potato.
SOA/HC/PG 09	Canopy Management in Fruits Crops	<ul style="list-style-type: none"> ● Aware the importance and advantages of canopy management. ● Learn various types of canopy, their structure and manipulation suited to different climatic condition. ● Practice about canopy management through training, pruning, PGRs, rootstocks etc and other management practices. ● Practice of canopy management in relation to growth, flowering and fruit quality in various fruit trees.
SOA/HC/PG 10	Biotechnology of Horticultural Crops	<ul style="list-style-type: none"> ● Understand the method to develop plant materials which are extinct and difficult to propagate in environment. ● Learn about genetically modified plant materials which are superior over their mother plant. ● Explained about applications of recombinant DNA technology, in-vitro fertilization and embryo transfer technology. ● Learn to develop plant materials by using various micro-propagation methods of horticultural plants on a commercial scale.
SOA/HC/PG 11	Advances in Breeding of Fruits and Plantation Crops	<ul style="list-style-type: none"> ● Aware about importance, objectives, principles, prospects and problems of fruit breeding. ● Explained about methods of improvement, introductions, clonal selection, hybridization, mutation, polyploidy, heterosis and back cross. ● Know about centre of diversity, germplasm resource, breeding objectives, early development and inheritance of characters. ● Understand the problems and advances made in fruits and plantation crops
SOA/HC/PG 12	Biodiversity and Conservation of Horticultural Crops	<ul style="list-style-type: none"> ● The students will know about biodiversity, conservation issues and exploitation of biological diversity through crop management. ● The students will be acquainted understanding the biodiversity, centers of origin of cultivated fruit crops. ● The students will be acquainted with the quantify economic importance of plants in managed ecosystems and the impact of horticultural crops in food systems.

SOA/HC/PG 13	Advances in Post- Harvest Technology and Management of Fruits and Vegetables	<ul style="list-style-type: none"> • Understand physio-biochemical changes, post-harvest losses, storage of fresh fruits and vegetables, factor affecting storage quality and storage disorders. • Aware about history, objectives and scope of fruit and vegetable preservation with principles and guidelines for establishing processing unit. • Know about containers, principles and methods of jam, jelly and marmalade, juice extraction, general methods of preparation and preservation and preservation of unfermented beverages. • Learn about general methods of making preserve, candy, pickles, chutneys, sauces, ketchup, soup and cocktail from some suitable fruits and vegetables.
SOA/HC/PG 14	Protected Cultivation of Horticultural Crops	<ul style="list-style-type: none"> • Aware about history, present status, importance, problems and prospects of protected cultivation. • Explained about types, designs, environment control, growing media and sterilization in protected structures and their management. • Know about soilless cultivation, hydro-ponics, aeroponics, irrigation, fertigation, integrated insect-pest, disease management, post-harvest management and marketing for protected cultivation. • Familiar how to produce and earn money by growing high value crops under protected structure.
SOA/HC/PG 15	Advances in Floriculture and Landscaping	<ul style="list-style-type: none"> • Aware about importance, scope and prospects of floriculture industry. • Know the various styles of gardening with their elements, planning and designing. • Making skills in bonsai culture, flower forcing and handling of flowers after harvesting. • Familiar about cultivation practices of various commercial flower crops with scientific approach to minimize the input cost and enhance yield.
SOA/HC/PG 16	Seminar	
SOA/HC/PG 17	Thesis Research	<ul style="list-style-type: none"> • Exposing for conducting the research and presenting its findings systematically and scientifically in a manuscript shape. • Specific topic for thesis research shall be assigned to each M. Sc. student by the teacher(s)/supervisor(s) of the department, in the first semester. • Carrying out the research for thesis under the respective supervisor(s) and finally present it in a book shape called thesis.

Elective Courses

Course No.	Course Title	
SOA/HE/PG 01	Growth and Development of Plants	<ul style="list-style-type: none"> • Aware about importance and scope of growth and development of plants with growth curve, environmental factors affecting growth and apical dominance. • Understand the seed germination, seed dormancy and bud • Teach the physiology of growth and development of horticultural crops. • Cellular structures and their function; definition of growth and development, growth analysis and its importance in Horticultural crops. • Physiology of dormancy and germination of seeds, tubers and bulbs; Application of synthetic hormones, plant growth retardants and inhibitors and modern PBRs for various purposes in

		<p>horticultural crops. dormancy.</p> <ul style="list-style-type: none"> ● Know about various kinds of hormones, flower initiation and development, photoperiodism, florigen concept and vernalization. ● Familiar about pollination, fruit-set, parthenocarpy, seedlessness, maturity, ripening, senescence and abscissions.
SOA/HE/PG 02	Advances in Breeding of Vegetable Crops	<ul style="list-style-type: none"> ● Notify about the history, principles, problems and prospects of vegetable improvement. ● Aware about introduction, selection, hybridization, mutation breeding, polyploidy and heterosis breeding for specific purposes. ● Learn about recent advances in breeding including biotechnological approaches. ● Familiar about cytogenetics, breeding objectives, inheritance, early achievement and advances made in solanaceous, cole, legumes, bulb, root, tuber, leafy and cucurbits vegetables.
SOA/HE/PG 03	Dry Land Horticulture	<ul style="list-style-type: none"> ● Aware about importance, limitations, present status, future scope and constraints of dry land horticulture. ● Know the agro-climatic features in rain shadow areas, scarce water resources, high temperature, soil erosion, run-off losses etc. ● Familiar about soil and water conservation methods, in-situ water harvesting methods and methods of reducing evapo-transpiration. ● Familiar about water use efficiency, economic and conjunctive use of water and micro systems of irrigation etc.
SOA/HE/PG 04	Biotic and Abiotic Stress Management in Horticultural Crops	<ul style="list-style-type: none"> ● Understand about various stresses in plant body which adversely affect the growth and development of plant. ● Learn about stress indices to diagnose and type of stress which help to correct the adverse effects of stress as soon as possible. ● Familiar about anti-transpirants, PGRS, soil moisture conservation, mulching etc, to lowers the effects caused by water deficit conditions. ● Explained about pollution, industrial waste and greenhouse effects of modern era which have adverse impact on the crops.
SOA/HE/PG 05	Advances in Breeding of Ornamental Crops	<ul style="list-style-type: none"> ● Acquaint about the evolution of varieties, origin, distribution, genetic resources, genetic divergence and patents ornamental crops. ● Information about different sexually and asexually propagated flower and ornamental plants, various techniques of crop improvement used in ornamental crops. ● Aware about the role of heterosis in hybrid seed production and steps involved in seed production of ornamental crops. ● Familiar about breeding constraints, achievement, genetics, objectives and techniques involved in ornamental crops.
SOA/HE/PG 06	Organic Horticulture	<ul style="list-style-type: none"> ● Aware about definition, misnomers, principles, methods, merits and demerits of organic horticulture. ● Focused on organic farming systems, different organic inputs, role of biofertilizers, biodynamics and the recent developments. ● Familiar about principles and management of GAP, HACCP exercise, certification of organic products and systems, agencies involved at national and international levels, standards evolved by different agencies.

Self-Study Courses

SOA/HS/PG 01	Self-Study Courses (Project Preparation and Presentation on Advances in Horticulture)	•
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