JAI HIND COLLEGE
BASANTSING INSTITUTE OF SCIENCE
&
J.T.LALVANI COLLEGE OF COMMERCE
(AUTONOMOUS)

"A" Road, Churchgate, Mumbai - 400 020, India.

Affiliated to
University of Mumbai

Program: B.Sc

Proposed Course: Botany (Applied Component)

Horticulture

Semester V

Credit Based Semester and Grading System (CBCS) with effect from the academic year 2020-21

SEMESTER V

T.Y.B.Sc. (A.C.) Horticulture and Gardening Syllabus

Academic year 2020-2021

Semester V			
Course Code	**Course Title**	**Credits**	**Lectures /Week**
SBOT5AC	**Horticulture and Gardening I**	2.5	4
SBOT5ACPR	**Practical**	2.5	4

Semester V – Theory

Course code: SBOT5AC	HORTICULTURE AND GARDENING –I (Credits : 2.5Lectures/Week: 4)	60 L
	Learning Objectives: • Study the various branches of horticulture as well as regional centres and research institutes promoting horticulture • Learn about different natural and artificial propagation techniques for mass and commercial crop production • Learn use of various gardening implements • Study the ways to test soil samples • Learn commonly used manures, fertilizers and the importance of biofertilizers for agricultural practices. • Study common pests and diseases of plants and their control measures. • Learn the importance of basic garden operations. • Learn nature based solutions in horticulture and learn the process of organic farming and scope of the same. **Learning Outcomes:** Students will be able to • Manage and operate nurseries as well as fruit and vegetable gardens in a profitable way • Understand and comment on different methods of quick and economical propagation of commercial crops • Comment on production of new hybrid varieties for better commercial and market demand • Understand the composition of various manures and fertilizers& thus to solve the common problems encountered with soil fertility by optimum use of environment friendly fertilizers. • Suggest control measures for pests and diseases in an eco-friendly way. • Differentiate and discuss each garden operation in detail understand its importance • Analyse the requirement of water by the plants and accordingly suggest method of irrigation to be implemented • Comment onNature-based solutions in horticulture, understand organic farming and emphasize on use of biofertilizers and manures, suggest ways of conservation of water	
Unit I	**INTRODUCTION TO HORTICULTURE** • Definition, importance and objectives of Horticulture, branches of Horticulture, Pomology, Olericulture, Landscape Gardening and Nursery development and management. • Allied branches – Apiculture – Bee box, honey bee life cycle and role of apiculture in pollination, Sericulture – Silk-worm life cycle, different types with host plant. • Exhibition: aims and objectives.	**15 L**

	• Important Horticulture Research Institutes and Government Schemes for strategy plantation o Konkan KrishiVidyapeeth – Dapoli o National Research Centre for grapes o Regional Fruit Research Centre, Pune o Horticulture Training Centre (H.T.C.) – Talegaon o Central Potato Research Institute (CPRI) – Shimla • Horticulture Consultancy • Strategy plantation – LakhibaugYojana	
Unit II	**PROPAGATION PRACTICES** • **By Seeds** Advantages and disadvantages, method of seed Propagation, Production of seeds, Handling, Collection and Storage, Sowing, Transplanting of seedlings and Hardening • **By specialized Vegetative structures** Bulbs, Tubers, Corms, Rhizomes, Root stock, runners, Offsets and suckers • **Artificial methods of plant propagation** o Cutting– Root cutting, Stem cuttings, and leaf cuttings. Use of PGR's for rooting o Layering – Definition, Types: Simple, compound, (Serpentine) Tip, Trench, Mound, Air Layering o Grafting-Definition,advantages and disadvantages o Basic types of grafting: Detached, Attached, and Repair grafting o Types of cuts and method of grafting (Splice, Whip/ Tongue, side, veneer, cleft, bark, epicotyl, enarching, bridge grafting and bracing o Budding–Definition, advantagesand disadvantages. Types: T-budding (or shield budding), patch, ring budding o Developing new varieties: Technique of Emasculation and bagging • Role of polyploidy in production of agronomically desirable varieties and also seedless varieties ofplants.Application of plant tissue culture in relation to horticulture	**15 L**
Unit III	**FERTILIZERS, MANURES, PEST AND DISEASES** • **Chemical Fertilizers**: Definition, Types – Straight, Compound and Mixed.Nitrogenous $(NH_4)_2SO_4$, Urea, $Ca(NO_3)_2$, NH_4Cl, Phosphatic (Superphosphate, Bone meal), Potassic (Muriate of potash, K_2SO_4, Liquid fertilizers. • **Nature based Solutions** **i) Manures**: Definition, importance, important manures Farm Yard Manures, oilcakes, green manure plants, organic manures and vermi-compost.	**15 L**

	ii) Biofertilizers: Bacteria, Cyanobacteria, Mycorrhiza, Sea weeds • **Diseases:** Horticultural plant diseases and their control o Fungal diseases- Rust, Smut, Powdery mildew o Bacterial diseases- Bacterial leaf spot, Bacterial wilt o Viral diseases– TMV, Leaf curl o Mycoplasma caused diseases- Grassy shoot disease of Sugarcane caused by MLO transferred by aphids/ Leaf hoppers • **Pests** – common pests on horticultural crops – Aphids, beetle, stem borer,caterpillars and rats • **Friends of farmers:** Earthworm, snakes & predaceous fungi.	
Unit IV	**GARDEN OPERATIONS FOR HORTICULTURE** • Selection of site, Preparation of soil for garden • Mulching, top- dressing, blanching • Sowing, transplanting, tree transplanting • Irrigation, - Overhead, Surface, Sub- surface, underground • Weeding and pruning • **Nature based agricultural practices** i) Water management and conservation through horticulture, Dry land Horticulture. ii) Organic Farming:Definition, Scope, Indian scenario, Future scope.	**15 L**

References:

1. Randhawa Gurcharan Singh & MukhopadhyayAmitabha, Floriculture in India, Allied Publishers, 1986
2. P. C. Das, Manures and Fertilisers Kalyani Publishers, 1997
3. Verma L. R.& Joshi V. K., Post-Harvest Technology of Fruits and Vegetables: General concepts and Principles, Indus Publishing 2000
4. Basak R. K., Fertilizers, A textbook, Kalyani Publishers, 2007

Course code:**SBOT5ACPR**	**Practical Paper I**	**Credits 2.5**

Learning Objectives:

- Learn to use various gardening implements for garden activities
- Learn the use of various kinds containers (made of different types of material) for holding soil and plants. They will learn to mix different types of soils and use this mixture as per requirement of plants to be grown. They will also learn the technique and importance of repotting and transplanting.
- Master the technique of artificial methods of plant propagation like Grafting (including budding), Layering and cutting.
- Learn to identify the chemical fertilizers by performing chemical test. They also gain knowledge on plants which can be used as green manure / bio-fertilizers.
- Learn to perform soil testing to find the type of soil in a particular area of cultivation.
- Learn the technique of making and maintaining Bonsai, Dish gardens, hanging baskets, bottle gardens and Terrariums.
- Learn to identify various fungal, bacterial and viral diseases commonly occurring in garden as well as cultivated plants. They also learn the control measures to protect plants from the same.
- Project work undertaken by any student equips them to gain complete practical and theoretical knowledge of a particular branch or technique of horticulture.

Learning Outcome:

- Students are well trained in garden operations and learn to use various garden implements commonly required to be used in Horticultural techniques.
- Students will use there innovativeness to create beautiful containers to grow indoor plants. They will thus add beauty and variety to the garden they construct. They will know which kind of soil mixture will be the best to grow the plant of their choice. They will be able to judge the need for transplanting and repotting as and when required by plants.
- Artificial plant propagation methods learnt by students will help them to decide what method will be the best to multiply the plants of their interest. This will also help them increase the production of plants for sale, when done on a commercial scale. It will also help them grow and multiply plants as well as create hybrid plants with desirable characteristics using the technique of grafting.
- As students are able to differentiate and identify fertilizer type and judge whether it is potassic, nitrogenous or phosphatic, they will also be able to use the same as per plant requirement. They will use their gained knowledge to identify plants that can be used as green manure or as bio-fertilizers.
- Students will be able to suggest the kind of improvement that can be done to improve the quality of the soil in any area under study after testing the soil under survey.
- Students will be able to use their knowledge along with their innovativeness to successfully make a variety of indoor displays like bonsai, terrarium and other hanging baskets. They may even further use their entrepreneurial skills to develop business opportunities in the same field.
- Students are able to use their knowledge on disease symptoms and control measures to protect plants against pests and diseases and suggests control measures for the same. They will also be able to make and use natural insecticides to control pest attacks and thus contribute to reduce pesticide pollution.
- Students are able to create a business opportunities for themselves in the area of interest, selected for their project. This is due to the fact that they have in depth practical as well as theoretical knowledge in the topic selected for their project.

	Practical
1	Garden implements and their uses.
2	Different types of pots & Potting medium , Potting and repotting
3	Propagation practices by seed, Vegetative propagation, cutting, layering, budding, grafting.
4	Identification of : Fertilizers – Identification by physical and chemical methods –Urea Ammonium sulphate, Potassium sulphate, super phosphate. Manures – Identification of plants as green manure – *Glyricidia, Crotolaria,Leucaena*. Biofertilizers – Identification (material as slides) VAM, *Nostoc,Rhizobium, Anabena – Azolla*complex.
5	Soil pH, Use of soil testing Kit, electrical conductivity, pH of water
6	Method of preparing bonsai, Bottle Garden / Terrarium, Hanging baskets, Dishgarden.
7	Diseases and pests Fungal – Powdery mildew, Rust, Smut, Bacterial – Leaf spot ,Wilt Viral – TMV, leaf curl Mycoplasma - Grassy shoot disease of Sugarcane Insects – Sucking, Biting, Chewing, Borers & Ants Non Insects pests- Nematodes, Rodents.
8	Preparation of natural insecticides – Neem arka,Dashparniarka, Seetaphal powder, Tobacco extract.
9	Project – Each student should individually present a project related to any topic related to Horticulture .It should be duly certified presented at practical examination.Project presentation at college level compulsory.

Evaluation Scheme:

[A] Evaluation scheme for Theory courses:

I. Continuous Assessment (C.A.) - 40 Marks

(i) C.A.-I: Test/**continuous evaluation in given time frame with Surprise test** -20 Marks of 40 mins. duration

(ii) C.A.-II: Assignment/project/quiz/**continuous evaluation in given time frame with Surprise test**

II. Semester End Examination (SEE)- 60 Marks

[B] Evaluation scheme for Practical courses: (SEE – 100 marks)

NOTE:

A minimum of One field excursion for Garden studies is compulsory.
