AC 25.04.24 ITEM NO: 25.4

Deccan Education Society's

Kirti M. Doongursee College of Arts, Science and Commerce (AUTONOMOUS)

Affiliated to

UNIVERSITY OF MUMBAI

Autonomy Based
Syllabus for
Program: Bachelor of Science
Course: T.Y.B.SC. BOTANY
Subject: HORTICULTURE & GARDENING

Choice Based Credit System (CBCS)
with effect from
Academic Year 2024-2025

PROGRAM OUTCOMES

PO	Description
A student completing Bachelor's Degree in **Science** Program will be able to	
PO1	**Disciplinary Knowledge:** Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate Programme. Execute strong theoretical and practical understanding generated from the specific graduate Programme in the area of work.
PO2	**Critical Thinking and Problem solving:** Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.
PO3	**Social competence:** Display the understanding, behavioral skills needed for successful social adaptation, work in groups, exhibits thoughts and ideas effectively in writing and orally.
PO4	**Research-related skills and Scientific temper:** Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research.
PO5	**Trans-disciplinary knowledge:** Integrate different disciplines to uplift the domains of cognitive abilities and transcend beyond discipline-specific approaches to address a common problem.
PO6	**Personal and professional competence:** Performing dependently and collaboratively as a part of team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.
PO7	**Effective Citizenship and Ethics:** Demonstrate empathetic social concern and equity centered national development and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
PO8	**Environment and Sustainability:** Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

Deccan Education Society's

Kirti M. Doongursee College (Autonomous)

Proposed Curriculum as per Autonomy

Year of implementation- 2024-25

Name of the Department: BOTANY

Semester	Course Code	Course Title	Credit
V	KUSACHO24501	HORTICULTURE & GARDENING -I	2
	KUSACHO245P1	Practicals based on all courses in theory	2
VI	KUSACHO24601	HORTICULTURE & GARDENING - II	2
	KUSACHO246P1	Practicals based on all the courses in theory	2

SEMESTER V

Course Code	UNIT	TOPICS	Credits	L / Week
KUSACHO24501	HORTICULTURE & GARDENING -I		2	4
	I	INTRODUCTION TO HORTICULTURE	2	1
	II	PROPAGATION PRACTICES		1
	III	MANURES, FERTILIZERS AND DISEASES		1
	IV	GARDEN OPERATIONS FOR HORTICULTURE		1
KUSACHO245P1	Practicals based on all courses in theory		2	4

SEMESTER VI

Course Code	UNIT	TOPICS	Credits	L / Week
KUSACHO24601	HORTICULTURE & GARDENING -II		2	4
	I	LANDSCAPE GARDENING	2	1
	II	HORTICULTURE PRODUCE		1
	III	COMMERCIAL PRODUCTION		1
	IV	POST HARVEST TECHNOLOGY & ENTREPRENEURSHIP IN HORTICULTURE		1
KUSACHO246P1	Practicals based on all the courses in theory		2	4

Course Code	SEM – V: BOTANY- APPLIED COMPONENT	Credits	Lectures/ Week
KUSACHO24501	HORTICULTURE AND GARDENING –I	2	
Unit	Topics		No of Lectures
I	**INTRODUCTION TO HORTICULTURE:** • Definition, importance and objectives of Horticulture, branches of Horticulture, Pomology, Olericulture, Landscape Gardening, Nurseries and development • .Allied branches – Apiculture – Bee box, honey bee life cycle and role of apiculture in pollination, Sericulture – Silkworm life cycle, different types with host plant, Social Forestry, Exhibition: aims and objectives. • Important Horticulture Research Institutes and Government Schemes for strategy plantations o Konkan Krishi Vidyapeeth – Dapoli o National Research Centre for grapes. o Regional Fruit Research centre Pune o Horticulture Training Centre (H.T.C.) – Talegaon. o Central Potato Tuber Research Institute (CPTRI) – Shimla • Horticulture Consultancy • Strategy plantation – Lakhibaug Yojana		**15**
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		**15**

	Seed treatment to control diseases Seedling diseases and their control. • **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. Types: Splice, Whip/ Tongue, side, veneer, cleft, bark, epicotyls, approach, repair grafting – enarching, bridge and bracing. o Budding – Definition, advantages and disadvantages. Types: Tbudding, shield, patch , ring budding. o Developing new varieties: Technique of Emasculation and bagging, role of polyploidy n production of seedless varieties in plants. • **Application of Tissue Culture in relation to Horticulture.**	
III	**MANURES, FERTILIZERS AND DISEASES** • **Manures**: Definition, importance, important manures FYM(compost), oil cakes, green manure, organic manures and vermicompost. • **Fertilizers**: Definition, Types – Straight, Compound and mixed. Nitrogenous (NH4)2 SO4, Urea, Ca (NO3)2, NH4Cl, Phosphatic (Superphosphate, Bone meal), Potassic (Muriate of potash, K2SO4 • **Biofertilizers**: Bacteria, Cyanobacteria, Mycorrhiza, Sea weeds. • **Diseases:** Horticultural plant diseases and their control.	**15**

	Fungal diseases- Rust, Smut, Powdery mildew.Bacterial – Citrus canker, Bacterial wilt. Viral – TMV, Leaf curl. • **Pests** – common pests on horticultural crops – Aphids, beetle, stem borer, caterpillars and rats. • **Friends of farmers:** Earthworm, snakes and predaceous fungi.	
IV	**GARDEN OPERATIONS FOR HORTICULTURE** • Selection of site, Preparation of soils for garden • Mulching, top- dressing, blanching • Sowing, transplanting, tree transplanting, • Irrigation, - Overhead, Surface, Underground • Weeding and pruning, - Principles, Objectives and general technique. • Water management and conservation through horticulture, Dry land Horticulture. • **Organic Farming** Definition, Scope, Indian scenario, Future scope	15

Reference books:

- Branches of Horticuture – Denisen Edmonds.
- Priciples of Horticulture and fruit growing by Y. N. Kunte, M.P.Kawthalkar, K. S. Yawalkar, 10th Edition , Agri-Horticultural Publishing House, Nagpur.
- Gardening in India- Percy Lancaster's-T K Bose & D. Mukherjee CBS Publishers.
- Principles of Horticulture-S. Prasada & U. Kumar-Agrobotania.
- Organic Horticulture of small fruits-Charles Dowing-Dominant Publisher & Distributor.
- Recent Technology in Horticulture-A critical Study- Dr. K. R. Bharad-cyber Tech Publication.
- Horticulture Science Research-Chandralekha Arora-Oxford Book Company.
- Principles of Horticulture-Charles Adams, Jane Brook & Katherine Bamford-Routledge-Taylor &Francis Group.

- Horticultural Crops-Mallikarjuna Reddy &Aparna Rao-Pacific Book International.
- Green House Management for Horticultural Crops- S Prasad & U. Prasad-AgroBios(India).
- Textbook for Horticulture-K. ManiBhushan Rao-MacMillan.

Course Code	**SEM V --Horticulture and gardening -I practical**	**Credits**	**Lectures/ Week**
KUSACHO245P1		**2**	
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 .		
5	Soil pH, Use of soil testing Kit, electrical conductivity, pH of water, liquid fertilizers .		
6	Method of preparing bonsai, Bottle Garden / Terrarium, Hanging baskets ,Dish garden.		
7	Diseases and pests		

	Fungal – Powdery mildew ,Rust ,Wilt, Blight, Smut, Bacterial – Canker ,Wilt Viral – Leaf curl ,yellow vein Mosaic Insects – Sucking, Biting, Chewing, Borers & Ants . Non Insects pests- Nematodes, Rodents.
8	Preparation of natural insecticides – Neem arka , Dashparni arka, Seetaphal **powder, Tobacco extracts .**
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 college at level compulsory.

Course Code	**SEM – VI: BOTANY- APPLIED COMPONENT**	**Credits**	**Lectures/ Week**
KUSACHO24601	**HORTICULTURE AND GARDENING –II**	**2**	
Unit	**Topics**		**No of Lectures**
I	**LANDSCAPE GARDENING:** • Principles of landscaping & garden design. • Indoor plants & Indoor gardens- Hydroponics, Terrarium/ Bottle garden, Dish garden. • Important garden features- Paths & Avenues, Hedges & Edges, Lawn, Flowerbeds, Arches& Pergolas, Fencing, Water bodies, Rock garden & Plants suitable for different locations & climates. • Lawn- Purpose of preparation of lawn, Method of		**15**

	preparation of lawn & management of lawn & lawn plants. • Soil manipulation for plantation of desirable varieties. • Mughal, Buddist, Botanical garden, Vertical wall garden & Theme park • Important Gardens of India—Shalimar (Shrinagar), Vrindavan(Mysore), Veer Jijamata Udyan(Mumbai)	
II	**HORTICULTURE PRODUCE** • **High –tech Horticultural production-** Green house technology- Meaning, types, layout & construction, irrigation systems. Care & attention. Hardening of plants. Space gardens. • **Floriculture** – Scope & importance, soil and climatic requirement and cultivation practices and Economics of green house production of Gerbera, Carnation, Roses, Orchids. Propagation techniques, packing and marketing, enhancing and delaying period of bloom by special methods. Floral decoration, Florist shop management.	**15**
III	**COMMERCIAL PRODUCTION** • **Commercial production of the following** – in relation to propagation, post plantation care, harvesting, post harvest management & varieties. o Tubers- potato o Vegetables- Tomato o Fruits- Mango, Grapes & Coconut- products like coco peat/ Coir etc. o Spices/condiments- chilly o Medicinal plants- *Aloe vera*, *Stevia rebaurdina*(Madura) o Aromatic plant- *Citronella*, Patchouli	**15**

IV	**POST HARVEST TECHNOLOGY & ENTREPRENEURSHIP IN HORTICULTURE** • **Maturity**- Factors responsible for maturity & ripening methods used for delaying ripening. • **Harvest**- Time of harvest, harvesting and handling of harvested products • **Storage of fresh produce**- Types of storage of fruits & vegetables • **Fruit & vegetables preservation technology**. • **Marketing**- grading, packing & transportation. Ways of increasing the market value and shelf life of horticultural produce. • **Horticultural business, management and Entrepreneurship development** Horticulture as a business definition and nature,organization, planning and operation of Horticulture farm business.	15

Reference Books:

- Branches of Horticuture – Denisen Edmonds.
- Priciples of Horticulture and fruit growing by Y. N. Kunte, M.P.Kawthalkar, K. S. Yawalkar, 10th Edition , Agri-Horticultural Publishing House, Nagpur.
- Gardening in India- Percy Lancaster's-T K Bose & D. Mukherjee CBS Publishers.
- Principles of Horticulture-S. Prasada & U. Kumar-Agrobotania.
- Organic Horticulture of small fruits-Charles Dowing-Dominant Publisher & Distributor.
- Recent Technology in Horticulture-A critical Study- Dr. K. R. Bharad-cyber Tech Publication.
- Horticulture Science Research-Chandralekha Arora-Oxford Book Company.
- Principles of Horticulture-Charles Adams, Jane Brook & Katherine Bamford-Routledge-Taylor &Francis Group.
- Horticultural Crops-Mallikarjuna Reddy &Aparna Rao-Pacific Book International.

- Green House Management for Horticultural Crops- S Prasad & U. Prasad-AgroBios(India).
- Textbook for Horticulture-K. ManiBhushan Rao-MacMillan.

Course Code	**SEM VI-Horticulture and gardening –II practical**	**Credits**	**Lectures/ Week**
KUSACHO246P1		**2**	
1	Preparation of garden layout.		
2	List of plants suitable for garden locations- 2-3 plants for each location .		
3	Identification of important horticultural plants 1. Herbs – foliage any 2 and flowering any 2 2. Shrubs – foliage any 2 flowering any 2 3. Trees – foliage any 2 and flowering any 2 4. Climbers – any 2 5. Lianas – any 2 6. Epiphytes – any 2 7. Creepers –any 2 8. Trailers – any 2 9. Aquatic plants – any 3 (preferably various habitat) 10. Succulents – any 2 11. Weeds –any 10.		
4	Methods of preparation of Bonsai, Bottle Garden/ terrarium, hanging basket, dish garden.		
5	Flower arrangements –Indian (Gajara , veni, garland , bouquet - Baskets , hand torch type , table floral arrangement), Japanese and western all type		
6	Preparation of Jams, Jellies, Squashes/ Syrups, Pickle, sauces.		

7	Fruit & vegetable carving & Bio-jewelery
8	Green house plants- Information regarding to soil, temperature, irrigation, fertilizer requirements and propagation methods for *Anthurium, Gerbera*, Orchids, Tuberose, Carnation, Roses, *Capsicum*
9	Preparation of garden layout.
10	List of plants suitable for garden locations- 2-3 plants for each location .

Visits : To Garden /Parks / Nurseries/ Exhibition / Horticulture industries / Research Station and record of visits should be duly certified and presented at practical examination.

Modality of Assessment :

Theory Examination Pattern:

A) Internal Assessment - 40% **40 marks.**

Theory **40 marks**

Sr No	Evaluation type	Marks
1	One Assignments/Case study/Project	20
2	One class Test (multiple choice questions / objective)	20

B) External Assessment - 60 %

Semester End Theory Assessment - 60% **60 marks**

i. Duration - These examinations shall be of two hours duration.

ii. Theory question paper pattern :-

1. There shall be **five** questions each of **12** marks. On each unit there will be one question & fifth one will be based on all the four units .

2. All questions shall be compulsory with internal choice within the questions. Each question will be of **24** marks with options.

3. Questions may be sub divided into sub questions a, b, c & d only, each carrying **six** marks and the allocation of marks depends on the weightage of the topic.

Practical Examination Pattern:

(A) Internal Assessment:- 40 % 40 marks

Sr No.	Particulars	Marks
1	Short Experimental work	30
2	Field trip/ excursion / industrial visit report	10

(B) External Assessment (Semester end practical examination) :- 60% 60 marks

Sr No.	Particulars	Marks
1	Laboratory work	30
2	Journal	05
3	Viva	05
4	Project/ Organoleptic test/ Archetechturlar garden plan	20

PASSING STANDARD AUTONOMY Third Year:

- The learners /students shall obtain minimum of 40% marks in the Internal Assessment and External Assessment (Semester End Examination) COMBINED, to pass the course in a particular semester. A learner / student will be said to have passed the course if He/She passes the Internal Assessment + Semester End Examination COMBINED.
- To pass the examination attendance is compulsory in both internal and external (theory plus practical) examination.

NOTE:

The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.

In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head of the Department/ Co-ordinator of the department ; failing which the student will not be allowed to appear for the practical examination.

The passing standards is 40% for external and internal component (24 out of 60 for external and 16 out of 40 for internal).