Resolution No.: AC/II (20-21).2.RUS18

# S.P. Mandali's RAMNARAIN RUIA AUTONOMOUS COLLEGE

(Affiliated to University of Mumbai)



Syllabus for: T. Y

**Program: B. Sc. (Applied component)** 

Course Code: Horticulture and gardening (RUSACHOR)

(Credit Based Semester and Grading System for the academic year 2020–2021)



# **PROGRAM OUTCOMES**

РО	PO Description		
	A student completing Bachelor's in Science program will be able to:		
PO 1	Recall and explain acquired scientific knowledge in a comprehensive manner and apply the skills acquired in their chosen discipline. Interpret scientific ideas and relate its interconnectedness to various fields in science.		
PO 2	Evaluate scientific ideas critically, analyse problems, explore options for practical demonstrations, illustrate work plans and execute them, organise data and draw inferences		
PO 3	Explore and evaluate digital information and use it for knowledge upgradation. Apply relevant information so gathered for analysis and communication using appropriate digital tools		
PO 4	Ask relevant questions, understand scientific relevance, hypothesize a scientific problem, construct and execute a project plan and analyse results.		
PO 5	Take complex challenges, work responsibly and independently, as well as in cohesion with a team for completion of a task. Communicate effectively, convincingly and in an articulate manner.		
PO 6	Apply scientific information with sensitivity to values of different cultural groups. Disseminate scientific knowledge effectively for upliftment of the society.		
PO 7	Follow ethical practices at work place and be unbiased and critical in interpretation of scientific data. Understand the environmental issues and explore sustainable solutions for it.		
PO 8	Keep abreast with current scientific developments in the specific discipline and adapt to technological advancements for better application of scientific knowledge as a lifelong learner		



# **PROGRAM SPECIFIC OUTCOMES**

PSO	PSO Description			
	A student completing Bachelor's in Science with Horticulture			
	and Gardening as Applied component will be able to:			
PSO 1	Apply horticultural principles and understanding of the composition,			
	fertility of soil to the successful growth and production of horticultural			
	plants.			
PSO 2	Identify and practice safe use of tools, equipment and supplies in			
	nursery and garden management.			
PSO 3	Apply an understanding of modern technology and its application to			
	growing plants, with emphasis being placed on hydroponic production			
	of commercially valuable crops			
PSO 4	Identify common plant pests and diseases and develop strategies to			
	manage them in an environmentally safe and sustainable manner.			
PSO 5	Disseminate recent agricultural technologies through extension and			
	serve the rural population			
PSO 6	Demonstrate a fundamental understanding of plant identification, best			
	suited for various garden locations and its application in garden and			
	landscape designing.			
PSO 7	Create an arrangement illustrating the elements and principles of color			
	theory and floral design			
PSO 8	Apply fundamental principles for Post harvest management of			
	horticultural produce, as a part of agribusiness initiative.			
PSO 9	Apply horticultural skills and knowledge to operate various business			
	entities found in the horticultural industry as well as emerging trends			



# **PROGRAM OUTLINE**

YEAR	SEM	COURSE CODE	COURSE TITLE	CREDITS
TY	V	RUSACHOR501	Horticulture and Gardening -I	2
		I	Introduction to horticulture	
		II	Propagation practices	110
		III	Manures, fertilizers and diseases	
		IV	Garden operations for horticulture	
		RUSACHORP 501	Practicals based on all courses 2 in theory	
ΤY	VI	RUSACHOR601	Horticulture and Gardening - II	2
		I	Landscape gardening	
		II	Floriculture, Bonsai and IPR	
		III	Commercial production	
		IV	Post-harvest technology & entrepreneurship in horticulture	
		RUSACHORP 601	Practicals based on all the courses in theory	2



#### **SEMESTER-V**

# Course Code: RUSACHOR 501 Course Title:Horticulture and Gardening – I Academic year 2020 - 2021

## **COURSE OUTCOMES:**

Upon successful completion of this course, learners will be able to;

COURSE OUTCOME	CO DESCRIPTION			
CO 1	Acquire basic knowledge about the fundamental aspects of horticulture and			
	examine the various branches of horticulture			
CO 2	Recall various types and categories of mushrooms, demonstrate various types			
	of mushroom cultivating technologies and other allied fields of horticulture.			
CO 3	Reflect upon the utility of urban/community forestry and community			
	involvement in Horticulture Extension Education and Rural Development:			
CO 4	Develop understanding about the concept of bio-fertilizers, Green manures and			
	organic fertilizers identify their types and the application of each therein.			
	Compare and contrast each of these with chemical fertilizers.			
CO 5	Critically evaluate different soil cultivation practices and irrigation methods.			
CO 6	Analyze the different methods of weed control.			
CO 7	Demonstrate different methods of organic farming, natural farming and soilless			
	cultivation techniques.			

# **Detailed syllabus**

RUSACHOR 501	Title: Horticulture and Gardening – I	Credits – 2
UNIT I	Introduction To Horticulture	Lectures-15
Silving	<ul> <li>Branches of Horticulture: All branches with special reference to Landscaping, Nursery management</li> <li>Allied branches –</li> <li>Apiculture – Bee box, honey bee life cycle and role of apiculture in pollination, bee attractants and their role in agriculture</li> <li>Sericulture – Silkworm life cycle, different types with host plant,</li> <li>Social Forestry</li> <li>Mushroom cultivation: nutritional value, edible and poisonous types, edible mushrooms, <i>Pleurotus</i>, <i>Volvariella</i> and <i>Agaricus</i>, medicinal value of mushrooms, Processing and preservations of mushrooms, economics</li> </ul>	



		T
	of spawn and mushroom production, post harvest technologies and mushroom recipes.	
	Important Horticulture Research Institutes	
	Konkan Krishi Vidyapeeth – Dapoli	
	National Research Centre for grapes – Nashik.	
	Regional Fruit Research centre – Pune	
	National Institute of post harvest technology – Talegaon	
	IIHR, Hessargata, Bengaluru.	-0/
	Central Potato Tuber Research Institute (CPTRI) – Shimla	
	Horticulture Extension Education and Rural Development:	
	Role of Horticulture in rural economy and employment	) ~
	generation	
	Rural Development Objectives	
	<ul> <li>People's participation in forestry programmes.</li> </ul>	
	<ul> <li>Motivation of women community, children, youth</li> </ul>	
	and voluntary organizations for horticulture	
	extension work.	
	<ul> <li>Transfer of technology programmes like lab to land</li> </ul>	
	programme (LLP) national demonstration (ND),front line	
	demonstration (FLD) Krishi Vigyan Kendras (KVK),	
	Technology Assessment and Refinement Programme	
	(TARP) etc. of ICAR.	
	Horticulture Consultancy	
UNIT II	Propagation Practices	Lectures-15
	By Seeds: Advantages and disadvantages, method of seed	
	propagation, Production of seeds, Handling, Collection and	
	Storage	
	Sowing, Transplanting of seedlings and Hardening, Seed	
	treatment to control diseases, Seedling diseases and their	
	control.	
	By specialized Vegetative structures: Bulbs, Tubers, Corms,	
$\mathcal{Q}$	Rhizomes, Root stock,runners, Offsets and suckers.	
	Artificial methods of plant propagation	
	Cutting     Root cutting, Stem cuttings, and leaf cuttings. Use of	
	PGR's for rooting.	
	Layering – Definition, Types: Simple,compound, (Serpentine)	
	Tip, Trench, Mound, Air Layering.	
	Grafting-Definition, advantages and disadvantages. Types:	
	Splice, Whip/ Tongue, side, veneer, cleft, bark, epicotyls,	
i	Splice, Writp/ Torigue, Side, Verleer, Clert, Dark, epicotyls,	
	approach, repair grafting – Enarching, bridge and bracing.	
	approach, repair grafting – Enarching, bridge and bracing.	



		T		
	bagging, role of polyploidy n production of seedless varieties in plants.			
	Application of Tissue Culture in relation to Horticulture.			
	In vitro micrografting in horticulture and its applications (lvy /			
	Chrysnthemum, fruit crops: citrus/ grapes/ mulberry)			
	grap con man crops			
UNIT III	Manures, Fertilizers And Diseases	Lectures-15		
	<b>Manures:</b> Definition, importance, important manures			
	FYM(compost), oil cakes, green manure, organic manures and	0,0		
	vermicompost.			
	Fertilizers: Definition, Types – Straight, Compound and mixed.			
	Nitrogenous (NH4) <sub>2</sub> SO <sub>4</sub> , Urea, Ca (NO <sub>3</sub> ) <sub>2</sub> , NH <sub>4</sub> Cl, Phosphatic	,		
	(Superphosphate, Bone meal), Potassic (Muriate of potash,			
	K <sub>2</sub> SO <sub>4</sub>			
	Biofertilizers: Bacteria, Cyanobacteria, Mycorrhiza, Sea weeds.			
	Horticultural plant diseases and their control.			
	Fungal diseases- Rust, Smut, Powdery mildew, fungal wilt.			
	Bacterial – Citrus canker, Bacterial wilt.			
	Viral – TMV, Leaf curl.			
	Pests – common pests on horticultural crops – Aphids, leaf miner,			
	mealy bugs, beetle, stem borer, caterpillars, Giant African snails, nematodes and rats.			
	Fundamentals of plant protection: Physical, chemical,			
	biological, cultural and legal methods of control, non-toxic			
	methods of insect control. IPM Use of transgenic plants in insect			
	control.			
	Friends of farmers: Earthworm, snakes and predaceous fungi.			
	Scouting for insect and pests.			
UNIT IV	Garden Operations and Hi-Tech Horticulture	Lectures-15		
	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.			
	High -tech Horticultural production- Green house technology-			
	Meaning, types, layout & construction, irrigation systems. Care &			
	attention. Hardening of plants Hydroponics: Types and techniques			
	Types and roles of pollinators			
	Organic Farming: Definition, Scope, Indian scenario, Future			
	scope.			
I	Concept of Natural Forming (SDNE)			
	Concept of Natural Farming(SPNF)			



PRACTICALS			
RUSACHORP 501	Horticulture and Gardening – I Credits - 2		
1	Garden implements and their uses.		
2	Different types of pots & Potting medium , Potting and repotting		
3	Propagation practices by seed,		
4	Vegetative propagation, cutting, layering, budding, grafting.	. (7)	
5	Developing new varieties-Technique of Emasculation and bagging(	(Rose/Vinca)	
6	Green house plants- Information regarding to soil, temperature fertilizer requirements and propagation methods for <i>Anthuria</i> Orchids, Carnation, Roses, Capsicum, Tomato, Strawberry	•	
7	Soilless cultivation technology		
8	Identification of :Fertilizers – Identification by physical and chemic Urea , Ammonium sulphate , Potassium sulphate, super phosphate		
9	Manures – Identification of plants as green manure – Gliricid Leucaena Biofertilizers – Identification (material as slides) VAM, Nostoc, Rhiz		
10	Soil pH, Electrical conductivity of soil		
11	Use of soil testing Kit for organic testing,		
12	Study of mineral nutrient deficiency symptoms in different plants (in	nternal)	
13	Diseases and pests	·	
	Fungal – Powdery mildew ,Rust ,Wilt, Blight, Smut, Bacterial – Canker ,Wilt Viral – Leaf curl ,yellow vein Mosaic Insects – Sucking, Biting, Chewing, Borers and Ants, Non Insects pests- Nematodes, Rodents.		
14	Scouting for insect and pests		
15	Collection of insect pest of the greenhouse crops (internal)		
16	Preparation of natural insecticides – Neemarka, Dashparniark powder, Tobacco extracts. (internal) Biopesticides: Beauveria/ Verticillium/ Trichoderma	a, Seetaphal	
17	Project – Each student should individually <b>initiate</b> a project related to any topic from the syllabus.		
700			
aluli	References:  • Acquash G (2002) Horticulture: Principles and Practices Blace	kwall Dubl	
.0	<ul> <li>Acquaah G. (2002). Horticulture: Principles and Practices. Blac</li> <li>Brown L. (2008). Applied Principles of Horticultural Science. Bu Heinemann.</li> <li>Chadha, K. L., (2014)Handbook of Horticulture, Indian Council or research, Kisan Forum Pvt. Ltd.</li> </ul>	tterworth –	
	<ul> <li>Christopher E. P. (2005). Introductory Horticulture. Biotech Boo</li> <li>Kumar N. (2010). Introduction to Horticulture. Oxford &amp; IBH Pub Ltd.</li> </ul>		



•	Manibhushan Rao, K. (2005)Textbook of Horticulture, McMillan Publication,
	Second edition

- Singh Jitendra (2011)Basic Horticulture, Kalyani Publishers,
- Singh R. S. (2017). Plant Diseases. Oxford & IBH Publ.

## **MODALITY OF ASSESSMENT**

## **Theory Examination Pattern:**

Internal Assessment - 40%: 40 marks.

Sr No	Evaluation type	Marks
1	Assignment / Field Visit/ Submission/ On-line test/ Active Participation (attentiveness/ability to answer questions)/ Participation in academic or Co-curricular activities	20
2	One class Test (multiple choice questions )	20

#### External examination - 60 %

## Semester End Theory Assessment - 60 marks

- i. Duration These examinations shall be of **2 hours** duration.
- ii. Paper Pattern:
  - There shall be 05 questions each of 12 marks and 01 question of 12 marks. On each unit there will be one question & last question will be based on all the 04 units.
  - 2. All questions shall be compulsory with internal choice within the questions.

Questions	Options	Marks	Questions on
Q.1 ) A, B, C	Any 2 out of 3	12	Unit I
Q.2) A, B, C	Any 2 out of 3	12	Unit II
Q.3) A, B, C	Any 2 out of 3	12	Unit III
Q.4) A, B, C	Any 2 out of 3	12	Unit IV
Q.5) a, b, c, d, e.	Any 3 out of 5	12	All units

#### **Practical Examination Pattern:**

#### **Internal Examination:**

Heading	Practical
Journal and practical participation	10(5+5)
Assignment/presentation/practical	30
field report	
Total	40



### External (Semester end practical examination):

Particulars	Practical
Laboratory work and/or Viva voce	60
Total	60

## PRACTICAL BOOK/JOURNAL

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/ Co-ordinator / Incharge of the department; failing which the student will not be allowed to appear for the practical examination.

#### **Overall Examination and Marks Distribution Pattern**

#### Semester- V

Course	501		Total per Course	Grand Total
	Internal	External		
Theory	40	60	100	200
Practicals	40	60	100	200



# **SEMESTER VI**

# Course Code: RUSACHOR 601 Course Title: Horticulture and Gardening – II Academic year 2020 - 21

#### **COURSE OUTCOMES:**

Upon successful completion of this course, learners will be able to;

COURSE OUTCOME	CO DESCRIPTION
CO 1	Apply the basic principles and components of gardening and suggest plants suitable for various locations in a garden
CO 2	Reflect upon and apply different landscaping practices and garden design
CO 3	Evaluate the importance of floriculture and conceptualize flower arrangement and bio-aesthetic planning
CO 4	Explain commercial production conditions and develop management plans for soil fertility, irrigation, and pest control in spices, medicinal and aromatic plants, fruit and vegetable production
CO 5	Discuss and evaluate horticulture as a business.
CO 6	Develop competency on post-harvest technology in horticultural crops

# **Detailed Syllabus**

RUSACHOR 601	Title: Horticulture and Gardening – II	Credits – 2
UNIT I	Landscape gardening	Lectures-15
Silving	History and Principles of landscape gardening Gardens types and styles: Garden types. Indoor garden (Terrarium/ Bottle garden, Dish garden)and Outdoor garden Garden styles- Formal gardens, Informal gardens, Freestyle gardens	
	Vertical garden and Topiary	
	Important garden features- Paths and Avenues, Hedges and Edges, Lawn, Flowerbeds, Arches and Pergolas, Fencing, Water bodies, Rock garden, palms, ferns and cacti succulents.  Plants suitable for different locations	
	Lawn- Purpose of preparation of lawn, Method of preparation of	



	lawn& management of lawn & lawn plants.		
	Mughal, Buddhist, Botanical garden, Theme park		
	Important Gardens of India - Shalimar (Shrinagar),		
	Vrindavan(Mysore), Veer JijamataUdyan (Mumbai), Sanjay		
	Gandhi National Park		
	Gandhi National Park		
UNIT II	Floriculture, Bonsai and IPR	Lectures-15	
	Floriculture - Scope & importance, soil and climatic requirement		
	and cultivation practices and Economics of green house		
	production of <i>Gerbera</i> , Carnation, Roses, Orchids. Propagation		
	techniques, packaging and marketing, enhancing and delaying		
	period of bloom by special methods. Floral decoration,		
	Flower arrangements –Indian , Japanese and western type, dry		
	flower arrangement		
	Bonsai		
	Genetic Resource Management – Germ plasm conservation, role		
	of NBPGR, IPR's – Plant variety protection.		
UNIT III	Commercial production	Lectures-15	
	Commercial production of the following – in relation to		
	propagation, post plantation care, harvesting, post harvest		
	management & varieties.		
	Rhizomes- Ginger		
Vegetables- Spinach, Coriander.			
	Fruits- Mango, Grapes, Coconut- products like coco peat/		
Coir , biodegradable straw, Banana.			
	Spices/condiments- Cinnamomum zeylanicum		
	Medicinal plants- Moringa pterigosperma, Stevia rebaurdina		
	(Madura)		
	Aromatic plant-Vetiveria zizanoides, Patchouli		
4			
UNIT IV	Post-Harvest Technology & Entrepreneurship In Horticulture	Lectures-15	
.00	Maturity- Factors responsible for maturity & ripening methods		
	used for delaying ripening.		
	Harvest- Time of harvest, harvesting and handling of harvested		
	products		
70.	Storage of fresh produce- Types of storage of fruits & vegetables		
70.	Storage of fresh produce- Types of storage of fruits & vegetables Fruit & vegetables preservation technology.		
70.			
	Fruit & vegetables preservation technology.  Marketing- grading, packing and transportation. Ways of		
	Fruit & vegetables preservation technology.  Marketing- grading, packing and transportation. Ways of increasing the market value and shelf life of horticultural produce.		
	Fruit & vegetables preservation technology.  Marketing- grading, packing and transportation. Ways of increasing the market value and shelf life of horticultural produce.		
	Harvest- Time of harvest, harvesting and handling of harvested		



	planning and operation of Horticulture farm business	
	planning and operation of Hortiodicalo lann basiness	
	PRACTICALS	
RUSACHORP 601	Horticulture and Gardening – II	Credits - 2
1	Preparation of garden layout	
2	List of plants suitable for garden locations- 2-3 plants for each loca	ition .
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	160
	<ul> <li>7. Creepers –any 2</li> <li>8. Trailers – any 2</li> <li>9. Aquatic plants – any 3 ( preferably various habitat)</li> <li>10. Succulents – any 2</li> </ul>	
4	Identification of weeds Survey of weeds in crop fields and other habitats Preparation of herbarium of weeds	
5	Method of preparing Bonsai, Bottle Garden/Terrarium, Hanging Bas Garden	skets, Dish
6	Flower arrangements –Indian (Gajara, veni, garland, bouquet - Ba, torch type, table floral arrangement/ Floating rangoli/Biorangoli), western type, dry flower arrangement	
7	Preparation of Jams, Jellies, Squashes/ Syrups, Pickle, sauces	
8	Varieties of banana/ watermelon/ brinjal/ grapes/chilli	
9	Drying of vegetables and fruits Gavar/chickoo/carrot/ beetroot/spinach/ lemon grass/ wheat grass/g	ginger
10	Fruit & vegetable carving & Bio-jewelry (Demonstration)	
11	Project – Each student should individually present a project re Horticulture .lt should be duly certified presented at practical e Project presentation at college level compulsory.	examination.
Silli	Visits: To Garden /Parks / Nurseries/ Exhibition / Horticulture Research Station and record of visits should be duly certified and practical examination in a field notebook.	
	<ul> <li>References:</li> <li>Peter K. V. (2009). Basics of Horticulture. New India Publ. A</li> <li>Randhawa G.S. &amp; Mukhopadhyay A. (1986)Floriculture in Publishers</li> <li>Randhawa G. S. (1973). Ornamental Horticulture in India Tomorrow's Printers and Publ. Rao K. M. (2005).</li> </ul>	India, Allied a. Today's &



Horticulture. MacMillan India Ltd.
<ul> <li>Schilletter J. C. &amp; Richey H. W. (2005). Textbook of General Horticulture.</li> </ul>
Biotech Books, Delhi.
Sharma V. K. (2004). Advances in Horticulture. Deep and Deep Publ.
Pvt. Ltd.

## **MODALITY OF ASSESSMENT**

#### **Theory Examination Pattern:**

#### Internal Assessment - 40%: 40 marks.

Sr No	Evaluation type	Marks
1	Assignment / Field Visit/ Submission/ On-line test/ Active	20
	Participation (attentiveness/ability to answer questions)/	
	Participation in academic or Co-curricular activities	
2	One class Test (multiple choice questions )	20

#### External examination - 60 %

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

- i. Duration These examinations shall be of **2 hours** duration.
- ii. Paper Pattern:
  - 1. There shall be **05** questions each of **12** marks and **01** question of **12** marks. On each unit there will be one question & last question will be based on all the **04** units.
  - 2. All questions shall be compulsory with internal choice within the questions.

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Q.1 ) A, B, C	Any 2 out of 3	12	Unit I
Q.2) A, B, C	Any 2 out of 3	12	Unit II
Q.3) A, B, C	Any 2 out of 3	12	Unit III
Q.4) A, B, C	Any 2 out of 3	12	Unit IV
Q.5) a, b, c, d, e.	Any 3 out of 5	12	All units

#### **Practical Examination Pattern:**

#### **Internal Examination:**

Heading	Practical
Journal and practical participation	10(5+5)
Assignment/presentation/practical	30
field report	
Total	40

#### External (Semester end practical examination):

Particulars	Practical
Laboratory work and/or Viva voce	60
Total	60



## PRACTICAL BOOK/JOURNAL

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/ Co-ordinator / Incharge of the department; failing which the student will not be allowed to appear for the practical examination.

## **Overall Examination and Marks Distribution Pattern**

#### Semester- VI

Course	601		Total per Course	Grand Total
	Internal	External		
Theory	40	60	100	200
Practicals	40	60	100	200

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