

**THE MAHATMA GANDHI UNIVERSITY  
UNDERGRADUATE PROGRAMMES (HONOURS)  
SYLLABUS**

**MGU-UGP (Honours)**

**(2024 Admission Onwards)**



**Faculty: Science**

**Expert Committee: Botany**

**Subject: Horticulture**

**Mahatma Gandhi University  
Priyadarshini Hills  
Kottayam – 686560, Kerala, India**

## Syllabus Index

Name of the Minor: **Horticulture**

### Semester 1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG1DSCHTC100	Basic horticulture	DSC B	4	5	3		2	

### Semester: 2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG2DSCHTC100	Plant propagation	DSC B	4	5	3		2	

**MGU-UGP (HONOURS)**

# Syllabus

**Semester: 3**


Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG3DSCHTC200	Floriculture and olericulture	DSC B	4	5	3		2	

**Semester: 4**

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG4DSCHTC200	Fruit science	DSC C	4	5	3		2	

**Semester: 7**

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours/ week	Hour Distribution /week			
					L	T	P	O
MG7DSEHTC400	Medicinal and aromatic plants and spices	DSE	4	4	4			
MG7DSEHTC401	Introduction to soil science		4	4	4			
MG7DSEHTC402	Home gardening		4	4	4			

		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Basic horticulture</b>					
<b>Type of Course</b>	DSC B					
<b>Course Code</b>	MG1DSCHTC100					
<b>Course Level</b>	100					
<b>Course Summary</b>	Basic Horticulture is an introductory course designed to provide students with foundational knowledge and practical skills in plant cultivation, propagation, and care. The course covers essential concepts of plant biology, gardening techniques, and horticultural practices applicable to various plant types.					
<b>Semester</b>	1	<b>Credits</b>			4	<b>Total Hours</b>
<b>Course Details</b>	<b>Learning Approach</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Others</b>	
		3	-	1	-	75
<b>Pre-requisites, if any</b>						

### COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand horticulture and its branches, modern trends in horticulture	K	PO3
2	Differentiate living and non living components of a garden and different zones of India	U	PO2
3	Demonstrate garden operations	U	PO1
4	Illustrate recent trends in horticulture	A	PO4,PO5
5	Illustrate various propagation methods, including cutting, grafting, and division, showcasing competence in plant propagation.	A	PO4,PO5

*\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
<b>Introduction to Horticulture (5 Hours)</b>				
1	1.1	Horticulture and its Importance	1	1
	1.2	Nature and scope. Objectives of horticulture. Branches of horticulture	2	1
	1.3	Fruit and vegetable zones of India. Career opportunities in horticulture	2	2
<b>Garden components and plant growing structures(15 Hours)</b>				
2	2.1	Garden and its parts – Living and non-living components. Garden implements and tools.	5	2
	2.2	Gardening - different styles of gardening, Designing of Garden	5	2
	2.3	Plant growing structures – Greenhouse, Polyhouses, Hotbeds, Rain shelters - Structure and functions	5	2
<b>Garden operations and Recent trends in horticulture(20 Hours)</b>				
3	3.1	Propagation – Cutting, Grafting, Layering, Budding, Micro propagation, Seedage	5	3
	3.2	Irrigation – Principles and methods	5	3
	3.3	Nutrient management – Principles and methods	2	3
	3.4	Modern tools in horticulture – Tractors, tillers, Lawn mower, Digger,	2	5
	3.5	Application of Artificial Intelligence in horticulture	2	5
	3.6	Modern Trend in horticulture- Aquaponics, Hydroponics, Aeroponics, Nutrient Film Technique.	4	5
<b>Practicals (30 Hours)</b>				
4	4.1	Hands on training in Budding, layering and grafting Methods Preparation of potting Mixture Visit to well established plant nursery Visit to a well established garden	30	5
	4.2	Submit a report on different types of plant growing structures with photographs		

	4.3	Submit a photographed list of garden tools and its uses. Submit different types of garden designs.		
5	<b>Teacher specific module</b>			

<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b> Lecturing Assignment Group discussion Field visit
<b>Assessment Types</b>	<p><b>MODE OF ASSESSMENT</b></p> <p><b>A. Continuous Comprehensive Assessment (CCA)</b></p> <p><b>Theory: 25 marks</b></p> <ul style="list-style-type: none"> <li>· Involvement and responses in class room transactions</li> <li>· Home Assignments/preparedness</li> <li>· Oral presentation/Viva/Quiz/Open book test/written test</li> <li>· Field study report /Group discussion on a recent research or review article (<math>\leq 5</math> years) related the course</li> <li>· Any other method as may be required for specific course / student by the course faculty</li> </ul> <p><b>Practical: 15 marks</b></p> <ul style="list-style-type: none"> <li>· Lab involvement and practical skills</li> <li>· Record/Any other method as may be required for specific course / student by the course faculty</li> </ul>
	<p><b>B. End Semester Evaluation (ESE)</b></p> <p><b>Theory: 50 marks</b></p> <p>Short answer (10 out of 12): <math>10 \times 1=10</math> Short Essay (6 out of 8): <math>6 \times 5= 30</math> Essay (1 out of 2) : <math>1 \times 10= 10</math></p> <p><b>Practical: 35 marks</b></p> <ul style="list-style-type: none"> <li>· Practical based assessments: 30 marks</li> <li>· Record: 5 marks</li> </ul>

#### REFERENCES

1. Christopher E P, 1958. Introductory Horticulture. McGraw Hill, New Delhi.
2. Denixon R I, 1979. Principles of Horticulture. Mac Millan, New York.
3. Edmond J B, Sen T D, Andrews T S, Halfacre R G, 1977. Fundamentals of olericulture. Tata McGraw Hill, New Delhi.


## SUGGESTED READINGS

1. Halfacre R G, Barden J A, 1979. Horticulture. McGraw Hill, New Delhi.
2. Janick J, 1963. Horticultural Science. W H Freeman, Sanfrancisco.
3. Kumar N, 1990. Introduction to Horticulture. Rajalekshmi Publication, Nagercoil.



**MGU-UGP (HONOURS)**

# Syllabus

		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Plant propagation</b>					
<b>Type of Course</b>	DSC B					
<b>Course Code</b>	MG2DSCHTC100					
<b>Course Level</b>	100					
<b>Course Summary</b>	The Plant Propagation Techniques course is designed to provide students with comprehensive knowledge and practical skills in propagating plants through various methods.					
<b>Semester</b>	II	Credits			4	Total Hours
<b>Course Details</b>	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	-	1		75
<b>Pre-requisites, if any</b>						

## MGU-UGP (HONOURS)

### COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Outline different methods of propagation	R	PO2
2	Select suitable method of plant propagation	U	PO1, PO2
3	Employ the knowledge of plant propagation	A	PO2, PO7
4	Differentiate artificial, natural and micro propagation	A	PO2

**\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**



## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
1	<b>Introduction to plant propagation and natural propagation (15 Hours)</b>			
	1.1	Introduction to plant propagation- History, Importance, Different methods of plant propagation Natural (vegetative)method- Types, Advantages and disadvantages	5	1,2
	1.2	Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames, hot beds, poly-houses, phytotrons nursery - tools and implements.	5	4
	1.3	Identification and propagation by division and separation: Bulbs, pseudobulbs, corms, tubers and rhizomes; runners, stolon, suckers and offsets.	5	3
2.	<b>Artificial propagation (15 Hours)</b>			
	2.1	Artificial method- Introduction and types	5	2
	2.2	Cutting and layering- Principles and methods. Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growthregulators in rooting of cuttings.	5	3
	2.3	Budding and grafting- Principles and methods	5	3
	<b>Micropropagation (15 Hours)</b>			
	3.1	Micropropagation- Introduction, History	5	1
	3.2	Laboratory requirements and organization. Sterilization - filter, heat, wet and chemical. Media preparation - inorganic nutrients, organic supplements, carbon source, vitamins, gelling agents, phytohormones and growth regulators; composition of commonly used culture media (MS and Gamborg's)	5	1,2
	3.3	Methods of plant micropropagation- Organized and unorganized methods	5	3
4	<b>Practicals (30 Hours)</b>			

	4.1	Students should submit a report on natural propagules with live or preserved propagules Hands on training in Budding, layering and grafting Methods	30	1,2,3,4
	4.2	Visit to a well established tissue culture lab		
5	<b>Teacher Specific Course Component</b>			

<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b> Lecturing Assignment Group discussion Field visit
<b>Assessment Types</b>	<p><b>MODE OF ASSESSMENT</b></p> <p><b>A. Continuous Comprehensive Assessment (CCA)</b>  <b>Theory: 25 marks</b>  ·Involvement and responses in class room transactions  ·Home Assignments/preparedness  ·Oral presentation/Viva/Quiz/Open book test/written test  Field study report /Group discussion on a recent research or review article (<math>\leq 5</math> years) related the course  ·Any other method as may be required for specific course / student by the course faculty</p> <p><b>Practical: 15 marks</b>  ·Lab involvement and practical skills  ·Record/Any other method as may be required for specific course / student by the course faculty</p> <p><b>B. End Semester Evaluation (ESE)</b>  <b>Theory: 50 marks</b>  Short answer (10 out of 12): <math>10 \times 1 = 10</math>  Short Essay (6 out of 8) : <math>6 \times 5 = 30</math>  Essay (1 out of 2) : <math>1 \times 10 = 10</math></p> <p><b>Practical: 35 marks</b>  ·Practical based assessments: 30 marks  ·Record: 5 marks</p>

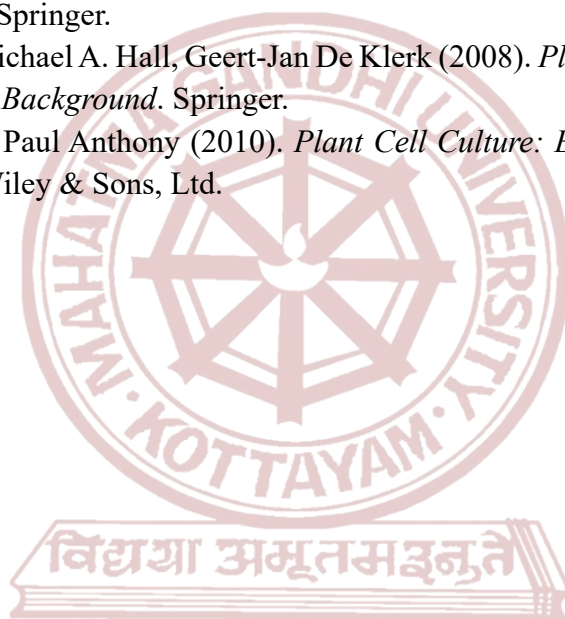
## References

1. Verma L R, Verma A K, Goutham D C, 2004. Pest Management in Horticulture Crops: Principles and Practices. Asiatech Publ., New Delhi.

2. Plant protection , Pests, Diseases and Weeds, 4th edition, rootrot Press 22 Lynch Street, Hughes, Canberra, ACT, Australia (e-book available)
3. Methods of Control, 4th edition, rootrot Press 22 Lynch Street, Hughes, Canberra, ACT, Australia (e-book available)
4. Selected Ornamentals, Fruit and Vegetables, 4th edition, rootrot Press 22 Lynch Street, Hughes, Canberra, ACT, Australia (e-book available)
5. How to Diagnose Plant Problems 4th edition, root rot Press 22 Lynch Street, Hughes, Canberra, ACT, Australia (e-book available).


#### **SUGGESTED READINGS**

1. Anne Kathrine Hvoslef-Fide, Walter Preil (Eds) (2005). *Liquid Culture Systems for in vitro Plant Propagation*. Springer.
2. Edwin F. George, Michael A. Hall, Geert-Jan De Klerk (2008). *Plant Propagation by Tissue Culture (Vol I): The Background*. Springer.
3. Michael R. Davey, Paul Anthony (2010). *Plant Cell Culture: Essential Methods*. Wiley-Blackwell A John Wiley & Sons, Ltd.



**MGU-UGP (HONOURS)**

## **Syllabus**

		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Floriculture and olericulture</b>					
<b>Type of Course</b>	DSC B					
<b>Course Code</b>	MG3DSCHTC200					
<b>Course Level</b>	200					
<b>Course Summary</b>	Floriculture and Olericulture course focuses on the science and techniques involved in the production of vegetables and flowers. It covers various aspects of floral and vegetable crop production, including cultivation, harvesting and post-harvest handling.					
<b>Semester</b>	III	Credits			4	Total Hours
<b>Course Details</b>	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	-	1	-	75
<b>Pre-requisites, if any</b>						

## MGU-UGP (HONOURS)

### COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Identify the components, importance of floriculture	K,U	PO2
2	Describe the methods of production of cut flower and loose flowers	K,U	PO2
3	Identify different methods of olericulture	R	PO2
4	Practice production of different value added products	A	PO2,PO10

**\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
1	<b>Introduction to Floriculture and Production of Cut Flowers and Loose flowers(20 Hours)</b>			
	1.1	Floriculture: History and scope of Floriculture. Importance of ornamental plants and flowers. Components of floriculture: ornamental gardening, commercial floriculture, landscape gardening, arboriculture; Commercial floriculture: importance, scope and significance	5	1,2
	1.2	Production Technology Of Cut Flowers and Loose flowers - Scope of cut flowers in global trade, Global Scenario of cut flower production. Cut Crops: Cut rose, cut chrysanthemum, gerbera, gladioli, tuberose, orchids, aster. Loose Crops- Jasmine, marigold, Gomphrena.	5	1,2,3
	1.3	Nursery management- media for nursery, special nursery practices; Growing environment, open cultivation, protected cultivation, soil requirements, artificial growing media, soil decontamination techniques, planting methods, influence of environmental parameters, light, temperature, moisture, humidity and CO <sub>2</sub> on growth and flowering. Cut flower standards and grades, harvest indices, harvesting techniques, post-harvest handling, Pre-cooling, pulsing, packing, Storage & transportation, marketing.	5	2,3
	1.4	Flower arrangement: principles, different styles: Fresh, dry and artificial. Techniques to prolong the vase life of flowers. Types of value added products, value addition in loose flowers - garlands, veni, floats, floral decorations. Value addition in cut flowers - flower arrangement, styles, Ikebana, morebana, free style, bouquets, button-holes, flower baskets, corsages, floral wreaths, garlands, etc.; Selection of containers and accessories for floral products and decorations.	5	2
<b>Introduction to Olericulture(11 Hours)</b>				
2	2.1	Olericulture - Introduction, Classification-botanical, cultural, thermo classification. Food value of common vegetables grown in Kerala.	3	1,2

		Types of vegetable farming - kitchen, garden, terrace garden, market garden, truck garden.		
	2.2	Cultivation-planting season, preparation of soil, seed selection, seeding, transplanting- thinning, mulching. Irrigation, manuring, plant protection methods	3	3
	2.3	Harvesting and post harvesting operations of the following crops. Warm season vegetables: brinjal, chilli, cucumber, bitter guard, lady's finger, cephalandra, amaranth, coleus, musa Cool season vegetables: cabbage, carrot, beet, onion, peas and beans. Pre and post-harvest changes in vegetables: role of growth regulators and stimulants in vegetable production: changes during cooking and processing- spoilage of vegetables-factors influencing spoilage- microbial spoilage-	5	
<b>Value added products (15 Hours)</b>				
3	3.1	Value added products from vegetables. Problems and prospects of vegetable cultivation in Kerala	5	2,3
	3.2	Mushroom as a vegetable: cultivation of edible mushrooms; button, paddy straw and oyster mushroom. Spawn production, utilization of paddy straw and other agro wastes in cultivation, pest and disease control.	5	4
	3.3	Role of government to promote floriculture and olericulture in India. Agencies promoting cultivation of vegetables and flowers. Role of agricultural and flower shows to promote the cultivation	5	1
<b>Practicals (30 Hours)</b>				
4	4.1	1. Identification of commercially important floricultural crops. 2. Propagation technique in Hibiscus/Rose/Chrysanthemum/tuberose. 3. Propagation technique in Gladiolus/ carnation Petunia 4. Sowing of seeds and raising of seedlings of a flowering plant. 5. Training and pruning of rose/Jasminum. 6. Drying and preservation of flowers. 7. Use of chemicals and other compounds for prolonging the vase life of cut flowers. 8. Flower arrangement practices. 9. Preparation of bouquets, garland	30	1,3,4

5	<b>Teacher specific module</b>
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<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b> Lecture, Tutorial , Seminars, Demonstration, Hands on training
<b>Assessment Types</b>	<p><b>MODE OF ASSESSMENT</b></p> <p><b>A. Continuous Comprehensive Assessment (CCA)</b>  <b>Theory: 25 marks</b></p> <ul style="list-style-type: none"> <li>· Involvement and responses in class room transactions</li> <li>· Home Assignments/preparedness</li> <li>· Oral presentation/Viva/Quiz/Open book test/written test</li> <li>· Field study report /Group discussion on a recent research or review article (<math>\leq 5</math> years) related the course</li> <li>· Any other method as may be required for specific course / student by the course faculty</li> </ul> <p><b>Practical: 15 marks</b></p> <ul style="list-style-type: none"> <li>· Lab involvement and practical skills</li> <li>· Record/Any other method as may be required for specific course / student by the course faculty</li> </ul>
	<p><b>B. End Semester Evaluation (ESE)</b>  <b>Theory: 50 marks</b></p> <p>Short answer (10 out of 12): <math>10 \times 1 = 10</math>  Short Essay (6 out of 8) : <math>6 \times 5 = 30</math>  Essay (1 out of 2) : <math>1 \times 10 = 10</math></p> <p><b>Practical: 35 marks</b></p> <ul style="list-style-type: none"> <li>· Practical based assessments: 30 marks</li> <li>· Record: 5 marks</li> </ul>

### References

1. Bhandari, K. and Prakash, J. 1994. Floriculture: Technology Trades, Trends. Oxford & IBH Publishing Company, New Delhi.
2. Bland, J. and Davidson, W. 2004. Houseplant – Survival Manual. Quantum Books Ltd., London.
3. Bose, T.K and Yadav, L.P. ed. 2003. Commercial Flowers. Naya Prakash, Calcutta, India.
4. Joiner, J.N. 1981. Foliage Plant Production. Prentice Hall Inc. London
5. Nambisan, K.M.P. 1991. Design elements of Landscape Gardening. Oxford & IBH Publishers Pvt. Ltd Calcutta
6. Pal, B.P. 1972. The Rose in India. ICAR, New Delhi.
7. Gopalakrishnan, T. R. 2007. Vegetable Crops. New India Publishing Agency, New Delhi.

8. Hazra, P. and Som, M. G. 1999. Technology for Vegetable Production and Improvement. Naya Prokash, Calcutta.
9. Thamburaj, S. and Singh, N. 2005. Vegetables, Tuber Crops and Spices. ICAR, New Delhi.

### **SUGGESTED READINGS**


1. Chadha, K. L. 2003. Handbook of Horticulture, ICAR, New Delhi.
2. Choudhury, B.1983. Vegetables. National Book Trust, New Delhi.
3. Das, P. C.1993. Vegetable Crops in India. Kalyani Publishers.
4. Rajeevan, P.K., Valsalakumari, P.K. and Geetha, C.K. 1999. Pookrishi:,SastravumPrayogavum. (Malayalam) Kerala Agricultural University, Mannuthy, Trichur
5. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied publishers New Delhi. Bose, T.K., Maiti, R.G., Dhua, R.S. and Das, P. ed. 1999. Floriculture and Landscaping. Naya Prokash, Culcutta, India.
6. Carpenter, P.L., Walker, T.D and Lanphear, F.O. 1975. Plants in the Landscape. W.H. Feeman and Co., San Francisco.
7. Chadha, K.L. 2001. Hand Book of Horticulture. ICAR, New Delhi.
8. Desai, B.L. 1979. Planning and Planting of Home Gardens. ICAR, New Delhi.



**MGU-UGP (HONOURS)**

# **Syllabus**



		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Fruit Science</b>					
<b>Type of Course</b>	DSC C					
<b>Course Code</b>	MG4DSCHTC200					
<b>Course Level</b>	200					
<b>Course Summary</b>	Fruit Science is an important branch of horticulture which deals with various aspects of fruits starting from raising of saplings, growing them properly, providing various intercultural operations, harvesting, ripening and marketing. The course is designed to educate the future generation on the crop management, conventional and molecular breeding of fruit crops of commercial importance through continuing education. The course also aims at equipping students in strengthening fruit science to promote food security, quality of life and a sustainable future.					
<b>Semester</b>	IV	Credits			4	Total Hours
<b>Course Details</b>	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	-	1	-	75
<b>Pre-requisites, if any</b>						

## Syllabus

### COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the importance and classification of Pomology	Understand (U)	PO2
2	Understand pre and post-harvest techniques	Understand (U)	PO2
3	Remember the government policies regarding the food safety	Remember (K)	PO2,PO7,PO8,PO10
4	Apply knowledge to manage the fruit gardens	Apply (A)	PO2

**\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
<b>Introduction to fruit science(20 Hours)</b>				
1	1.1	<b>Introduction to Fruit science-</b> Importance of fruits. classification of fruit plants. Fruit cultivation in India. Role of fruits in the Indian economy.	5	1
	1.2	<b>Tropical and Subtropical Fruit Production:</b> Commercial varieties of regional, national and international importance, eco -physiological requirements, recent trends in propagation, scion-stock relationship, planting systems, cropping systems, canopy management, nutrient management, water management, fertigation, role of bioregulators, abiotic factors limiting fruit production, physiology of flowering, pollination, fruit set and development, honeybees in cross pollination, physiological disorders—causes and remedies, quality improvement by management practices; maturity indices, harvesting, grading, packing, storage and ripening techniques; industrial and export potential.	5	1
	1.3	Cultivation of fruit trees - Tropical Crops: Mango, Banana, Citrus, Papaya, Guava, Sapota.  Subtropical Crops: Pineapple, Jackfruit, Apple, Grapes.	10	1
<b>Post harvest technology</b>				
2	2.1	<b>Post-Harvest Technology:</b> Maturity indices, harvesting practices and grading for specific market requirements, influence of pre-harvest practices, enzymatic and textural changes, respiration, transpiration; Physiology and biochemistry of fruit ripening, ethylene evolution and ethylene management, factors leading to post-harvest loss, pre-cooling;	5	2

	2.2	Treatment prior to shipment, viz., chlorination, waxing. Chemicals, bio-control agents and natural plant products, fungicides, hot water, vapour heat treatment, sulphur fumigation and irradiation. Methods of storage-ventilated, refrigerated, MAS, CA storage, physical injuries and disorders; Packing methods and transport, quality evaluation.	5	2
	2.3	Principles and methods of preservation, food processing, canning, fruit juices, beverages, pickles, jam, jelly, candy; Dried and dehydrated products, nutritionally enriched products, fermented fruit beverages, packaging technology, processing waste management and food safety standards; Role of HACCP.	5	2
<b>Policies and regulations(10 Hours)</b>				
3	3.1	Government policies, regulations and specifications for fresh and processed products, export promotion agencies and their role on export of fresh and processed products.	5	3
	3.2	Food standards- Important Food standards, Packaging and labelling,	2	3
	3.3	General guidelines for establishment of a home scale processing unit	3	3,4
<b>Practicals(30 Hours)</b>				
4	4.1	Collection and Identification of different fruit types Visit to established orchards, fruit processing industries Demonstration of preservation methods specified in the syllabus	30	
<b>Teacher specific Module</b>				

<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b> Lecture, Practical, Activities
<b>Assessment Types</b>	<b>MODE OF ASSESSMENT</b> <b>A. Continuous Comprehensive Assessment (CCA)</b> <b>Theory: 25 marks</b>

	<ul style="list-style-type: none"> <li>·Involvement and responses in class room transactions</li> <li>·Home Assignments/preparedness</li> <li>·Oral presentation/Viva/Quiz/Open book test/written test</li> <li>Field study report /Group discussion on a recent research or review article (<math>\leq 5</math> years) related the course</li> <li>·Any other method as may be required for specific course / student by the course faculty</li> </ul> <p><b>Practical: 15 marks</b></p> <ul style="list-style-type: none"> <li>·Lab involvement and practical skills</li> <li>·Record/Any other method as may be required for specific course / student by the course faculty</li> </ul>
	<p><b>B. End Semester Evaluation (ESE)</b></p> <p><b>Theory: 50 marks</b></p> <p>Short answer (10 out of 12): <math>10 \times 1 = 10</math></p> <p>Short Essay (6 out of 8) : <math>6 \times 5 = 30</math></p> <p>Essay (1 out of 2) : <math>1 \times 10 = 10</math></p> <p><b>Practical: 35 marks</b></p> <ul style="list-style-type: none"> <li>·Practical based assessments: 30 marks</li> <li>·Record: 5 marks</li> </ul>

## References

1. Amar Singh, 1986. Fruit Physiology and Production. Kalyani Publishers, New Delhi.
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**MGU-UGP (HONOURS)**

# Syllabus

		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Medicinal and aromatic plants and spices</b>					
<b>Type of Course</b>	DSE					
<b>Course Code</b>	MG7DSEHTC400					
<b>Course Level</b>	400					
<b>Course Summary</b>	This course delves into the study of various medicinal plants, aromatic herbs, and spices, emphasizing their cultivation, properties, uses, and commercial applications. It covers the identification, cultivation techniques, processing methods, and value addition of MAPs and spices					
<b>Semester</b>	VII	Credits			4	Total Hours
		Learning Approach	Lecture	Tutorial	Practical	
<b>Course Details</b>		4	-	-	-	60
<b>Pre-requisites, if any</b>						

### MGU-UGP (HONOURS) COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Remember the importance of medicinal and aromatic plants and spices.	Remember (K)	PO2
2	Describe taxonomy and uses of medicinal plants	Remember (K)	PO2
3	Describe taxonomy and uses of common aromatic plants.	Remember (K)	PO2
4	Outline the common extraction and characterization techniques in phytochemistry	Apply (A)	PO2, PO4
5	Identify common medicinal and aromatic plants and spices in the field	Remember (K)	PO1, PO2

**\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
<b>Medicinal plants(15 Hours)</b>				
1	1.1	Definition, significance of medicinal plants in Indian systems of medicine.	5	1
	1.2	Taxonomy and uses of important medicinal plants - <i>Tinospora cordifolia</i> , <i>Papaver somniferum</i> , <i>Aegle marmelos</i> , <i>Plumbago rosea</i> , <i>Adhatodavasica</i> , <i>Withaniasomnifera</i> , <i>Kaempheria galanga</i> , <i>Sida acuta</i> , <i>Azadirachta indica</i> , <i>Glycirriza glabra</i> , <i>Phyllanthus neruri</i> , <i>Datura stramonium</i> , <i>Hemidesmus indicus</i> , <i>Aloe veera</i> , <i>Tylophora indica</i> , <i>Acorus calamus</i> .	10	2
<b>Aromatic plants(15 Hours)</b>				
2	2.1	Definition, significance of aromatic plants in Kerala	5	3
	2.2	Taxonomy and uses of important aromatic plants - <i>Vetiveriazizanoides</i> , <i>Cinnamomum zeylanica</i> , <i>Syzygium aromaticum</i> , <i>Santalum album</i> , <i>Ocimumbacilicum</i> , <i>Rosa</i> , <i>Mentha piperita</i>	10	3
<b>Spices(15 Hours)</b>				
3	3.1	Spices; significance, role of spices in Indian economy	2	5
	3.2	Taxonomy and uses of important spices in Kerala - Pepper, Cardamom, Nutmeg, Curcuma, Cinnamon and Campoge.	8	5
	3.3	Government agencies, research centres dealing with medicinal and aromatic plants and spices. Job opportunities in research centers	5	5
<b>Phytochemistry(15 Hours)</b>				
4	4.1	Introduction to phytochemical approaches – morphological-organoleptic-microscopic- to study medicinal and aromatic plants	3	4
	4.2	Cold extraction Hot extraction—soxhlet Solvents - petroleum ether, chloroform, ethanol, water.	8	4

	Separation technique-TLC, Column, HPLC. Characterization technique-GC/MS, HPTLC, UV Spectra, IR Spectra(Brief study only)		
4.3	Study of active principles- alkaloids, Phenols (Introduction, properties, occurrence, classification, functions and pharmacological uses.)	4	4

<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b>  Lecture, Activity
<b>Assessment Types</b>	<b>MODE OF ASSESSMENT</b>  <b>A. Continuous Comprehensive Assessment (CCA)</b> <b>Theory/Hands on Work- 30 Marks</b> <ul style="list-style-type: none"> <li>● Involvement and responses in class room transactions</li> <li>● Home Assignments</li> <li>● Oral presentation/ Viva/Quiz/Open book test</li> <li>● Field study, Group discussion on a recent research or review article(&lt;5 years) related to the course</li> <li>● Any other method as may be required for specific course / student by the course faculty</li> </ul>
	<b>B. End Semester Evaluation (ESE)- 70 marks</b> <ul style="list-style-type: none"> <li>● Very Short Answer (10 out of 12) : 2 x 10=20 Marks</li> <li>● Short Answer ( 8 out of 10) : 8 x 5= 40 Marks</li> <li>● Essay ( 1 out of 2): 1x 10= 10marks</li> </ul>

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**MGU-UGP (HONOURS)**

## Syllabus

	<b>Mahatma Gandhi University</b> <b>Kottayam</b>					
<b>Programme</b>						
<b>Course Name</b>	<b>Introduction to soil science</b>					
<b>Type of Course</b>	DSE					
<b>Course Code</b>	MG7DSEHTC401					
<b>Course Level</b>	400					
<b>Course Summary</b>	The Introduction to Soil Science course provides students with foundational knowledge of soil composition, properties, and their significance in agriculture, environmental science, and land management. It covers various aspects of soil science, including soil formation, classification, fertility, and management practices.					
<b>Semester</b>	VII	Credits			4	Total Hours
<b>Course Details</b>	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	-		-	60
<b>Pre-requisites, if any</b>						

### COURSE OUTCOMES (CO) B.A. POLITICAL SCIENCE (HONOURS)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Holistic understanding of soil properties, their interrelationships, and their critical roles in supporting plant life and maintaining ecosystem health	U	PO2, PO7
2	Gain a profound knowledge of the intricate relationships among soil organisms, the environment, and plant life	A	PO2, PO7
3	Ability to proficiently gather and process soil samples, conduct accurate nutrient estimations, and evaluate fixation capacities	E	PO2
4	Expert proficiency in employing cutting-edge tools to enhance precision, sustainability, and remediation strategies in soil science	A	PO2, PO7

**\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
1	<b>Soil physical and chemical properties(22 Hours)</b>			
	1.1	Definition and significance of soil properties, Role of soil properties in plant growth and ecosystem functions	1	1
	1.2	Soil Physical Properties- Soil texture, horizons, structure, water, porosity, thermal properties and colour Activity: <ul style="list-style-type: none"> <li>• Description soil profile in the field</li> <li>• Estimation of soil pH, electrical conductivity, moisture content and maximum water holding capacity</li> </ul>	6	1
	1.3	Soil Chemical Properties- pH, Cation Exchange Capacity, Nutrients, Organic Matter. Soil classification, Soil development and evolution <ul style="list-style-type: none"> <li>• Chemical analysis of soil samples- Organic Carbon, Available or Mineralizable Nitrogen, Available Phosphorus, Available or Exchangeable Potassium, Available Sulphur</li> <li>• Determination of Available Zn, Fe, Mn and Cu in Soil by AAS or other methods</li> <li>• Visit a soil museum and submit a comprehensive report with photographs</li> </ul>	15	1
2	<b>Soil biology(14 Hours)</b>			
	2.1	Introduction to Soil Ecology- Definition and scope of soil ecology, Significance of soil organisms in ecosystem functioning.	2	2
	2.2	Soil formation, classification of Kerala soil.	2	2
	2.3	Soil as a habitat for microorganisms, plants, and animals, Soil-plant-atmosphere continuum. Interactions between soil organisms.	4	2
	2.4	Soil food webs and trophic dynamics. Influence of soil fauna on soil structure and nutrient cycling	3	2
	2.5	Soil enzymes, origin, activities and importance, soil characteristics influencing growth and activity of microflora.	3	2
3	<b>Analytical techniques and instrumental methods in soil analysis(10 Hours)</b>			

	3.1	Soil Sample Preparation- Methods for sample collection and preservation, Homogenization and grinding techniques, Digestion and extraction procedures	4	3
	3.2	Spectroscopic Techniques- UV-Visible spectroscopy in soil analysis, Infrared spectroscopy for soil organic matter And Atomic absorption spectroscopy (AAS) for metal analysis	3	3
	3.3	Advanced Instrumentation for Soil Analysis- Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Scanning Electron Microscopy (SEM), and Differential Scanning Calorimetry (DSC) for thermal analysis	3	3
	<b>Recent Advances in Soil Science(14 Hours)</b>			
	4.1	Remote sensing technologies for soil monitoring- Unmanned aerial vehicles (UAVs) and satellite imagery	2	4
	4.2	Precision Agriculture and Digital Soil Mapping	2	4
4	4.3	Applications of nanomaterials in soil improvement	3	4
	4.4	Nanosensors for monitoring soil condition	2	4
	4.5	Phytoremediation and microbial-assisted remediation, AI in Monitoring Soil Quality	2	4
	4.6	Soil analysis techniques aid in determining soil stability and suitability for construction projects	3	4
5	<b>Teacher specific Module</b>			

Teaching and Learning Approach	Classroom Procedure (Mode of transaction)
Assessment Types	<p><b>MODE OF ASSESSMENT</b></p> <p><b>A. Continuous Comprehensive Assessment (CCA)</b>  <b>Theory/Hands on Work- 30 Marks</b></p> <ul style="list-style-type: none"> <li>● Involvement and responses in class room transactions</li> <li>● Home Assignments</li> </ul>


	<ul style="list-style-type: none"> <li>• Oral presentation/ Viva/Quiz/Open book test</li> <li>• Field study, Group discussion on a recent research or review article(&lt;5 years) related to the course</li> <li>• Any other method as may be required for specific course / student by the course faculty</li> </ul>
	<p><b>B. End Semester Evaluation (ESE)- 70 marks</b></p> <ul style="list-style-type: none"> <li>• Very Short Answer (10 out of 12) : 2 x 10=20 Marks</li> <li>• Short Answer ( 8 out of 10) : 8 x 5= 40 Marks</li> <li>• Essay ( 1 out of 2): 1x 10= 10marks</li> </ul>

## References

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		<h1>Mahatma Gandhi University</h1> <h2>Kottayam</h2>				
<b>Programme</b>						
<b>Course Name</b>	<b>Home gardening</b>					
<b>Type of Course</b>	DSE					
<b>Course Code</b>	MG7DSEHTC402					
<b>Course Level</b>	400					
<b>Course Summary</b>	The Home Gardening course is designed to equip individuals with the foundational knowledge and practical skills necessary to create and maintain a successful home garden. It covers various aspects of gardening, including plant selection, soil management, basic horticultural practices, and sustainable gardening techniques tailored for home environments					
<b>Semester</b>	VII	Credits			4	Total Hours
<b>Course Details</b>	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	-	-	-	60
<b>Pre-requisites, if any</b>						

### COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Understand the factors affecting home gardens	Understand (U)	PO1,PO 2
2	Remember essential Crops and Planting Techniques	Remember (K)	PO2
3	Write the gardening Techniques and Maintenance	Apply (A)	PO2, PO6, PO7
4	Construct miniature of modern horticultural techniques	Create (C)	PO2

*\*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## COURSE CONTENT

Module	Units	Course description	Hrs	CO No.
1	<b>Introduction to Home Gardening(15 Hours)</b>			
	1.1	Introduction to gardening in Indian contexts: regional variations, climate considerations, and traditional practices. Importance of home gardening	5	1
	1.2	Soil types, monsoon patterns, and adapting gardening techniques to local conditions.	10	1
2	<b>Essential Crops and Planting Techniques(15 Hours)</b>			
	2.1	Popular Vegetables and Herbs in Indian Gardens Overview of common vegetables and herbs suitable for Indian climates and soils.	5	2
	2.2	Seed Starting and Propagation Methods - Seed saving, seedling care, and propagation techniques suitable for Indian gardens.	10	2
3	<b>Gardening Techniques and Maintenance(15 Hours)</b>			
	3.1	Water conservation and irrigation methods - Efficient water usage, drip irrigation, and rainwater harvesting.	5	3
	3.2	Pest Control and Soil Enrichment - Traditional pest control methods, organic fertilizers, and soil enrichment	10	3
4	<b>Harvesting and Beyond(15 Hours)</b>			
	4.1	Harvesting and Storage Practices in India - Timing harvests, storage methods, and traditional food preservation techniques.	5	4
	4.2	Season Extension and Year-Round Gardening - Techniques for extending the growing season, managing different seasons, and year-round gardening	5	4
	4.3	Advances in Horticultural Crops – Plasticulture, Hydroponics&Aerophonics	5	4

<b>Teaching and Learning Approach</b>	<b>Classroom Procedure (Mode of transaction)</b> <b>Lecture, Activities, Field Visit</b>
<b>Assessment Types</b>	<p><b>MODE OF ASSESSMENT</b></p> <p><b>A. Continuous Comprehensive Assessment (CCA)</b> <b>Theory/Hands on Work- 30 Marks</b></p> <ul style="list-style-type: none"> <li>● Involvement and responses in class room transactions</li> <li>● Home Assignments</li> <li>● Oral presentation/ Viva/Quiz/Open book test</li> <li>● Field study, Group discussion on a recent research or review article(&lt;5 years) related to the course</li> <li>● Any other method as may be required for specific course / student by the course faculty</li> </ul> <p><b>B. End Semester Evaluation (ESE)- 70 marks</b></p> <ul style="list-style-type: none"> <li>● Very Short Answer (10 out of 12) : 2 x 10=20 Marks</li> <li>● Short Answer ( 8 out of 10) : 8 x 5= 40 Marks</li> <li>● Essay ( 1 out of 2): 1x 10= 10marks</li> </ul>

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