

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**Total Credits= 22**

Semester V		Contact Hours			Max Marks		Total Marks	Credits
Subject Code	Subject Name							
		L	T	P	Int.	Ext.		
BAGRS1-551	Principles of Integrated Pest and Disease Management	2	0	0	40	60	100	2
BAGRS1-552	Manures, Fertilizers and Soil Fertility Management	2	0	0	40	60	100	2
BAGRS1-553	Pests of Crops and Stored Grain and their Management	2	0	0	40	60	100	2
BAGRS1-554	Diseases of Field and Horticultural Crops and their Management -I	2	0	0	40	60	100	2
BAGRS1-555	Crop Improvement-I ( <i>Kharif Crops</i> )	1	0	0	40	60	100	1
BAGRS1-556	Entrepreneurship Development and Business Communication	1	0	0	40	60	100	1
BAGRS1-557	Geoinformatics and Nano-technology and Precision Farming	1	0	0	40	60	100	1
BAGRS1-558	Intellectual Property Rights	1	0	0	40	60	100	1
BAGRS1-559	Principles of Integrated Pest and Disease Management Lab	0	0	2	20	30	50	1
BAGRS1-560	Manures, Fertilizers and Soil Fertility Management Lab	0	0	2	20	30	50	1
BAGRS1-561	Pests of Crops and Stored Grain and their Management Lab	0	0	2	20	30	50	1
BAGRS1-562	Diseases of Field and Horticultural Crops and their Management -I Lab	0	0	2	20	30	50	1
BAGRS1-563	Crop Improvement-I ( <i>Kharif Crops</i> ) Lab	0	0	2	20	30	50	1
BAGRS1-564	Entrepreneurship Development and Business Communication Lab	0	0	2	20	30	50	1
BAGRS1-565	Geoinformatics and Nano-technology and Precision Farming Lab	0	0	2	20	30	50	1
	<b>ELECTIVE</b>							
XXXXXX	Landscaping/ System Simulation and Agroadvisory/ Protected Cultivation/ Micro propagation Technologies	2	0	0	40	60	100	2
XXXXXX	Landscaping/ System Simulation and Agroadvisory/ Protected Cultivation/ Micro propagation Technologies Lab	0	0	2	20	30	50	1
Total		14	0	16	520	780	1300	22

**Electives:**

1. Landscaping: **BAGRD1-571**
2. System Simulation and Agroadvisory: **BAGRD1-572**
3. Protected Cultivation: **BAGRD1-573**
4. Micro propagation Technologies- **BAGRD1-574**

**Electives Lab:**

1. Landscaping Lab: **BAGRD1-575**
2. System Simulation Agroadvisory Lab: **BAGRD1-576**
3. Protected Cultivation Lab: **BAGRD1-577**
4. Micro propagation Technologies Lab- **BAGRD1-578**

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
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**Total Credits= 22**

<b>Semester VI</b>		<b>Contact Hours</b>			<b>Max Marks</b>		<b>Total Marks</b>	<b>Credits</b>
<b>Subject Code</b>	<b>Subject Name</b>							
		<b>L</b>	<b>T</b>	<b>P</b>	<b>Int.</b>	<b>Ext.</b>		
BAGRS1-651	Rainfed Agriculture & Watershed Management	1	0	0	40	60	100	1
BAGRS1-652	Protected Cultivation and Secondary Agriculture	1	0	0	40	60	100	1
BAGRS1-653	Diseases of Field and Horticultural Crops and their Management-II	2	0	0	40	60	100	2
BAGRS1-654	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	0	40	60	100	1
BAGRS1-655	Management of Beneficial Insects	1	0	0	40	60	100	1
BAGRS1-656	Crop Improvement-II ( <i>Rabi crops</i> )	1	0	0	40	60	100	1
BAGRS1-657	Principles of Organic Farming	1	0	0	40	60	100	1
BAGRS1-658	Farm Management, Production & Resource Economics	1	0	0	40	60	100	1
BAGRS1-659	Principles of Food Science and Nutrition	2	0	0	40	60	100	2
BAGRS1-660	Rainfed Agriculture & Watershed Management Lab	0	0	2	20	30	50	1
BAGRS1-661	Protected Cultivation and Secondary Agriculture Lab	0	0	2	20	30	50	1
BAGRS1-662	Diseases of Field and Horticultural Crops and their Management-II Lab	0	0	2	20	30	50	1
BAGRS1-663	Post-harvest Management and Value Addition of Fruits and Vegetables Lab	0	0	2	20	30	50	1
BAGRS1-664	Management of Beneficial Insects Lab	0	0	2	20	30	50	1
BAGRS1-665	Crop Improvement-II ( <i>Rabi crops</i> ) Lab	0	0	2	20	30	50	1
BAGRS1-666	Principles of Organic Farming Lab	0	0	2	20	30	50	1
BAGRS1-667	Farm Management, Production & Resource Economics Lab	0	0	2	20	30	50	1
<b>ELECTIVE</b>								
XXXXX	Hi-tech. Horticulture/ Agricultural Journalism/ Food Safety and Standards/ Agri-business Management	2	0	0	40	60	100	2
XXXXX	Hi-tech. Horticulture/ Agricultural Journalism/ Food Safety and Standards/ Agri-business Management Lab	0	0	2	20	30	50	1
<b>Total</b>		<b>13</b>	<b>0</b>	<b>18</b>	<b>580</b>	<b>870</b>	<b>1450</b>	<b>22</b>

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**Electives:**

1. Hi-tech. Horticulture: **BAGRD1-671**
2. Agricultural Journalism: **BAGRD1-672**
3. Food Safety and Standards: **BAGRD1-673**
4. Agri-business Management: **BAGRD1-674**

**Electives Lab:**

1. Hi-tech. Horticulture Lab: **BAGRD1-675**
2. Agricultural Journalism Lab: **BAGRD1-676**
3. Food Safety and Standards: **BAGRD1-677**
4. Agri-business Management: **BAGRD1-678**

**Overall Marks / Credits**

Semester	Marks	Credits
V	1300	22
VI	1450	22
<b>Total</b>	<b>2750</b>	<b>44</b>

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**PRINCIPLES OF INTEGRATED PEST AND DISEASE MANAGEMENT**

**Subject Code: BAGRS1-551**

**L T P C**

**Duration: 30 (Hrs.)**

2 0 0 2

**Course Outcomes:**

1. To aware students about various insect and pest of agriculture.
2. To familiarize students with agricultural insects.
3. To create awareness about biological analysis of insects and implementation of strategies for successful pest management

**Course Outcomes:**

1. Providing knowledge about various types of insects and pests in agriculture.
2. Students will able to recognise the agricultural important insects.
3. The students will be able to examine insects deeply up to biological level of analysis and make different strategies for successful pest management.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1										
CO2				3								
CO3				2								

**UNIT-I (7 Hours)**

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis.

**UNIT-II (7 Hours)**

Methods of detection and diagnosis of insect pest and diseases. Calculation and dynamics of economic injury level and importance of Economic threshold level.

**UNIT-III (8 Hours)**

Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases

**UNIT-IV (8 Hours)**

Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

**Recommended Text Books / Reference Books:**

1. Singh RS. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Co., New Delhi.
2. Pathak, V. N. Essentials of plant pathology. Prakash Pub., Jaipur
3. Agrios, G. N. Plant Pathology. 5th edition, Published by a division of Reed Elsevier India Pvt., Ltd., New Delhi (2005)
4. Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur
5. Stakman EC & Harrar JG. 1957. Principles of Plant Pathology. Ronald Press, USA.
6. Tarr SAJ. 1964. The Principles of Plant Pathology. McMillan, London.
7. Vander Plank, JE. 1975. Principles of Plant Infection. Acad. Press
8. Verma JP, Varma A & Kumar D. (Eds). 1995. Detection of Plant Pathogens and their Management. Angkor Publ., New Delhi
9. Mehrotra RS & Aggarwal A. 2003. Plant Pathology. 2nd Ed. Oxford & IBH,

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**2019 BATCH ONWARDS**

10. Dhingra OD & Sinclair JB. 1986. Basic Plant Pathology Methods. CRC Press
11. Fox RTV. 1993. Principles of Diagnostic Techniques in Plant Pathology. CABI Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. Oxford & IBH, New Delhi.
12. Palti J. 1981. Cultural Practices and Infectious Crop Diseases. Springer- Verlag, New York.
13. Vyas SC. 1993 Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw

**MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT**

**Subject Code: BAGRS1-552**

**L T P C**

**Duration: 30 (Hrs.)**

2 0 0 2

**Course Outcomes:**

1. To familiarize students with different manures and fertilizers
2. To aware students about different fates of fertilizers.
3. To develop ability of students in evaluating soil fertility and nutrient uptake by plants

**Course Outcomes:**

1. Providing knowledge about different types of manures and fertilizers and their application.
2. Providing knowledge about the different fates of fertilizers.
3. Students will able to evaluate fertility of soil and plant nutrients uptake.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2		2										
CO3		2										

**UNIT-I (6 Hours)**

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management

**UNIT-II ( 6 Hours)**

Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order.

**UNIT-III (8 Hours)**

History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants

**UNIT-IV (10 Hours)**

Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

**Recommended Text Books / Reference Books:**

1. Mariakulandi and Manickam: 1975 : Chemistry of fertilizers and manures.
2. Mariakulandi and Manickam (1975) : Chemistry of manures an fertilizers
3. Tandon H. L. S. (1994) : Recycling of crop, animal, human and industrial Wastes in Agriculture. FDCO, Delhi Krishna and Murthy (1978) : Manual on compost and other organic manures .
4. Rakshit A. 2015.Manures Fertilizers and Pesticides Paperback – Import. CBS Publishing; 1ST edition, pp. 266.

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT**

**Subject Code: BAGRS1-553**

**L T P C**

**Duration: 30 (Hrs.)**

2 0 0 2

**Course Outcomes:**

1. To aware students about various types of insects and pests
2. To familiarize students with families families and orders of class Insecta and economic losses caused by them
3. To develop ability for identification of agriculturally important insect-pest based on morphological characteristics, feeding habit and habitat

**Course Outcomes:**

1. Providing knowledge about various types of insects and pests in agriculture.
2. To be able to understand about different families and orders of class Insecta which cause economic losses for human beings.
3. To be able to identify morphological characteristics, feeding habit and habitat of agriculturally important insect-pest.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2										
CO2				3								
CO3		3										

**UNIT-I (6 Hours)**

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics

**UNIT-II (9 Hours)**

Nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various

Insect pests of cotton: Cotton jassid, whitefly, aphid, spotted bollworm, pink boll worm, American bollworm, tobacco caterpillar, mealy bug, red cotton bug, dusky cotton bug, grey weevil.

Insect pests of sugarcane: Early shoot borer, top borer, Gurdaspur borer, stalk borer, pyrilla, whitefly, black bug and mealy bug.

Insect pests of rice: Stem borer, rice leaf folder, white backed planthopper, brown plant hopper, rice hispa, rice bug.

Insect pests of wheat, maize and sorghum: Wheat aphid, army worm, maize borer, Pink stem borer, sorghum shoot fly.

Insect pests of pulses: gram cut worm, gram pod borer, lentil pod borer, tur pod fly, pea leaf miner, pea green aphid, pea blue butterfly, bean thrips, red hairy caterpillar, Bihar hairy caterpillar, spotted pod borer and blister beetle.

Insect pests of brinjal and okra: brinjal hadda, brinjal shoot and fruit borer, cotton jassid, cotton whitefly, spotted bollworms.

Insect pests of cruciferous and cucurbitaceous vegetables: cabbage butterfly, diamond back moth, cabbage semilooper, cabbage head borer, mustard aphid, mustard sawfly, painted bug, red pumpkin beetle, melon fruit fly.

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Insect pests of tomato, potato and onion: tomato fruit borer, potato tuber moth, whitefly, onion thrips, onion maggot.  
Insect pests of mango: mango hopper, mealy bug, mango stem borer, bark eating caterpillar, fruit fly.  
Insect pests of citrus: citrus caterpillar, leaf miner, citrus psylla, whitefly, fruit sucking moth.  
Insect pests of grapevine and cashew: grapevine leaf hopper, thrips, leaf roller, cashew tree borer, cashew leaf miner.  
Insect pests of banana and pomegranate: banana scale moth, banana weevil, anar butterfly.

**UNIT-III (6 Hours)**

Insect pests of chillies, garlic, turmeric, ginger, coriander, spices and condiments : chilli thrips, whitefly, castor capsule borer, Bihar hairy caterpillar, cardamom thrips, pollu beetle.

Insect pests of oilseeds (mustard, sunflower, groundnut, castor): mustard aphid, mustard saw fly, painted bug, leaf miner, Bihar hairy caterpillar, green peach aphid, cabbage semilooper, tobacco caterpillar, sesamum leaf webber, sunflower head borer, tobacco caterpillar, cutworms, groundnut aphid, white grub, castor capsule borer, castor hairy caterpillar

Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.

**UNIT-IV (9 Hours)**

Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

**Recommended Text Books / Reference Books:**

1. A.S. Atwal and G.S. Dhaliwal :Agricultural Pests of South Asia and their Management
2. B.V. David and V.V. Rammurthy: Elements of Economic Entomology
3. Manishekharan and Sudarajan : Pest Management in Field Crops.
4. Pedigo L.P. : Entomology and Pest Management.
5. VenuGopal Rao: Insect Pest Management.
6. B.P. Khare : Storage Entomology

**DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-I**

**Subject Code: BAGRS1-554**

**L T P C**

**Duration: 30 (Hrs.)**

**2 0 0 2**

**Course Objectives:**

1. To make students able in recognizing the various diseases of horticultural crops.
2. To aware students about causes of diseases and their symptoms
3. To encourage them to use economical and environmentally friendly techniques for management of diseases

**Course Outcomes:**

1. To be able to recognise the various diseases of horticultural crops.
2. Students study about the causes of these diseases and their symptoms, which aids in the identification of diseases in horticultural and field crops.
3. Management techniques that are both economical and environmentally friendly can be used.



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2019 BATCH ONWARDS**

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		1										
CO2		2										
CO3							3					

**UNIT-I (7 Hours)**

Symptoms, etiology, disease cycle and management of major diseases of following crops:  
Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose,

**UNIT-II (8 Hours)**

Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt  
Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic, Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic

**UNIT-III (7 Hours)**

Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight;

**UNIT-IV (8 Hours)**

Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight, Tea - blister blight; Coffee – rust.

**Recommended Text Books / Reference Books:**

1. Agrios, GN. 2010. Plant Pathology. Acad. Press
2. Diseases of Horticultural Crops fruits (1999) By Verma L.R and Sharma R.c, Indus Publishing company, New Delhi
3. Diseases of fruit crops (1986) By V.N.Pathak ,Oxford & IBH publication, New Delhi
4. Diseases of fruit crops (1986) By R.S.Singh ,Oxford & IBH publication, New Delhi
5. Diseases of Fruits and vegetables (2007) S.A.M.H. Naqvi, Springer Science & Business Media
6. Diseases of Plantation Crops (2014) By P.Chowdappa, Pratibha Sharma IPS 263pp
7. Diseases of Horticulture Crops and their management ,ICAR e-book for B.Sc.(Agri) & B.Tech (Agri) By TNAU pp172
8. Advances in the diseases of Plantation crops & spices (2004) P.Santha Kumari, International Book Distributing Company



**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**CROP IMPROVEMENT – I (KHARIF CROPS)**

**Subject Code: BAGRS1-555**

**L T P C**

**Duration: 15 (Hrs.)**

1 0 0 1

**Course Objectives:**

1. To make students aware about the wild relatives and their value in developing unique kharif crop varieties.
2. To develop ability in students to learn about techniques used for the preservation of genetic material for use in kharif crop improvement.
3. To familiarize students about the breeding techniques used to enhance kharif crops.

**Course Outcomes:**

1. Learners know the value of wild relatives in developing unique kharif crop varieties.
2. The student learns how to preserve genetic material for use in kharif crop improvement.
3. The student learns how to use breeding techniques to enhance kharif crops.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			1									
CO2					2							
CO3				1								

**UNIT-I (4 Hours)**

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops

**UNIT-II (4 Hours)**

Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops

**UNIT-III ( 3 Hours)**

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress, tolerance and quality (physical, chemical, nutritional)

**UNIT-IV (4 Hours)**

Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

**Recommended Text Books / Reference Books:**

1. Crop Breeding and Biotechnology, HariHar Ram KalyaniPublication, New Delhi.
2. Breeding of Asian Field crops D. A. Sleper J.M., Poehlman ,Blackwell Publishers
3. Principle and Procedures of Plant Breeding Biotechnological and Conventional Approach, G. S. Chahal, S. S. Gosla Narosa Publishers House. New Delhi.

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS COMMUNICATION**

**Subject Code: BAGRS1-556**

**L T P C**

**Duration: 15 (Hrs.)**

1 0 0 1

**Course Outcomes:**

1. To make students familiar with business environment.
2. To aware students about entrepreneurial tactics.
3. To enable students in developing business plan.

**Course Outcomes:**

1. Identify business prospects by analysing the business environment.
2. Analyze the efficiency of various entrepreneurial tactics.
3. Making sense of their own business plan

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2					2							
CO3											2	

**UNIT-I (3 Hours)**

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; Impact of economic reforms on Agribusiness/ Agrienterprises

**UNIT-II (3 Hours)**

SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development

**UNIT-III (6 Hours)**

Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill

**UNIT-IV (3 Hours)**

Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agripreneurship and rural enterprise

**Recommended Text Books / Reference Books:**

1. Akhouri, M.M.P., Mishra, S.P. and Sengupta, Rita (1989). Trainers Manual on Developing Entrepreneurial Motivation, NIESBUD, New Delhi
2. Betty, Gorddan B. (1979). Entrepreneurship, Playing to Win, Taraporewala, Mumbai
3. Entrepreneurship Development Institute in India (1987). Developing New Entrepreneurs, EDII, Ahmedabad, NISIET, Library : 338.93/EDI/87/25104.
4. Mancuso, Joseph (1974). The Entrepreneurs Handbook, Vol.I& II, Artech House Inc. USA.
5. Patel, V.G. (1987). Entrepreneurship Development in India and its relevant Developing Countries, Entrepreneurship Development Institute of India, Ahmedabad, NISIET, Library : 338.93 (540)/PAT/87/25103.
6. Singh, A.K., Lakhan Singh, R. and Roy Berman (2006). Dimensions of Agricultural Extension, Aman Publishing House, Meerut.
7. Mondal Sagar and G.L.Ray (2009). Text Book of Entrepreneurship and Rural Development. Kalyani Publishers, Ludhiana. ISBN 978-81-272-5599-2

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING**

**Subject Code: BAGRS1-557**

**L T P C**

**Duration: 15 (Hrs.)**

1 0 0 1

**Course Objectives:**

1. To develop the ability of motivating the farmers to use original data from the field.
2. To familiarize students about the balanced and unbalanced amount of agricultural inputs.
3. To make them aware about sustainable crop production.

**Course Outcomes:**

1. Motivate the farmers to use original data from the field to analyse the spatial and temporal variability of the input factors.
2. Trying to educate farmers on the effects of using unbalanced amounts of agricultural inputs such irrigation, fertiliser, insecticides, and pesticides.
3. Effectively uses of inputs for sustainable crop production without harming environment.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				2								
CO2						3						
CO3							3					

**UNIT-I (3 Hours)**

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.

**UNIT-II (3 Hours)**

Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies

**UNIT-III (5 Hours)**

Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture

**UNIT-IV (4 Hours)**

Nanotechnology, Definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

**Recommended Text Books / Reference Books:**

1. GIS : Fundamentals, Applications & Implementations – Dr. K Elangovan New India publishing Agency, New Delhi.
2. Remote sensing , GIS and wet land management - Er Tasneem Abbasi & Prof. S.A. Abbasi

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**INTELLECTUAL PROPERTY RIGHTS**

**Subject Code: BAGRS1-558**

**L T P C**

**Duration: 15 (Hrs.)**

1 0 0 1

**Course Objectives:**

1. Students will study the background, principles, and varieties of international treaties and conventions for the protection of intellectual property.
2. To educate people on the importance that intellectual property plays in trade, commerce, and growth.
3. The many ecosystems and their sustainable applications will be taught to students.

**Course Outcomes:**

1. Students will understand the concept of intellectual property rights.
2. Builds procedural understanding of the legal system and problem-solving with regard to intellectual property rights.
3. Development of a legal consultancy and service company.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								1				
CO2						1						
CO3											1	

**UNIT-I (4 Hours)**

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

**UNIT-II (3 Hours)**

Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

**UNIT-III (5 Hours)**

Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeders rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders.

**UNIT-IV (3 Hours)**

Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

**Recommended Text Books / Reference Books:**

1. Introduction to Intellectual Property Rights by H.S. Chawla, Oxford & IBH Publishing Co. Pvt. Ltd. 113-B ShahpurJat, 2nd Floor, Asian Games Village side New Delhi 110 049, India
2. Encyclopedia of Intellectual Property rights Volume No. 1 to 10 by Priyanjan Trivedi (2008)
3. Plant Breeding by B.D. Singh (2006), Kalyani Publication
4. Intellectual Property Right Under Globalization by Tawar S. Serials Publication, New Delhi. ..

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**PRINCIPLES OF INTEGRATED PEST AND DISEASE MANAGEMENT LAB**

**Subject Code: BAGRS1-559**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. Students will be able to identify several plant diseases and pathogens.
2. Identification of various pests' and pathogens' life cycles for the purpose of management measures.
3. Develop various IPM techniques to control pests and diseases without contaminating the soil, water, or environment.

**Course Outcomes:**

1. Students will be able to detect the different pathogens and diseases in plants.
2. Identification of life cycle of different pests and pathogens for control measures.
3. Make different IPM strategies so that the pests and diseases can be controlled without soil, water and environment pollution.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases .Awareness campaign at farmers fields.

**MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT LAB**

**Subject Code: BAGRS1-560**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. Providing information on the many types of manure and fertilisers used in various crops depending on soil conditions.
2. To understand the significance of plant nutrients, how they are delivered to plants, and the variables that affect their availability.
3. Should build a soil testing laboratory and be knowledgeable about the soil testing process in order to give farmers with correct information

**Course Outcomes:**

1. Providing knowledge about different kinds of manure and fertilizers used in different crops

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

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according to soil condition.

2. To comprehend the importance of plant nutrients, their mechanisms of transport to plants, and the factors that control their availability.
3. To be able about procedure of soil testing and establish soil testing laboratory to provide accurate knowledge to farmers.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

1. Determination of organic carbon in soils
2. Determination of alkaline hydrolysable N in soils
3. Principle of colorimeter, its calibration, application and determination of available P in soils
4. Principle of flame photometer, its calibration, application and determination of available K in soils
5. Determination of exchangeable cations in soils
6. Determination of available S in soils
7. Principle of atomic absorption spectrophotometer, its calibration, application and determination of DTPA extractable Zn, Fe, Mn and Cu in soils
8. Digestion of plant samples for determination of nutrients
9. Determination of total N in plants
10. Determination of total P in plants
11. Determination of total K and S in plants
12. Determination of Zn, Fe, Mn and Cu in plants
13. Determination of total N in urea
14. Determination of water soluble P in SSP and DAP
15. Determination of total N and P in manure

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**2019 BATCH ONWARDS**

**PESTS OF CROPS AND STORED GRAINS AND THEIR MANAGEMENT LAB**

**Subject Code: BAGRS1-561**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. Acquainted with identifying several insect pests that affect stored grains, vegetables, and fields.
2. To determine the pest's type of damage and symptoms so that the appropriate pest management method can be used for effective control.
3. By using integrated pest management, crop pests can be managed without endangering the wellbeing of surrounding wildlife, plants, or the environment.

**Course Outcomes:**

1. Familiarized with identification of different insect pest of field, vegetables and stored grains at the field level.
2. To identify the type of damage and symptoms brought on by the pest so that the proper pest management strategy can be utilised for efficient control.
3. Integrated pest management can control crop pests without adversely affecting the health of plants, animals, or the environment.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store / godown. Identification of rodents and rodent control operations in godowns. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory, Department of Food., Delhi. Visit to nearest FCI godowns.

**DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-I LAB**

**Subject Code: BAGRS1-562**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. The typical pathogens that cause diseases will be addressed to the students.
2. Appropriate management techniques can be used by understanding the various means of distribution.
3. It is possible to take actions that are both economical and environmentally friendly.

**Course Outcomes:**

1. Students will be familiar with the typical disease-causing microorganisms.
2. By knowing the different dissemination means suitable management practices can be applied.
3. Economical and eco-friendly measures can be used.

**Mapping**



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**2019 BATCH ONWARDS**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for Herbarium; Note: Students should submit 50 pressed and well mounted specimens.

**CROP IMPROVEMENT – I LAB**

**Subject Code: BAGRS1-563**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. The life cycles of various crops will be taught to the students.
2. The dissemination of information on hybridization's many techniques.
3. The many techniques for producing seeds will be taught to the students.

**Course Outcomes:**

1. Students will learn about the life cycles of different crops.
2. Providing knowledge about the different methods of hybridization.
3. Students will learn about the different methods of seed production.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Sesame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different *kharif* crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in *Kharif* crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS COMMUNICATION LAB**

**Subject Code: BAGRS1-564**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. Analyze the business environment to seek business opportunities.
2. Describe the elements that contribute to the success of entrepreneurial endeavours.
3. Describe the importance of marketing and management for small businesses.

**Course Outcomes:**

1. To find business possibilities, analyse the business environment.
2. Describe the components that make entrepreneurial initiatives successful.
3. Describe the significance of management and marketing for small firms.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**PRACTICALS**

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

**GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING LAB**

**Subject Code: BAGRS1-565**

**L T P C**

**Duration: 30 (Hrs.)**

0 0 2 1

**Course Objectives:**

1. Supplying GIS knowledge to evaluate spatiotemporal variability.
2. Supplying remote sensing expertise so that data may be interpreted.
3. Give fertiliser advice based on the analysis of the soil.

**Course Outcomes:**

1. Providing knowledge about GIS to assess the spatiotemporal variability.
2. Providing knowledge about remote sensing in order to interpret data.
3. Give fertilizers recommendation on the basis of soil mapping.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS**  
**2019 BATCH ONWARDS**

**Practical**

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.

**LANDSCAPING**

**Subject Code: BAGRD1-571**

**L T P C**

**Duration: 30 (Hrs.)**

2 0 0 2

**Course Objectives:**

1. Students will gain knowledge of gardening's significance, range, and various forms.
2. Choose a variety of trees, shrubs, and methods for their propagation.
3. The various establishment, care, and grass management strategies will be covered with the students.

**Course Outcomes:**

1. Students will learn about the importance, scope and different types of gardening.
2. Selection of different trees, shrubs and their propagation techniques.
3. Students will learn about the different principles of establishment, maintenance and lawn management practices.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**UNIT-I (7 Hours)**

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes.

**UNIT-II (7 Hours)**

Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme

**UNIT-III (6 Hours)**

Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**UNIT-IV (10 Hours)**

Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

**Recommended Text Books / Reference Books:**

1. Complete Gardening in India – Gopalswamiengar
2. Complete Home Gardening – Dey, S.C.
3. Floriculture and Landscaping – Bose, T.K.
4. Floriculture and Landscaping – Deshraj
5. Floriculture in India – Randhawa and Mukhopadhyay
6. Introduction to Landscaping, Designing, Construction and Maintenance – Ronald J.Biondo and Charles B. Schroder
7. Landscape Gardening & Design with Plants – Supriya Kumar Bhattacharjee
8. Landscaping principles and practices – Jack E. Ingels

**LANDSCAPING LAB**

**Subject Code: BAGRD1-575**

**L T P C**

**Duration: 30 (Hrs.)**

**0 0 2 1**

**Course Objectives**

1. To aware students about various techniques of landscaping.
2. To familiarize them with methods used for propagation.
3. To teach them about designing of conservatory.

**Course Outcomes:**

1. To know about the different implements used in landscaping.
2. To know the different methods of propagation.
3. Students will learn about designing of conservatory and lathe house.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**Practical**

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/ parks/ institutes.

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**SYSTEM SIMULATION AND AGROADVISORY**

<b>Subject Code: BAGRD1-572</b>	<b>L T P C</b>	<b>Duration: 30 (Hrs.)</b>
	2 0 0 2	

**Course Objectives:**

1. Students will study the many methods of weather forecasting.
2. Use of weather-based agro-advisory bulletins.
3. Students must be aware of the importance of forecasting in farming.

**Course Outcomes :**

1. Students will learn about the different techniques of weather forecasting.
2. Use of agro-advisory bulletin based on weather forecast.
3. To know the value of forecasting in agricultural farming.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**UNIT-I (8 Hours)**

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams

**UNIT-II (8 Hours)**

Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity;

**UNIT-III (7 Hours)**

Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas

**UNIT-IV (7 Hours)**

Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use of crop simulation model for preparation of Agro-advisory and its effective dissemination.

**SYSTEM SIMULATION AND AGROADVISORY LAB**

<b>Subject Code: BAGRD1-576</b>	<b>L T P C</b>	<b>Duration: 30 (Hrs.)</b>
	0 0 2 1	

**Course Objectives:**

1. To aware them about preparation of charts based on weather forecasting.
2. To familiarize them about weather and crop management practices.
3. To teach them about use of statistical models in weather forecasting.

**Course Outcomes:**

1. To prepare different working charts based on weather forecast.
2. Analysis of varying weather and crop management practices.
3. Use of statistical accurate models in weather forecasting.

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**Practical**

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast. Feedback from farmers about the agro-advisory.

**PROTECTED CULTIVATION**

**Subject Code: BAGRD1-573**

**L T P C**

**Duration: 30 (Hrs.)**

2 0 0 2

**Course Objectives:**

1. Students must be aware of the significance and extent of protected cultivation.
2. To be knowledgeable about various crop, soil, and water management techniques.
3. Students will get knowledge about protected growing techniques for off-season crop production.

**Course Outcomes:**

- 1 To know the importance and scope protected cultivation.
2. To know the different methods of crop, soil and water management practices.
3. Students will learn about how offseason crops can be grown under protected cultivation.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**UNIT-I (8 Hours)**

Protected cultivation- importance and scope, Status of protected cultivation in India and World types of protected structure based on site and climate

**UNIT-II (8 Hours)**

Cladding material involved in greenhouse/ poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops

**MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS  
2019 BATCH ONWARDS**

**UNIT-III (7 Hours)**

Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lily, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc

**UNIT-IV (7 Hours)**

Cultivation of economically important medicinal and aromatic plants.  
Off-season production of flowers and vegetables. Insect pest and disease management

**PROTECTED CULTIVATION LAB**

<b>Subject Code: BAGRD1-577</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 30 (Hrs.)</b>
	0	0	2	1	

**Course Objectives:**

1. Students will discover how to cultivate seedlings in a protected environment.
2. Making various soil pastes to gain knowledge about measuring soil EC and pH.
3. To manage fertigation and irrigation together.

**Course Outcomes:**

1. Student will learn how seedlings can be raised under protected cultivation.
2. To learn about the measurement of soil EC and pH by making different soil pastes.
3. To regulate irrigation along with fertigation.

**Mapping**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												

**Practical**

Raising of seedlings and saplings under protected conditions, use of pro trays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging and misting.

**MICRO PROPAGATION TECHNOLOGIES**

<b>Subject Code: BAGRD1-574</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>Duration: 30 (Hrs.)</b>
	2	0	0	2	

**Course Objectives:**

1. To understand the origins, significance, and use of micro-propagation.
2. Students will discover how small portions can be used to establish new plants.
3. To learn about the variety of plants utilising various propagation techniques.

**Course Outcomes:**

1. To know the history, importance and scope of micro-propagation.
2. Students will learn how new plants can be established by using small parts.
3. To know the diversity of plants using different method of propagation.



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**2019 BATCH ONWARDS**

<b>Mapping</b>												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
<b>UNIT-I (8 Hours)</b>												
Introduction, History, Advantages and limitations; Types of cultures (seed, embryo, organ, callus, cell)												
<b>UNIT-II (8 Hours)</b>												
Stages of micro propagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture)												
<b>UNIT-III (7 Hours)</b>												
Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures												
<b>UNIT-IV (7 Hours)</b>												
Production of secondary metabolites, Somaclonal variation, Cryopreservation												

MICRO PROPAGATION TECHNOLOGIES LAB												
Subject Code: BAGRD1-578				L	T	P	C	Duration: 30 (Hrs.)				
				0	0	2	1					
<b>Course Objectives:</b> 1. Providing information on the many tools used in laboratories to create culture medium. 2. The various media preparation and sterilising processes will be covered with the students. 3. The various stocks and working solutions produced in labs will be taught to students.												
<b>Course Outcomes:</b> 1. Providing knowledge about different equipments used in laboratory to prepare culture media. 2. Students will learn about the different methods of preparation and sterilization techniques of media. 3. Students will learn the different stock and working solution prepared in labs.												
<b>Mapping</b>												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												
CO2												
CO3												
<b>Practical</b> Identification and use of equipments in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques forexplants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures.												