



Karmaveer Bhaurao Patil University, Satara

**Syllabus for
B. Sc. II Plant Protection**

**Under
Faculty of Science and Technology
(As per NEP 2020)**

With effect from Academic Year 2025-2026

Syllabus for Bachelor of Science (B.Sc.) Part – II Plant Protection

PREAMBLE:

The B. Sc. Plant Protection course under autonomy will be effective from the academic year 2025 - 2026. It has been prepared to keep in view the unique requirements of B. Sc. Plant Protection students as per NEP-2020. The contents have been drawn up to accommodate the widening horizons of the discipline of biological sciences. The emphasis is to provide students with the latest information along with due weightage to the concepts of Plant Protection so that they can understand and appreciate the current interdisciplinary approaches in the study of plant sciences and their role in societal development. The course content also lists new practical exercises so the students get hands-on experience with the latest techniques that are currently in use. The course will also inspire students to pursue higher studies in Plant Protection and Plant Protection to become entrepreneurs, and enable students to get employed in plant-based industries like Seed agrochemical industries.

General Objectives of the Course:

- i. To impart knowledge of Plant Protection is the basic objective of this course.
- ii. To develop a scientific attitude among the students and to make the students open-minded, critical, and curious.
- iii. To develop skills in practical work, experiments, and laboratory materials.
- iv. To understand scientific terms, concepts, facts, phenomenon, and their relationships.
- v. To make the students aware of the Agro-industry and the environment.
- vi. To enable the students to acquire knowledge of plants (crops) and related subjects to understand nature and the environment to fulfill basic needs like food, fodder, and clothing.
- vii. To develop the ability for the application of acquired knowledge to improve agriculture and related fields to make themselves self-reliant.

PROGRAMME OUTCOMES:

After completing B. Sc. Program, the students will.....

1. Graduate with proficiency in the subject.
2. Develop scientific attitude and become open minded, critical and curious so that they enter research field with a positive approach.
3. Develop skill in practical work, experiments and laboratory materials.
4. Become eligible to continue higher studies in their subject in India as well as abroad.

5. Become eligible to appear for the examinations for jobs in government organizations.

6. Become eligible to appear for jobs with minimum eligibility as science graduate.
7. Be able to establish their own entrepreneurial ventures.
8. Acquire increased ability of critical thinking, development of scientific attitude, handling of problems and generating solution, improve practical skills, enhance communication skill, social interaction, increase awareness in judicious use of plant resources by recognizing the ethical value system.

PROGRAM SPECIFIC OBJECTIVES:

1. The students are expected to understand the fundamentals, principles, concepts and recent developments in the Plant Protection.
2. The practical course is framed in relevance with the theory courses to improve the understanding of the various concepts in Plant Protection.
3. It is expected to inspire and boost interest of the students in Plant Protection.
4. To develop the power of appreciations, the achievements in science and role in nature and society.
5. To enhance student sense of enthusiasm for science and to involve them in an intellectually stimulating experience of Course in a supportive environment.

PROGRAMME SPECIFIC OUTCOMES:

After completing B. Sc. (Plant Protection) Programme the students will.....

1. Explain, describe, discuss and ask questions related to the different aspects of plant sciences.
2. Perform and design experiments related to plant sciences
3. Critically analyze the interactions between the living and non- living entities around them.
4. Apply the knowledge of plant sciences in finding sustainable solutions for the society as well as industry.
5. Apply the knowledge of plant sciences in becoming self- reliant either through entering into a job, establishing a model agricultural set up or initiating a plant based entrepreneurial venture
6. Design and undertake projects related to plant sciences
7. Attain skills needed in the plant based industries through internship.
8. Improve the research based skills by entering into a research internship as well as in house project.
9. Present their research findings in research conglomerations like conferences and in research journals in the form of publications.
10. Critically analyze their role as an environment sustainability goals oriented citizen.

1. **TITLE:** Plant Protection

2. **YEAR OF IMPLEMENTATION:** 2025-2026

3. **DURATION:** 01 year

4. **PATTERN:** Semester examination

5. **MEDIUM OF INSTRUCTION:** English

6. ELIGIBILITY OF THE STUDENT:

As per guidelines obtained from university by following rules and regarding reservations
by Govt. of Maharashtra

7. ELIGIBILITY OF THE CORE FACULTY:

As per the rules and regulations of the University Grants Commission (UGC) and the Government of
Maharashtra

8. STRUCTURE OF COURSE: As per B.Sc. II NEP 2.0

Third Semester (Level 5.0)

Sr. No.	Course	Theory				Practical		
		Course Code	Title of Course	No. of lectures per week	Credits	Course No.& Course Code	No. of lectures Per week	Credits
1	Major	BPPT 231	Advances in plant Pathology	2	2	BPPP 233	2	2
		BPPT 232	Advancement in Crop Production	2	2			
2	Minor	BPPT 234	Farm Management	2	2	BPPP 236	2	2
		BPPT 235	Agricultural Management and Marketing	2	2			
3	OE	BPPOE-III		2	2			
4	VSC		Advanced Botanical Skills Part-I (Microtechniques, Slide preparation & Staining Techniques)	--	--	BPPPVSC-1	2	2
5	SEC		Botanical Illustration and photography			BPPPSEC-1	2	2
6	AEC	BPPTAEC-1	English	2	2			
7	IKS	BPPTIKS -II	Indian Agriculture	2	2			

Fourth Semester (Level 5.0)

Sr. No.	Course	Theory				Practical		
		Course Code	Title of Course	No. of lectures per week	Credits	Course Code	No. of lectures Per week	Credits
1	Major	BPPT 241	Agricultural entomology -I	2	2	BPPP 243	2	2
		BPPT 242	Weeds and their Management	2	2			
2	Minor	BPPT 244	Weed Management in Horticultural Crops	2	2	BPPP 246	2	2
		BPPT 245	Organic Agriculture	2	2			
3	OE	BBTOE IV		2	2			
4	VSC		Advanced Botanical Skills Part-II (Plant Collection, Identification & Preservation)	--	--	BPPPVSC II	2	2
5	SEC	BPPTSEC II	Scientific writing			BPPPSEC II	2	2
6	AEC	BPPTAEC II	English	2	2	--	--	--
7	VEC	BPPTVEC II	Environmental studies	2	2	--	--	--

6. Evaluation Structure: As per B.Sc. II NEP 2.0

Semester III

Course	Course Category	Course Code	Internal Evaluation (Best of two CCE Marks will be considered)			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BPPT 231	10	10	10	30	50	02
	T	BPPT 232	10	10	10	30	50	02
	P	BPPP 233	--	--	--	50	50	02
Minor	T	BPPT 234	10	10	10	30	50	02
	T	BPPT 235	10	10	10	30	50	02
	P	BPPP 236	--	--	--	50	50	02
OE	T	BPPTOE III (For IDS Courses)	05	--	05	15	25	01
	P	B*POE III	--	--	--	25	25	01
OE	T	B*TOE 3 (For Humanities)	10	10	10	30	50	02
VSC	P	BPPPVSC 1	--	--	--	50	50	02
SEC	P	BPPPSEC 1	--	--	--	50	50	02
AEC	T	BPPTAEC 1	10	10	10	30	50	02
IKS	T	BPPTIKS II	10	10	10	30	50	02
Total							550	22

Semester IV

Course	Course Category	Course Code	Internal Evaluation (Best of two CCE Marks will be considered)			ESE	Total Marks	Credits
			CCE-I	CCE-II	CCE-III			
Major	T	BPPT 241	10	10	10	30	50	02
	T	BPPT 242	10	10	10	30	50	02
	P	BPPP 243	--	--	--	50	50	02
Minor	T	BPPT 244	10	10	10	30	50	02
	T	BPPT 245	10	10	10	30	50	02
	P	BPPP 246	--	--	--	50	50	02
OE	T	B*TOE IV (For IDS Courses)	05	--	05	15	25	01
	P	B*POE IV	--	--	--	25	25	01
OE	T	B*TOE IV (For Humanities)	10	10	10	30	50	02
VSC	P	BPPPVSC II	--	--	--	50	50	02
SEC	P	BPPPSEC II	--	--	--	50	50	02
AEC	T	BPPTAEC II	10	10	10	30	50	02
VEC	T	BPPTVEC II	10	10	10	30	50	02
Total							550	22

7. OTHER FEATURES:

A) LIBRARY:

Reference books, Textbooks, journals, and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective course syllabus)

B) EQUIPMENT:

a) Computer, LCD projector, visualizer, smart board

b) Laboratory Equipment:

- | | |
|-------------------------------------|-----------------|
| 1. Microscope with a digital camera | 2. Hot Air Oven |
| 3. Digital weighing balance | 4. Incubator |
| 5. pH meter | 6. Refrigerator |
| 7. Microtome | 8. Autoclave |

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashwantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC V (Major I)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT-231 Advances in Plant Pathology		
Course Objectives: By the end of the course, Student will be able to, 1) Explain the principles of plant disease diagnosis. 2) Differentiate plant diseases from nutrient disorders. 3) Explain the management of major plant diseases. 4) Describe the principles of Integrated Pest Management (IPM).		
Course Outcomes: By the end of the course, students should be able to, 1) Identify plant diseases using diagnostic techniques. 2) Analyze symptoms to distinguish diseases from nutrient deficiencies. 3) Apply appropriate management practices for major plant diseases. 4) Recommend suitable IPM strategies for pest management.		
Module	Title and Contents	Hrs.
Module -1:	Module 1: Introduction to Plant Disease Diagnosis 1.1 Importance of accurate disease diagnosis 1.2 Types of plant diseases: Biotic vs. Abiotic 1.3 Pathogen Isolation and Identification 1.4 Advanced Diagnostic Tools for disease diagnosis 1.5. Koch's postulates and its application	07
Module-2:	Module 2: Symptomatology in Plant Diseases and Nutrient Disorders 2.1 Symptomatology of Major Pathogen Groups - Fungal diseases: Leaf spots, rusts, mildews, damping-off - Bacterial diseases: Wilts, blights, cankers, soft rots - Viral diseases: Mosaics, ringspots, malformations - Nematode-related symptoms: Root galls, stunting, necrosis 2.2 Nutrient Deficiency and Toxicity Symptoms. (Macronutrient Deficiencies, Micronutrient Deficiencies) 2.3 Differentiating Disease vs. Nutrient Disorders. 2.4 Lab and field techniques for accurate diagnosis of diseases and Deficiencies.	08
Module -3:	Module 3: Common Plant Diseases and their management 3.1 Phytoplasmal Disease: Little leaf of Brinjal 3.2 Bacterial Disease: Citrus Canker 3.3 Viral: Yellow Vein of Mosaic of Bhendi	

	3.4 Fungal diseases and their management i. White Rust of Amaranthus. ii. Rust of Wheat, Rust of Soybean. iii. Grain smut of Jowar. iv. Tikka disease of Ground Nut	08
Module- 4:	Module 4: Pest diagnosis and Integrated management. 4.1 Major pest groups (insects, mites, nematodes, rodents, etc. 4.2 Importance of pest diagnosis in plant health. 4.3 Principles of Integrated Pest Management (IPM) 4.4 Pest Control Strategies in IPM (Cultural, Biological, Chemical, Biotechnological)	07
Reference Books: - Agrios, George N. <i>Plant Pathology</i>. 5th ed. San Diego: Academic Press, 2005. - Aneja, K. R. <i>Experiments in Microbiology, Plant Pathology and Tissue Culture</i>. New Delhi: New Age International (P) Ltd. Publishers, 2005. - Baruah, H. K. <i>Textbook of Plant Pathology</i>. New Delhi: Oxford & IBH Publishing Co., 1984. - Bilgrami, K. S. <i>Textbook of Modern Plant Pathology</i>. New Delhi: CBS Publishers & Distributors, 1990. - Butler, Edwin J. <i>Plant Pathology</i>. London: Macmillan & Co., 1949.		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation:(20 Marks): - CCE-1: Home Assignment: 10 Marks - CCE-II: Short and long answer questions Test/Seminar/Open Book Test/Quiz/Case study/Book review/Field work/ Industry visit: 10 Marks - CCE-III: MCQ Test:10 Marks Note: Internal evaluation (Best of two CCE Marks will be considered)		End Semester Examination:(30 Marks): - Question-1: Solve the following questions (five questions of 2 marks) 10 M - Question-2: Attempt any two questions (three questions of 10marks) 20 M - Question-3: Attempt any four questions (five questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC VI (Major-II)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
	Name of the Course: BPPT-232 Advancement in Crop Production	
Course Objectives: By the end of the course, students will be able to: 1) Understand the concept and importance of plant protection. 2) Study the gross morphology and the Agronomy of Agricultural Crops. 3) Gain the knowledge about different methods of Plant Protection. 4) Impart Knowledge about the advanced methods of Plant Protection.		
Course Outcomes: By the end of the course, students should be able to: 1) Describe the concept and importance of plant protection. 2) Get knowledge about gross morphology and agronomy of floricultural crops and fruit crops. 3) Apply knowledge of different methods of plant protection. 4) Understand the concept of integrated disease management.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Introduction of plant protection 1.1 Definition, scope, and importance of agronomy 1.2 Principles of agronomy and their application. 1.3 Role of agronomy in sustainable crop production 1.4 Importance of major crops in food security and economy 1.5 Classification of crops. 1.6 Global and national production trends of major crops	07
Module-2:	Module- 2: Agronomical practices of Some Important Crops 2.1 Introduction and importance of Plant Protection; Study of Agronomical practices about the following crops: 2.2 Cereal Crops – Jowar, /Maize. - Oil seed crop– Groundnut, /safflower /sunflower. - Pulse Crop – Gram. - Cash crop – Sugarcane	08
Module -3:	Module-3: Study of Horticultural Crops 3.1 Study of agronomical practices about the following crops: - Fruit crops – Mango. - Vegetable crops - Brinjal. - Spices –Chilli. - Floriculture-Marigold.	08

	3.2 Eco-friendly Agricultural practices: Green manuring 3.3 Biofertilizers and their types, Biopesticides	
Module- 4:	Module – 4: Agronomic Practices for High Yield 4.1 Improved varieties and hybrid seeds. 4.2 Crop rotation and mixed cropping. 4.3 Integrated Nutrient Management (INM) and Integrated Pest Management (IPM).	07
Reference Books: 1. Denckla, Tanya. <i>Gardener's A–Z to Growing Organic Food</i>. England: Storey Books, 2004. 2. De, Gopal Chandra. <i>Fundamentals of Agronomy</i>. Bangalore: Oxford & IBH Publishing Co. Ltd., 1980. 3. Panda, S. C. <i>Agronomy</i>. New Delhi: Agribios Publications, 2006. 4. Rao, V. S. <i>Principles of Weed Science</i>. New Delhi: Oxford & IBH Publishing Co., 2006. 5. Reddy, S. R. <i>Principles of Agronomy</i>. Ludhiana: Kalyani Publishers, 2011.		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 Marks): • CCE-1: Home Assignment: 10 Marks • CCE-II: Short and long answer questions Test/Seminar/Open Book Test/Quiz/Case study/Book review/Field work/ Industry visit: 10 Marks • CCE-III: MCQ Test: 10 Marks • Note: Internal evaluation (Best of two CCE Marks will be considered)		End Semester Examination (30 Marks): • Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (five questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC (Major P)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
	Name of the Course: BPPP 233 (Based on theory paper BPPT 231 and BPPT 232)	
Course Objectives: The students should be able to... 1) Familiarize the students with general plant pathological equipment and pathological procedures. 2) Learn the preparation of Soil Samples for laboratory analysis. 3) Understand the concept and importance of plant protection. 4) Study the gross morphology and the Agronomy of Agricultural Crops.		
Course Outcomes: The students should be able to... 1) Describe the basic concepts of plant protection, & explain basic terminologies used in plant protection. 2) Describe the factors affecting infection, and explain the agricultural crop diseases. 3) Identify diseases with symptoms and by nature of damage. 4) Understand the agronomic conditions of crops.		
Module	Title and Contents	Hrs.
	Module- 1: Practicals based on Theory Courses V 1-6 Study of selected plant diseases w.r.t symptoms, causal organisms and disease management. Phytoplasmal Disease: Little leaf of Brinjal Bacterial Disease: Citrus Canker Viral: Yellow Vein of Mosaic of Bhendi Fungal Diseases and their management a) White Rust of Amaranthus b) Rust of Wheat, c) Rust of Soybean d) Grain smut of Jowar e) Tikka disease of Ground Nut 7. Study of Koch's postulates 8. To Study principles of Integrated Pest Management (IPM) 9. Soil dilution technique- Serial Dilution, Isolation, Inoculation, and identification of soil fungi. 10. Separation of amino acids from healthy and diseased plants using paper chromatography technique. 11. Tour report /Excursions/ Visits to Agricultural institutes/ Polyhouse.	60

	Agronomic studies of the following crops with reference to gross morphology for crop identification and agronomic conditions- 12. Study of Morphological characters of Plants 13. Cereal Crops – Jowar, Oil seed crop– Groundnut, 14. Pulse Crop – Gram, Cash crop – Sugarcane 15. Fruit crops – Mango, Vegetable crops –Brinjal, 16. Spices –Chilli, Floriculture – Marigold; 17. Eco-friendly agrobiochemicals: Green manuring: Sunhemp and Delchi. 18. Biofertilizers: Azolla and Nostoc; Biopesticides: Azadirachtin and Pyrethrin. 19. Bactericide, Insecticides, Nematicides, 20. Determination of sucrose percentage by Hand refractometer in Sugarcane and Grape. 21. Tour report /Excursions/ Visits to Agricultural institutes/ Polyhouse.	
Reference Books: 1. Agrios, G. N. Plant Pathology. 5th ed. San Diego: Academic Press, 2005. 2. Aneja, K. R. Experiments in Microbiology, Plant Pathology and Tissue Culture. New Delhi: New Age International (P) Ltd. Publishers, 2005. 3. Baruah, H. K. Textbook of Plant Pathology. New Delhi: Oxford & IBH Publishing Co., 1984. 4. Bilgrami, K. S. Textbook of Modern Plant Pathology. New ed. New Delhi: CBS Publishers & Distributors, 1990. 5. Butler, Edwin J. Plant Pathology. London: Macmillan & Co., 1949.		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 marks): • Journal: 10 Marks • Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC V (Minor I)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT-234 Farm Management		
Course Objectives: The students will be able to... 1) Understand the basic knowledge about the farming system. 2) Know the types of cropping used in farming. 3) Impart the knowledge about principles and management of farms. 4) Update the knowledge about various risks and uncertainties in agriculture.		
Course Outcomes: The students should be able to... 1) Explain the basic concepts of farming System and management. 2) Classify intercropping, mono-cropping, sole cropping, sequential cropping. 3) Discuss various factors influencing types of farming. 4) Create the problem-solving methods for risks and uncertainty in agriculture		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Farming System 1.1 Farm: Definition, types, characteristics and factors determining the size of farms 1.2 Farming Systems: Concepts, Definitions, and Classification 1.3 Factors determining farming systems (physical, biological, and socioeconomic). 1.4 Small- scale tropical farming systems	07
Module-2:	Module- 2: Cropping Systems 2.1 Nomadic farming, shifting cultivation, fallow rotation, permanent cultivation, ley farming 2.2 Intercropping, mono-cropping, sole cropping, sequential cropping, relay cropping, strip cropping.	08
Module -3:	Module-3: Common Plant Diseases and their management 3.1 Farm management: Introduction, Definitions, Scope, Objectives, Relationship with Other Sciences.	

	3.2 Types of farming: Specialization, Diversification, Mixed farming, Dry farming and Ranching 3.3 Factors influencing types of farming.	08
Module- 4:	Module – 4: Risks and Uncertainty in Agriculture. 4.1 Risk and uncertainty in agriculture. 4.2 Nature and sources of risks Production. 4.3 Technical risks, Price or marketing risk, financial risk. 4.4 Methods of reducing risk	07

Reference Books:

1. Reddy, S. R. *Principles of Agronomy*. Ludhiana: Kalyani Publishers, 2011.
2. Panda, S. C. *Agronomy*. New Delhi: Agribios Publications, 2006.
3. De, Gopal Chandra. *Fundamentals of Agronomy*. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd., 1980.
4. Singh, S. S. *Principles and Practices of Agronomy*. New Delhi: Kalyani Publishers, 2015.
5. Subba Reddy, S., and P. Raghu Ram. *Agricultural Economics*. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd., 2016.

Evaluation Pattern

Total Marks:50

Internal Evaluation:(20 Marks):

- CCE-1: Home Assignment: 10 Marks
- CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks
- CCE-III: MCQ Test :10 Marks
- **Note:** Internal evaluation (Best of two CCE Marks will be considered)

End Semester Examination: (30 Marks):

- Question-1: Solve the following questions (five questions of 2 marks) 10 M
- Question-2: Attempt any two questions (three questions of 10marks) 20 M
- Question-3: Attempt any four questions (five questions of 5 marks) 20 M
- **Note:** Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC VI (Minor II)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT- 235 Agricultural Management and Marketing		
Course Objectives: The students should be able to... 1) Explain the principles and functions of agricultural management. 2) Describe agricultural waste management practices for sustainable farming. 3) Explain nursery management techniques for quality plant production. 4) Describe the concepts of agribusiness development and agricultural marketing.		
Course Outcomes: The students should be able to... 1) Apply management principles in agricultural enterprises. 2) Implement appropriate agricultural waste management practices. 3) Demonstrate nursery management techniques for healthy plant production 4) Evaluate agribusiness opportunities and marketing strategies for agricultural products.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Introduction to Agricultural Management 1.1 Scope and importance of agricultural management 1.2 Functions of management: Planning, organizing, leading, controlling 1.3 Types of agricultural enterprises (farms, agribusiness, cooperatives).	07
Module-2:	Module- 2: Agricultural Waste Management Systems 2.1 Principles of agricultural waste management 2.2 Addressing animal and human waste. 2.3 Management and disposal of agricultural chemicals 2.4 Waste management function.	08
Module -3:	Module-3: Nursery Management 3.1 Importance of plant nurseries in agriculture and horticulture 3.2 Soil and Media Preparation (sand, peat, vermiculite, cocopeat).	

	3.3 Water and Nutrient Management 3.4 Disease and Pest Management 3.5 Hardening and Transplanting Techniques 3.6 Nursery Business and Marketing	08
Module- 4:	Module – 4: Agribusiness Development. 4.1 Agro-processing and food value chains. 4.2 Branding, packaging, and certification in agribusiness. 4.3 Entrepreneurship in agriculture. 4.4 Role of ICT in agricultural marketing 4.5. Online platforms and social media for agribusiness	07
Reference Books: 1. Reddy, S. R. <i>Principles of Agronomy</i>. Ludhiana: Kalyani Publishers, 2011. 2. Choudhary, M. L., and V. S. Beniwal. <i>Nursery and Plantation Practices in Horticulture</i>. New Delhi: New India Publishing Agency, 2017. 3. Sharma, D. D. <i>Agricultural Marketing</i>. New Delhi: CBS Publishers & Distributors, 2016. 4. Subba Reddy, S., and P. Raghu Ram. <i>Agricultural Economics</i>. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd., 2016. 5. Kalyanasundaram, K. <i>Agribusiness Management</i>. New Delhi: Atlantic Publishers & Distributors, 2018.		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation:(20 Marks): • CCE-1: Home Assignment: 10 Marks • CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks • CCE-III: MCQ Test :10 Marks • Note: Internal evaluation (Best of two CCE Marks will be considered)	End Semester Examination:(30Marks): • Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10 marks) 20 M • Question-3: Attempt any four questions (five questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC (Minor P)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: Practical Course BPPP 236 (Based on theory paper BPPT 234 and BPPT 235)		
Course Objectives: The students will be able to... 1) Understand farm planning and management practices. 2) Explain agricultural waste and nursery management. 3) Apply value addition techniques for agricultural products. 4) Describe agribusiness and agricultural marketing concepts.		
Course Outcomes: The students should be able to... 1) Prepare farm plans using appropriate agricultural practices. 2) Demonstrate waste and nursery management techniques. 3) Perform value addition and processing of agricultural products. 4) Develop basic agribusiness and marketing plans.		
Module	Title and Contents	Hrs.
	1. Study of farm management aspects. 2. Study of preparation of farm plans for cash crops. 3. Study of preparation of farm plans for cereal crops. 4. Study of preparation of farm plans for oil-yielding crops. 5. Study of preparation of farm plans for fodder crops. 6. Study of plans for application of fertilizers. 7. Study of management of intercropping (any three examples/plans). 8. Study of risks and uncertainty in agriculture. 9. Preparation of a business plan for a small-scale agricultural enterprise. 10. Preparation of a composting unit using crop residues and farm waste. 11. Study of earthworm species used in composting and their role in decomposition. 12. Study of biogas plant design and functioning. 13. Nursery layout and preparation. 14. Study of water and soil management in nurseries. 15. Extraction and preservation of fruit juices (mango, orange, lime).	60

	16. Study of different types of packaging materials (glass, plastic, metal, and paper). 17. Mushroom cultivation on agro-waste. 18. Extraction of fibers from crop residues (banana, jute, wheat straw) for paper making. 19. Creation of digital advertisements and promotional content for agricultural products. 20. Case study on successful agro-based startups (e.g., Mapro, Parle, Greenhouse).	30
--	--	----

Reference Books:

1. Agrios, G. N. *Plant Pathology*. 5th ed. San Diego: Academic Press, 2005.
2. Brown, R. C. *Thermo-Chemical Processing of Biomass: Conversion into Fuels, Chemicals and Power*. Hoboken, NJ: John Wiley & Sons, 2019.
3. Ptasiński, Krzysztof J. *Efficiency of Biomass Energy: An Energy Approach to Biofuels, Power, and Biorefineries*. Hoboken, NJ: John Wiley & Sons, 2016.
4. Bilgrami, K. S. *Textbook of Modern Plant Pathology*. New Delhi: CBS Publishers & Distributors, 1990.
5. Butler, Edwin J. *Plant Pathology*. London: Macmillan & Co., 1949

Evaluation Pattern

Total Marks:50

Internal Evaluation (20 marks):

- Journal: 10 Marks
- Students Performance: 10 Marks

End Semester Examination (30 Marks):

- 4 questions

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: VSC-I	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPPVS-1 Advanced Skills in Plant Protection-I		
Course Objectives: The students should be able to... 1) Understand the principles of plant microtechniques and microscopy 2) Explain methods of specimen preparation and staining in plant sciences. 3) Apply cytological and molecular techniques for plant analysis. 4) Demonstrate laboratory techniques for microscopic observation and organelle isolation.		
Course Outcomes: The students should be able to... 1) Perform fixation, staining, mounting, and slide preparation techniques. 2) Operate basic microscopy and microtechnique instruments. 3) Analyze mitosis, meiosis, and DNA isolation using standard laboratory methods. 4) Demonstrate protoplast, chloroplast, and chromosome preparation techniques.		
Module	Title and Contents (Any 15 of the following)	Hrs.
Module -1:	1.Study of various fixation techniques in plant sciences. 2.Study of various staining techniques in plant sciences. 3.Study of various clearing and mounting medium used in plant sciences. 4-6. Study of various instrument which are used in Microtechniques (Microphotography, Scanning Electron Microscopy, Microtome, Centrifuge) 7. Study of mitosis in <i>Allium cepa</i> roots. 8. Study of meiosis in <i>Allium cepa</i> flower buds. 9. Isolation of DNA from suitable plant specimen 10-11. Study of different types of Microscopy (Light microscopy, fluorescence microscopy and light microscopy). 12.Study of methods of slide preparation (whole mount, smear, squash and section).	60

	13. Study of preparation of permanent slides. 14. Isolation of protoplast from given plant specimen. 15. Methods of microscopic measurement and data processing. 16. Study of maceration techniques in plants. 17. Study of different pre-treating agents used for chromosome separation 18. Study of different pre-treating agents used for chromosome separation. 19. Study of isolation of chloroplast	
Reference Books: 1. Berlyn, G. P., and J. P. Miksche. <i>Botanical Microtechnique and Cytochemistry</i>. Ames: Iowa State University Press, 1976. 2. Johansen, D. A. <i>Plant Microtechnique</i>. New York: McGraw-Hill Book Company, 1940. 3. Ruzin, S. E. <i>Plant Microtechnique and Microscopy</i>. New York: Oxford University Press, 1999. 4. Sass, J. E. <i>Botanical Microtechnique</i>. Ames: Iowa State University Press, 1958. 5. □ Yeung, E. C. T., C. Stasolla, M. J. Sumner, and B. Q. Huang. <i>Plant Microtechniques and Protocols</i>. Cham: Springer, 2015		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 marks): • Journal: 10 Marks - Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B. Sc.	Semester - III
	Type: SEC-I	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: Skill Enhancement Course (BPPSEC-I): Pest Illustrations and Photography		

Course Objectives: By the end of the course, students will be able to:

- 1) Understand the morphological characteristics of plants.
- 2) Apply botanical illustration and photography techniques for plant documentation.
- 3) Analyze digital images using photography, Photoshop, and AI tools.
- 4) Create scientific botanical exhibits following ethical practices.

Course Outcomes: By the end of the course, students will be able to:

- 1) **Identify** plant morphological characters.
- 2) **Apply** botanical photography and illustration techniques.
- 3) **Analyze** and process digital images using editing software and AI.
- 4) **Create** and present botanical photographs and illustrations ethically.

Practical No.	Title and Contents	Hrs.
1	Study of habit of Plants.	4
2	Study of various leaf shapes, margins, and venation patterns.	4
3	Morphological study of complete flower.	4
4	Study of different types of fruits and seeds.	4
5	Comparative study of plant species using both drawings and photos.	4
6	Study of types of camera and accessories.	4
7	Study of photography and its types.	4
8	Study of Indoor and Outdoor Photo Shoots.	
9	Study of image processing using AI.	4
10	Study of Light and shadow as requirements in photography.	4
11	Study of color and Black & White Photography.	4
12	Demonstration of photoshop software.	4
13	Study of Digital Photography.	4
14	Study of Processing of digital photographs.	
15	Study of Macrophotography.	
16	Study of Microphotography.	

17	Study of Labelling of Photographs.	
18	Ethics in photography and nature photography.	
19	Preparation of exhibition of botanical illustrations and photographs.	

Reference Books:

1. Bell, A. D., and A. Bryan. *Plant Form: An Illustrated Guide to Flowering Plant Morphology*. 2nd ed. Portland, OR: Timber Press, 2008.
2. Evert, R. F. *Esau's Plant Anatomy: Meristems, Cells, and Tissues of the Plant Body*. 3rd ed. Hoboken, NJ: John Wiley & Sons, 2006.
3. Judd, W. S., C. S. Campbell, E. A. Kellogg, P. F. Stevens, and M. J. Donoghue. *Plant Systematics: A Phylogenetic Approach*. 4th ed. Sunderland, MA: Sinauer Associates, 2016.
4. Hedgecoe, J. *The New Manual of Photography*. London: DK Publishing, 2003.
5. Kelby, S. *The Digital Photography Book*. Vol. 1. Berkeley, CA: New Riders, 2020

Evaluation Pattern:

Total Marks: 50

Internal Evaluation (20 marks):

- Journal: 10 Marks
- Students Performance: 10 Marks

End Semester Examination (30 Marks):

- 4 questions

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: IKS II	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPTIKS II- Indian Agriculture		
Course Objectives: The students should be able to... 1) Understand the history and importance of Indian agriculture from ancient to modern times. 2) Explain traditional irrigation systems and ancient agricultural practices. 3) Analyze the development of Indian agricultural technologies and productivity across different periods. 4) Evaluate the role of agriculture in shaping Indian society and culture.		
Course Outcomes: The students should be able to... 1) Describe the historical development of Indian agriculture. 2) Explain ancient irrigation systems and traditional farming practices. 3) Analyze the evolution of agricultural technologies and productivity in India. 4) Evaluate the social and cultural significance of agriculture in Indian civilization.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: History of Indian Agriculture 1.1 Introduction and importance of Agriculture in India 1.2 History of Indian agriculture: The significance of agriculture and irrigation as emphasized in the Indian Mythological texts like Ramayana, Mahabharata and other 1.3 Mention of Indian agriculture by Greek historians and later travelers.	07
Module-2:	Module- 2: Ancient Irrigation Techniques 2.1 Significance of Agriculture and irrigation for the Kings of Indian tradition 2.2 Major water bodies of ancient times. The Ery system of south India.	08
Module -3:	Module-3: Indian Agriculture Technologies 3.1 Excellence of Indian agricultural technologies as observed by	

	more recent European observers 3.2 Productivity of Indian agriculture in medieval Thanjavur and eighteenth-century Allahabad, Chengalpattu, etc.	08
Module- 4:	Module – 4: Agriculture and Indian Society. 4.1 Indian attitude towards agriculture in ancient times. 4.2 Indian attitude towards agriculture in medieval times. 4.3 Indian attitude towards agriculture in modern times.	07
Reference Books: 1. Kumar, Dharma. <i>The Cambridge Economic History of India, Volume 2: c. 1757–1970</i>. Cambridge: Cambridge University Press, 1983. 2. Randhawa, M. S. <i>A History of Agriculture in India</i>. Vol. 1. New Delhi: Indian Council of Agricultural Research (ICAR), 1980. 3. Randhawa, M. S. <i>A History of Agriculture in India</i>. Vol. 2. New Delhi: Indian Council of Agricultural Research (ICAR), 1983. 4. Sadarangani, P. R. <i>History of Agriculture in India</i>. New Delhi: Oxford & IBH Publishing Co., 1998. 5. Thakur, Devendra. <i>Agricultural Heritage of India</i>. New Delhi: Deep & Deep Publications, 2004.		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation:(20 Marks): • CCE-1: Home Assignment: 10 Marks • CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks • CCE-III: MCQ Test: 10 Marks • Note: Internal evaluation (Best of two CCE Marks will be considered)		End Semester Examination:(30 Marks): • Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (five questions of 5 marks) 20 M • Note: Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: DSC VI (Major III)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT- 241 Agricultural Entomology I		
Course Objectives: The students will be able to... 1) Understand agricultural entomology and insect classification. 2) Identify major crop and stored-grain insect pests. 3) Apply insect pest management and IPM techniques. 4) Evaluate modern pest management and safe pesticide use.		
Course Outcomes: The students should be able to... 1) Classify insect pests based on key characteristics. 2) Identify important insect pests and their damage. 3) Apply appropriate pest control methods. 4) Evaluate integrated pest management practices.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Agricultural Entomology 1.1 Definition and importance of entomology in agriculture and losses (qualitative and quantitative) caused by insect pests. 1.2 General characters of insect (Insect Morphology) 1.3 Classification of insect pests based on ○ Nature of damage ○ Mouthparts ○ Metamorphosis	07
Module-2:	Module- 2: Study of insect pests 2.1 Study of the following insect pests of different crops with reference to the scientific name, Marks of identification, Nature of damage, Life cycle, and management in the following: Jowar – Stem borer, Sugarcane – White grub, Gram– Pod borer, Mango – Jassid, Brinjal– Fruit borer,	08

	Rose – Aphids 2.2 Stored grain pests and their management with reference to scientific name, Marks of identification, Nature of damage, Life cycle, management in the following: Rice weevil, Pulse beetle.	
Module -3:	Module-3: Management of Insect pests 3.1 Principles of insect pest control 3.2 Classification of insecticides based on mode of entry – stomach, contact, systemic, Mode of action – Respiratory, Nervous. 3.3 Chemical nature Inorganic and Organic Insecticides: Sulphur and Organophosphates. 3.4 Plant-origin insecticides: Azadirachtin, Pyrethrin, and Nicotine 3.5 Nature of formulation – Dust, Granules, Wettable powder, Emulsifiable concentrates 3.6 IPM-Integrated Pest Management	08
Module- 4:	Module – 4: Recent trends in pest management. 4.1 Attractants; Repellants; Antifeedants; Pheromones; Chemosterilants. 4.2 Precautionary measures used during pesticide application.	07

Reference Books:

1. Atwal, A. S., and G. S. Dhaliwal. *Agricultural Pests of South Asia and Their Management*. 6th ed. Ludhiana: Kalyani Publishers, 2015.
2. David, B. V., and T. N. Ananthakrishnan. *General and Applied Entomology*. 2nd ed. New Delhi: Tata McGraw-Hill Education, 2004.
3. Dhaliwal, G. S., R. Arora, and A. K. Dhawan. *Fundamentals of Applied Entomology*. New Delhi: Kalyani Publishers, 2010.
4. Pedigo, L. P., and M. E. Rice. *Entomology and Pest Management*. 6th ed. Long Grove, IL: Waveland Press, 2014.
5. Vasantharaj David, B. *Elements of Economic Entomology*. 8th ed. Chennai: Brillion Publishing, 2019.

Evaluation Pattern

Total Marks:50

Internal Evaluation:(20 Marks):

- CCE-1: Home Assignment: 10 Marks
- CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks
- CCE-III: MCQ Test :10 Marks
- **Note:** Internal evaluation (Best of two CCE Marks will be considered)

End Semester Examination:(30Marks):

- Question-1: Solve the following questions (five questions of 2 marks) 10 M
- Question-2: Attempt any two questions (three questions of 10marks) 20 M
- Question-3: Attempt any four questions (five questions of 5 marks) 20 M
- **Note:** Conversion of 50 marks of ESE to 30 marks

Karmaveer Bhaurao Patil University, Satara

	(A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashwantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: DSC VIII (Major IV)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT – 242 Weeds and their Management		
Course Objectives: The students should be able to... 1) Understand the classification, biology, and importance of weeds. 2) Identify major weeds based on morphology and ecology. 3) Apply mechanical, chemical, and biological weed management methods. 4) Evaluate herbicide action, weed–crop interactions, and integrated weed management (IWM).		
Course Outcomes: The students should be able to... 1) Classify weeds based on their characteristics and ecology. 2) Identify economically important weeds and their impact on crops. 3) Apply suitable weed management practices. 4) Evaluate herbicide resistance and integrated weed management strategies.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Introduction of weeds 1.1 Weeds – Definition and losses caused by weeds. 1.2 Classification of weeds based on Ontogeny, Ecology (ecological affinities, Soil type, Habitat, cotyledon number, soil pH 1.3 Crop association 1.4 Reproduction and mode of dispersal of weeds. 1.5 Study of parasitic and poisonous weeds.	07
Module-2:	Module- 2: Study of Noxious and troublesome weeds with reference to Gross morphology for weed identification, Reproduction, Ecology, Dispersal, Management Dicot: <i>Parthenium hysterophorus</i> , <i>Argemone mexicana</i> , <i>Celosia argentea</i> , <i>Euphorbia hirta</i> , <i>Amaranthus Species</i> , <i>Alternanthera sessilis</i> Monocot: <i>Cyperus rotundus</i> , <i>Cynodon dactylon</i>	08

Module -3:	Module-3: Methods of weed management 3.1 Mechanical methods - Ploughing, Hoeing, Hand weeding, Sickling and mowing, Burning and flooding, Mulching 3.2 Chemical methods - Classification of weedicides on the basis of chemical nature, mode of action, Study of weedicides with reference to properties, mode of action, formulation and uses of Glyphosate, Gramoxane (Paraquat). 3.3 Biological methods - Weed management by bacteria, fungi and insects.	08
Module- 4:	Module – 4: Weed biology. 4.1 Weed physiology after application of herbicides. 4.2 Weed-crop competition and allelopathy 4.3 Mechanism of action of herbicides with reference to photosynthesis 4.4 Concept of herbicide resistance, Concept and principles of IWM	07

Reference Books:

1. Gupta, O. P. *Modern Weed Management*. 3rd ed. Jodhpur: Agrobios (India), 2018.
2. Rao, V. S. *Principles of Weed Science*. 3rd ed. New Delhi: Oxford & IBH Publishing Co., 2000.
3. Rao, V. S. *Weed Management*. 2nd ed. New Delhi: CBS Publishers & Distributors, 2009.
4. Subramaniam, S., and M. A. Balasubramanian. *Weed Science*. New Delhi: Kalyani Publishers, 2016.
5. Zimdahl, R. L. *Fundamentals of Weed Science*. 5th ed. London: Academic Press, 2018.

Evaluation Pattern

Total Marks:50

Internal Evaluation:(20 Marks):

- CCE-I: Home Assignment: 10 Marks
- CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks
- CCE-III: MCQ Test: 10 Marks
- **Note:** Internal evaluation (Best of two CCE Marks will be considered)

End Semester Examination: (30 Marks):

- Question-1:Solve the following questions (five questions of 2 marks) 10 M
- Question-2: Attempt any two questions (three questions of 10marks) 20 M
- Question-3: Attempt any four questions (five questions of 5 marks) 20 M
- **Note:** Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- III
	Type: DSC P (Major P)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: Practical Course- BPPP 243 (Based on theory papers BPPT 241 and BPPT 242)		
Course Objectives: The students will be able to... 1) Understand the identification and biology of insect pests and weeds. 2) Apply techniques for pest and weed identification and management. 3) Analyze the use of pesticides, weedicides, and pest management equipment. 4) Develop practical skills in specimen collection, herbarium preparation, and field surveys.		
Course Outcomes: The students should be able to... 1) Identify major insect pests and weeds of agricultural crops.. 2) Apply appropriate pest and weed management practices. 3) Analyze the use of pesticides, weedicides, and application equipment. 4) Demonstrate field techniques such as insect collection, weed herbarium preparation, and crop field surveys.		
Module	Title and Contents	Hrs.
	1. Study of general characteristics of insect pests. 2. Study of insect pests of Jowar (Stem borer) with reference to scientific name, marks of identification, life cycle, nature of damage, and management. 3. Study of insect pests of Sugarcane (White grub), Gram (Pod borer), and Mango (Jassids) with reference to scientific name, marks of identification, life cycle, nature of damage, and management. 4. Study of insect pests of Brinjal (Fruit borer) and Rose (Thrips) with reference to scientific name, marks of identification, life cycle, nature of damage, and management. 5. Study of stored-grain pests (Rice weevil and Pulse beetle) with reference to scientific name, marks of identification, life cycle, nature of damage, and management. 6. Study of any two insecticides, bactericides, and fungicides with reference to chemical nature, mode of action, and uses. 7. Study of attractants and repellents (any one from each group) and demonstration of insect collection and preservation techniques. 8. Study of pesticide application equipment (Sprayer and Fogger) and preparation of pesticide formulations for application. 9. Study of morphological characters for weed identification and identification of the following weeds with reference to gross morphology, reproduction, dispersal, and management: 10. Dicot weeds: <i>Argemone mexicana</i> , <i>Parthenium hysterophorus</i> , <i>Amaranthus spinosus</i> , <i>Alternanthera</i>	60

	<i>sessilis</i>, <i>Euphorbia hirta</i>, <i>Celosia argentea</i> 11. Monocot weeds: <i>Cyperus rotundus</i>, <i>Cynodon dactylon</i> 12. Estimation of weed seeds by seed count method (<i>Argemone mexicana</i>, <i>Celosia argentea</i>, or any locally available weed). 13. Study of seed dispersal mechanisms in <i>Parthenium hysterophorus</i>, <i>Tridax procumbens</i>, <i>Xanthium strumarium</i>, <i>Alternanthera</i> spp., <i>Achyranthes aspera</i>, and <i>Cynodon dactylon</i>. 14. Study of weedicides (Glyphosate and Gramoxone/Paraquat) with reference to properties, formulation, mode of action, and uses. 15. Study of recent trends in pest management and any two equipment used for weed management. 16. Preparation of a weed herbarium. 17. Survey of weeds in crop fields from different habitats and visit to an agricultural field/research institute.	
Reference Books: 1. Atwal, A. S., and G. S. Dhaliwal. <i>Agricultural Pests of South Asia and Their Management</i>. 6th ed. Ludhiana: Kalyani Publishers, 2015. 2. David, B. V., and T. N. Ananthakrishnan. <i>General and Applied Entomology</i>. 2nd ed. New Delhi: Tata McGraw-Hill Education, 2004. 3. Gupta, O. P. <i>Modern Weed Management</i>. 3rd ed. Jodhpur: Agrobios (India), 2018. 4. Rao, V. S. <i>Principles of Weed Science</i>. 3rd ed. New Delhi: Oxford & IBH Publishing Co., 2000. 5. Pedigo, L. P., and M. E. Rice. <i>Entomology and Pest Management</i>. 6th ed. Long Grove, IL: Waveland Press, 2014		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 marks): • Journal: 10 Marks • Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: DSC VII (Minor III)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT-244: Weeds Management in Horticultural Crops.		
Course Objectives: Students will be able to... 1) Understand the biology, classification, and importance of weeds in horticultural crops. 2) Identify major weeds based on their morphology, ecology, and reproduction. 3) Apply mechanical, chemical, biological, and integrated weed management practices. 4) Evaluate weed management strategies for sustainable crop production.		
Course Outcomes: Students should be able to... 1) Identify common weeds of horticultural crops and their characteristics. 2) Classify weeds based on morphology, ecology, and dispersal mechanisms. 3) Apply suitable weed management methods, including IWM. 4) Prepare a weed herbarium and recommend appropriate weed control measures.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Introduction of weeds 1.1 Weeds – Characteristics of weeds, Definition and losses caused by weeds 1.2 Classification of weeds based on Ontogeny, Ecology (ecological affinities, Soil type, Habitat, cotyledon number, soil pH) 1.3 Reproduction and mode of dispersal of weeds. 1.4 Harmful and Beneficial effects of Weeds 1.5 Allelopathic effects of weeds on Crops	07
Module-2:	Module- 2: Study of following weeds with reference to 2.1 Gross morphology for weed identification, Reproduction, Ecology, Dispersal, Management in horticultural crops: <i>Parthenium hysterophorus, Argemone mexicana, Cassia tora, Datura metal, Euphorbia geniculate, Lantena camera Cyperus rotundus, Cynodon dactylon</i>	08

Module -3:	Module-3: Methods of weed management 3.1 Mechanical methods - Ploughing, Hoeing, Hand weeding, Sickling and mowing, Burning and flooding, Mulching 3.2 Chemical methods - Classification of weedicides on the basis of chemical nature, mode of action, Study of weedicides with reference to properties, mode of action, formulation and uses of 2-4 D, Glyphosate. 3.3 Biological methods - Weed management by bacteria, fungi and insects.	08
Module- 4:	Module – 4: Weed Biology and Weed Management in Crops. 4.1 Preparation of a weed herbarium. 4.2 Tropical and Subtropical fruit crops (Mango, Banana, Sugarcane). 4.3 Biological weed control agents. 4.4 IWM (Integrated weed management)	07
Reference Books: 1. Gupta, O. P. <i>Modern Weed Management</i> . 3rd ed. Jodhpur: Agrobios (India), 2018. 2. Rao, V. S. <i>Principles of Weed Science</i> . 3rd ed. New Delhi: Oxford & IBH Publishing Co., 2000. 3. Rao, V. S. <i>Weed Management</i> . 2nd ed. New Delhi: CBS Publishers & Distributors, 2009. 4. Subramaniam, S., and M. A. Balasubramanian. <i>Weed Science</i> . New Delhi: Kalyani Publishers, 2016. 5. Zimdahl, R. L. <i>Fundamentals of Weed Science</i> . 5th ed. London: Academic Press, 2018		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation:(20 Marks): - CCE-1: Home Assignment: 10 Marks - CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks - CCE-III: MCQ Test:10 Marks Note: Internal evaluation (Best of two CCE Marks will be considered)	End Semester Examination:(30 Marks): - Question-1: Solve the following questions (five questions of 2 marks) 10 M - Question-2: Attempt any two questions (three questions of 10marks) 20 M - Question-3: Attempt any four questions (five questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 marks	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: DSC VIII (Minor IV)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPT- 245 Organic Agriculture		
Course Objectives: Students should be able to... 1) Understand the knowledge about pollution, pests, and threats to Biodiversity. 2) Know about the importance and types of organic farming. 3) Impart the knowledge about characteristics and types of soil. 4) Explain the knowledge about cultivation and irrigation systems.		
Course Outcomes: Students should be able to... 1) Learn about pesticide contamination and human health hazards. 2) Discuss about advantages and disadvantages of organic farming. 3) Update the knowledge about types of organic agriculture and characteristics of soil. 4) Apply the knowledge about the irrigation systems in the field.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Organic Agriculture 1.1 Detrimental effects of currently chemical dependent farming. Reduction of crop production due to depletion of soil Health 1.2 Pesticide contamination and human health hazard. Contamination of food products by pesticides & chemicals. 1.3 Environmental (soil, water, air) pollution. 1.4 Reduction of natural enemies of crop pests. Threat to Biodiversity.	07
Module-2:	Module- 2: Types of Farming and Farm Designing 2.1 Pure Organic Farming – Definition, Concept & Benefits 2.2 Integrated Farming system (Combination of Organic and Inorganic) Mixed Farming; Concept of different cropping systems about Organic Farming (Intercropping etc). 2.3 Characteristics and components of an organic farm, planning and layout of the farm. 2.1 2.4 Farm components in different Agro Eco-Systems, field crops in	08

	organic Farms, buffer zone.	
Module -3:	Module-3: Organic Horticulture and Operations 3.1 Introduction to the science of organic horticulture; importance and current scenario in India 3.2 Horticultural crops for organic farming: Medicinal: Aloe vera/ Lemon Grass; vegetables: Brinjal/Spinach. 3.3 Cultivation practices of selected plants viz. varieties, climate, soil, season, and field preparation. Planting, spacing. 3.4 Irrigation, manuring, plant protection, harvesting, and post-harvest handling.	08
Module- 4:	Module – 4: Irrigation practices in organic agriculture. 4.1 Basic Principles in Irrigation; Water use efficiency & methods of irrigation. 4.2 Micro irrigation system – Drip, Sprinkler. 4.3 Pre-Sowing Irrigation, Crop Rotation, Intercropping, Mixed cropping. 4.1 4.4 Use of tolerant Resistant varieties, Manipulations in sowing dates; Weed Management.	07

Reference Books:

1. Bansal, and Mamta. *Basics of Organic Farming*. CBS Publication, 2017.
2. De, Gopal Chandra. *Fundamentals of Agronomy*. Bangalore: Oxford and IBH Publishing Co. Ltd., 1980.
3. Maliwal, P. L. *Principles of Organic Farming Textbook*. Jodhpur: Scientific Publishers, 2020. Panda, S. C. *Agronomy*. New Delhi: Agribios Publication, 2006.
4. Walia, S. S., and R. K. Nanwal. *Principles of Organic Farming*. New Delhi: New India Publishing Agency, 2022.

Evaluation Pattern

Total Marks:50

Internal Evaluation:(20 Marks):

- CCE-1: Home Assignment: 10 Marks
- CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks
- CCE-III: MCQ Test :10 Marks
- **Note:** Internal evaluation (Best of two CCE Marks will be considered)

End Semester Examination:(30 Marks):

- Question-1: Solve the following questions (five questions of 2 marks) 10 M
- Question-2: Attempt any two questions (three questions of 10marks) 20 M
- Question-3: Attempt any four questions (five questions of 5 marks) 20 M
- **Note:** Conversion of 50 marks of ESE to 30 marks

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: DSC P (Minor P)	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: Practical Course BPPP- 246 (Based on theory paper BPPT 244 and BPPT 245)		
Course Objectives: Students will be able to... 1) Know the knowledge about weeds. 2) Understand the knowledge of identification and morphology of agronomical weeds. 3) Learn about the different methods of management of weeds. 4) Impart the knowledge about laboratory techniques.		
Course Outcomes: Students should be able to... 1) Realize the importance of identification of insect pests. 2) Apply the advanced techniques for insect management. 3) Discuss about the importance of reproduction and dispersal of weeds. 4) Explain identification of agricultural weeds based on morphology.		
Module	Title and Contents	Hrs.
	1. Study of morphological characters for identification of weeds. 2. Study of <i>Argemone mexicana</i> with reference to gross morphology, reproduction, dispersal, and management. 3. Study of <i>Parthenium hysterophorus</i> and <i>Cassia tora</i> with reference to gross morphology, reproduction, dispersal, and management. 4. Study of <i>Datura metel</i> and <i>Euphorbia</i> spp. with reference to gross morphology, reproduction, dispersal, and management. 5. Study of <i>Lantana camara</i> , <i>Cyperus rotundus</i> , and <i>Cynodon dactylon</i> with reference to gross morphology, reproduction, dispersal, and management. 6. Estimation of weed seeds by seed count method using <i>Argemone mexicana</i> , <i>Celosia argentea</i> , or any locally available weed. 7. Study of seed dispersal mechanisms in <i>Parthenium hysterophorus</i> , <i>Tridax procumbens</i> , <i>Xanthium strumarium</i> , <i>Alternanthera</i> spp., <i>Achyranthes aspera</i> , and <i>Cynodon dactylon</i> . 8. Study of weedicides (Glyphosate and 2,4-D/Gramoxone) with reference to properties, formulation, mode of action, and uses.	60

	9. Study of the preparation of Panchagavya (bio-organic liquid fertilizer). 10. Study of the preparation and application of vermicompost in organic farming. 11. Study of post-harvest handling and grading of organic vegetables. 12. Study of the preparation and application of organic manures for horticultural crops. 13. Study of medicinal plants suitable for organic farming (<i>Aloe vera</i> and <i>Lemongrass</i>) and their uses. 14. Study of weed management practices in organic farming. 15. Study of allelopathy in weeds and its effect on crop germination. 16. Study of the water-holding capacity of organic and inorganic soils. 17. Visit to an organic/integrated farm to observe practical implementation of organic farming and weed management.	
--	---	--

Reference Books:

1. Gupta, O. P. "Modern Weed Management". India: Agrobios Publications, 2011.
2. Gupta, O. P. "Scientific Weed Management: Today and Tomorrows". New Delhi, 2011. King, L. J. "Weed of The World". 1st ed. Mumbai: Wiley Eastern, 1966.
3. Robert, H. A. "Weed Control Handbook: Principles". 9th ed. New Delhi: Blackwell Publishing, 1990.
4. Thakur, C. "Weed Science". 2nd ed. New Delhi: Metropolitan, 1984.

Evaluation Pattern

Total Marks:50

Internal Evaluation (20 marks): • Journal: 10 Marks - Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions •
--	--

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: VSC-II	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: BPPTVSC II- Advanced skills in plant protection- II (Plant Collection, Identification & Preservation)		
Course Objectives: Students will be able to... 1) Understand the principles of plant collection, preservation, and herbarium techniques. 2) Apply standard methods for collection, preservation, and identification of plant specimens. 3) Analyze plant specimens using floras, taxonomic keys, and field guides. 4) Develop skills in herbarium preparation and field documentation.		
Course Outcomes: Students should be able to... 1) Explain plant collection, preservation, and herbarium methods. 2) Perform collection, preservation, and herbarium preparation of plant specimens. 3) Identify plants using floras, taxonomic keys, and field guides. 4) Prepare herbarium specimens and maintain field records using standard taxonomic practices.		
Module	Title and Contents (Any 15 of the following)	Hrs.
	1. Study of various equipments used in collection of plant material. 2. Study of Dry and wet collection method of plant. 3. Study of various preservatives used in plant sciences. 4. Study of collection of microscopic plants. 5. Study of use of flora for identification of plant. 6. Study of preparation of herbarium specimen. 7. Study of poisoning methods of herbarium. 8. Identification of genus and species of locally available wild flora. 9. Study of different types of field guides (Flora, Monograph, Manual, Icones etc.). 10. Study of taxonomic keys. 11. Study of Identification of microscopic plants.	60

	12. Study of collection, preservation and collection of algae. 13. Study of collection, identification and preservation of Wild Mushroom. 14. Field trips within and around the Institute campus 15. Compilation of field notes and preparation of herbarium sheets of such plants	
Reference Books: 1. Bridson, D., and L. Forman. <i>The Herbarium Handbook</i>. 3rd ed. Kew: Royal Botanic Gardens, 2004. 2. Jain, S. K., and R. R. Rao. <i>A Handbook of Field and Herbarium Methods</i>. New Delhi: Today & Tomorrow's Printers, 1977. 3. Singh, G. <i>Plant Systematics: Theory and Practice</i>. 4th ed. CRC Press, 2019. 4. Lawrence, G. H. M. <i>Taxonomy of Vascular Plants</i>. Oxford & IBH. 5. Naik, V. N. <i>Taxonomy of Angiosperms</i>. Tata McGraw-Hill, 1984		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 marks): • Journal: 10 Marks • Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016)	
	Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: SEC-II	Marks: 50
	Credits: 2	From: A. Y. 2025-26
Name of the Course: Skill Enhancement Course (BPPSEC-II): Agronomical Studies of Medicinal Plants		
Course Objectives: Students will be able to...		
1) Understand the cultivation practices of medicinal and aromatic plants. 2) Apply propagation, nursery, nutrient, irrigation, and crop management techniques. 3) Analyze plant growth, crop health, and economic aspects of medicinal plant cultivation 4) Develop skills in harvesting, processing, documentation, and preparation of herbal products		
Course Outcomes: Students should be able to...		
1) Explain cultivation practices of medicinal and aromatic plants. 2) Perform propagation, nursery raising, crop management, harvesting, and post-harvest operations. 3) Assess plant growth, pest and disease management, and economics of medicinal crop production. 4) Prepare herbarium specimens, herbal formulations, digital records, and field reports following Good Agricultural Practices.		
Module	Title and Contents (Any 15 of the following)	Hrs.
Module -1:	1. Agronomical study of important medicinal and aromatic plants. (Ashwagandha, Korfad, Sarpagandha and Lemongrass) 2. Study of seed germination and seed treatment methods in medicinal plants. 3. Study of propagation techniques (seed, cutting, division, tissue culture). 4. Study of raising nursery for medicinal and aromatic plants. 5. Study of effect of organic and inorganic fertilizers on medicinal crops. 6. Study of weed management practices in medicinal plant cultivation.	60

	7. Study of common pests and diseases of medicinal crops and their control. 8. Study of intercropping systems with medicinal crops. 9. Collection and herbarium preparation of medicinal species. 10. Study of transplanting and spacing techniques. 11. Study of irrigation and nutrient management. 12. Study of measurement of growth parameters. 13. Study of harvesting and post-harvest handling. 14. Study of drying and storage of medicinal plant materials. 15. Documentation of good agricultural Practices. 16. Economic analysis of cultivation and marketing. 17. Extraction of essential oils or active ingredients. 18. Preparation of herbal formulations (Powder, Decoction, or Ointment) 19. Digital documentation and labelling. 20. Visit to medicinal plant garden/nursery – report preparation.	
Reference Books: 1. Farooqi, A. A., B. S. Sreeramu, and K. N. Srinivasappa. <i>Cultivation of Medicinal and Aromatic Crops</i>. Hyderabad: Universities Press, 2005. 2. Pal, S. K., and S. Jain. <i>Medicinal and Aromatic Plants: Cultivation, Processing and Uses</i>. New Delhi: New India Publishing Agency, 2011. 3. Trivedi, P. C. <i>Medicinal Plants: Utilization and Conservation</i>. Jaipur: Aavishkar Publishers, 2006. 4. Ravindran, P. N. <i>Advances in Herbs and Spices</i>. New Delhi: Agrobios (India), 2012. 5. Kumar, N. <i>Medicinal Plants: Cultivation and Their Uses</i>. New Delhi: Daya Publishing House, 2010		
Evaluation Pattern		
Total Marks:50		
Internal Evaluation (20 marks): • Journal: 10 Marks • Students Performance: 10 Marks	End Semester Examination (30 Marks): • 4 questions	

	Karmaveer Bhaurao Patil University, Satara (A State Public University Est. u/s 3(6) of MPUA 2016) Faculty of Science and Technology	
	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Botany	
	Programme: B.Sc.	Semester- IV
	Type: VEC-II	Marks: 50
	Credits: 2	From: A. Y. 2025-26
	Name of the Course: (BPPTVSC-II) Environmental studies in Plant Protection	
Course Objectives: Students will be able to... 1) Those laws made to safeguard the environment. 2) Know importance of sustainable development. 3) Understand the environmental issues. 4) Relate correlate knowledge of sustainable development with plant sciences.		
Course Outcomes: Students should be able to... 1) Explain the causes of environmental issues. 2) Discuss concepts related to environmental laws and ethics. 3) Discuss the sustainable development goals. 4) Compare and analyze the importance of plant sciences in meeting the sustainable development goals.		
Module	Title and Contents	Hrs.
Module -1:	Module- 1: Environmental issues 1.1 Pollution (Air, Water and Land) 1.2 Fresh-water overuse. 1.3 Natural disasters. 1.4 Fuel and Energy shortage due to overuse 1.5 Increase in wasteland 1.6 Biodiversity loss 1.7 Global warming and climate change (Causes and intensity of the problem) 1.8 Role of Plant Protection in creation of environmental issues	07
Module-2:	Module- 2: Environmental laws and ethics 2.1 Environmental Protection Act 2.2 Wildlife Protection Act. 2.3 Forest Conservation Act. 2.4 Prevention and Control of Pollution Act (Air, water and Land).	08

	2.5 From unsustainable to sustainable development 2.6 Responsibilities of an Environmentally aware citizen	
Module -3:	Module-3: Sustainable Development Goals 3.1 Global sustainable goals with emphasis on environment related Sustainable Development goals.	08
Module- 4:	Module – 4: Role of Plant Sciences in meeting the sustainable development goals. 4.1 Examples and case studies.	07

Reference Books:

1. Agarwal, S. K. "Fundamentals of Ecology". New Delhi: APH Publishing Corporation, 2008.
2. De, Gopal Chandra. *Fundamentals of Agronomy*. Bangalore: Oxford and IBH Publishing Co. Ltd., 1980.
3. Brunner, R. C. "Hazardous Waste Incineration". New York: McGraw-Hill Inc., 1989. Odum, E. P., and G. W. Barrett. "Fundamentals of Ecology". California: Thomson Brooks/Cole Publishing, 2005.
4. Sharma, P. D. "Ecology and Environment". Meerut: Rastogi Publications, 2007

Evaluation Pattern

Total Marks:50

Internal Evaluation: (20 Marks): • CCE-1: Home Assignment: 10 Marks • CCE-II: Short and long answer questions Test/ Seminar/Open Book Test/Quiz/Case study/ Book review/Field work/ Industry visit: 10 Marks • CCE-III: MCQ Test :10 Marks • Note: Internal evaluation (Best of two CCE Marks will be considered)	End Semester Examination:(30 Marks): • Question-1: Solve the following questions (five questions of 2 marks) 10 M • Question-2: Attempt any two questions (three questions of 10marks) 20 M • Question-3: Attempt any four questions (five questions of 5 marks) 20 M Note: Conversion of 50 marks of ESE to 30 Marks
--	--

Study Tour/ Excursion:

One teacher along with a batch not more than 20 students is taken for excursions to places of study interest, one in each term. If there are female students in a batch of sixteen, one additional lady teacher is permissible for excursion. Each excursion will not be more than 3 days during college working days. T.A. and D.A. for teachers and non-teaching staff participating in the excursions should be paid as per the rules. The tour report duly certified by the concerned teacher and the head of the department should be submitted at the time of practical examination