

The University of Burdwan



Syllabus of 3-Year Degree in Plant Protection

Under Curriculum and Credit Framework for Undergraduate Programme (CCFUP) as per National Education Policy 2020

With effect from 2023-24

Course Introduction

The new curriculum of B.Sc. Plant Protection presents a comprehensive view of basic knowledge, technical skill and diversity of applications focusing on protection of plants from diseases. The approach and the content of the syllabus encompass practical combination of core, elective and vocational papers with judicious mix of interdisciplinary components. Students of this subject would get adequate exposure to both basic concept of the subject along with upcoming state of art technologies in the concerned field. The contents are made with care to make the students socially aware, economically concerned and environmentally sensitive, in the context of national scenario. Students will also learn and practise knowledge about ecosystem, life processes and environment friendly approach to crop protection and disease management. As a result, they are expected to acquire comprehensive knowledge on plant protection in relation to current agro-climatic traits.

Programme outcomes (POS):

This modern curriculum would transform psyche of the students to more goal oriented discovery seeking persons equipped with practical skills with adequate theoretical bases. The students would become updated with various pedagogical trends like e-learning, hybrid learning in the context of this subject. Some prominent programme outcomes are highlighted below:

- 1) Shall develop students with proficiency in plant protection
- 2) Students can employ and implement their acquired knowledge in basic and applied aspects of plant protection.
- 3) Will help to enhance students ability of in-depth thinking, development of scientific attitude, management of problems and generating solutions

Course Objectives:

Semester I

Major

- Exploring the historical aspect and current and modern applications of plant protection to obtain a comprehensive view of the subject and working principle, in general.
- Detailed understanding of plant protection in diverse field of applications like food production, crop security, crop germplasms preservation, pest and pathogen management, green pesticides, green fertilizers practises.

Minor

- Exploring the historical aspect and current and modern applications of plant protection to obtain a comprehensive view of the subject and working principle, in general.
- Detailed understanding of plant protection in diverse field of applications like food production, crop security, crop germplasms preservation, pest and pathogen management, green pesticides, green fertilizers practises.

Multidisciplinary

- Development of concepts on vermiculture and its uses
- Knowledge on vermicomposting, its preparation and application in organic farming

SEC

- Development of general idea about plant pest, pesticides and their significance
- Preparation, mode of action and utilization of green pesticide

Course Objectives:

Semester II

Major

- Basic idea about pest mediated damage and their management
- Idea on dissemination of plant pathogen, knowledge on transmission and epidemiology of different types of plant diseases

Minor

- Basic idea about pest mediated damage and their management
- Idea on dissemination of plant pathogen, knowledge on transmission and epidemiology of different types of plant diseases

Multidisciplinary

- Development of basic ideas on pesticides and their applications
- Introduction to equipments, pesticide management, their handling techniques and formulation of pesticides

SEC

- Development of preliminary ideas about pest survey and surveillance
- Introduction to detailed ideas on various survey methods, pest sampling techniques and pest infected injury to crops

**SEMESTER WISE & COURSE WISE CREDIT DISTRIBUTION STRUCTURE UNDER CCFUP as per
NEP, 2020**

Semester	Course Type	Paper Code	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva	Full Marks	Distribution of Marks		
									Theory	Pract./Tuto./Viva-voce	Internal Assessment
I	Major/DS Course(Core)	PLPT1011	Major: Pest and Vectors-I	4	3	1		75	40	20	15
	Minor Course	PLPT1021	Minor: Pest and Vectors-I	4	3	1		75	40	20	15
	Multi/inter disciplinary	PLPT 1031	Vermiculture	3	2	1	0	50	40	0	10
	Ability Enhancement Course (AEC) [L1-1MIL]		Arabic/ Bengali/ Hindi/ Sanskrit/Santali/Urdu Or Equivalent. Course from SWAYAM	2	2	0	0	50	40	0	10
	Skill Enhancement Course(SEC)	PLPT1051	SEC: Green pesticide	3	2	1	0	50	40	0	10
	Value Added(VA) Course	CVA1061	Environmental Science/ Education	4	3	0	1	100	60	20	20
	Total			20				400			

Semester	Course Type	Course Code	Name of the Course	Credit	Lect.	Tuto.	Pract./Viva	Full Marks	Distribution of Marks		
									Theory	Pract./Tuto./Viva-voce	Internal Assessment
II	Major/DS Course (Core)	PLPT 2011	Major: Pests and Vectors-II	4	3	0	1	75	40	20	15
	Minor Course	PLPT 2021	Minor: Pests and Vectors-II	4	3	0	1	75	40	20	15
	Multi/inter disciplinary	PLPT 2031	Pesticide application equipments	3	2	1	0	50	40	0	10
	Ability Enhancement Course [L2-1]	ENGL 2041	English or Equivalent. Course from SWAYAM	2	2	0	0	50	40	0	10
	Skill Enhancement Course (SEC)	PLPT 2051	SEC: Pests survey and surveillance	3	2	1	0	50	40	0	10
	Value Added (VA) Course	CVA 2061	Understanding India/digital and technological solution/health and wellness, yoga education, sports and fitness.	4	3/3	1/0	0/1	100	80/60	0/20	20
Skill based vocational course (addl. 4 Credits) during summer term for eight weeks, who will exit the Programme after securing 40 Credit											
For UG Certificate 40 credit + Additional 4 credit (work based vocational course) = 44cr. Students are allowed to re-enter within 3 years within the stipulated max. period of 7 years											
	Total			20				400			

SEMESTER-I

**Major
PLPT1011**

(4 Credits)

Pests and Vectors -I

Unit-1: Introduction of Plant Protection and its objectives in Agriculture, Pest-Comprehensive definition, causes of pest outbreak, losses caused by insect pests, Categories of pests: Major pests, minor pests, Monophagous pests, Polyphagous pest, Pathogenic Pests, Regular Pests, and Sporadic Pests with examples. Concept of vectors with examples. **14 L**

Unit-2: Characteristics, examples, Nature of damage, symptoms of damage and Management of following pests.

Molluscan Pests (Giant African Snail), Birds Pests (Blue rock pigeon, Rose ring parakeet) and Rodent Pests (Large bandicoot rat) **10 L**

Unit-3: Classification of Plant Diseases:

Brief account of Bacteria and bacteria like organisms, fungi and fungi like organisms, algae and angiosperms, disease triangle, disease pyramid, Viroids and molecutes. **10 L**

Unit4: Symptoms:

Major types of plant disease symptoms caused by fungi, bacteria and viruses. **06 L**

Practical

I. Identification of Insect Pest and diseases.

- i) Rice- stem borer, Gandhi bug, blast of rice, bacterial leaf blight (BLB)
- ii) Jute- stem rot, Hooghly wilt, jute semilooper, jute apion
- iii) Vendi-fruit borer, yellow vein mosaic disease

II. Practical field visits

III. Preparation and submission of preserved insect pest Specimens, herbarium of plant diseases and practical note book during final examination

Suggested reading

1. Atwal, A. S. 1986: Agricultural Pests of India and South-East Asia. Kalyani Publishers, Ludhiana
2. Dasgupta, M K 1988: Principles of Plant Pathology. Allied Publishers Pvt. Ltd., Calcutta
3. Mandahar, C L, 1987: Introduction of Plant Virus. S Chandan Co. (Pvt.) Ltd., New Delhi
4. Basu, A N and Giri, B K 1993: The Essentials of Viruses, Vectors and Plant Diseases. Wiley Eastern Ltd., New Delhi
5. Agarios, GN 1988: Plant Pathology Academic Press Inc, New York
6. TV Prasad. Hand book of Entomology. New Vishal Publications, New Delhi

Pests and Vectors - I

Unit-1: Introduction of Plant Protection and its objectives in Agriculture, Pest-Comprehensive definition, causes of pest outbreak, losses caused by insect pests, Categories of pests: Major pests, minor pests, Monophagous pests, Polyphagous pest, Pathogenic Pests, Regular Pests, and Sporadic Pests with examples. Concept of vectors with examples. **14 L**

Unit-2: Characteristics, examples, Nature of damage, symptoms of damage and Management of following pests.

Molluscan Pests (Giant African Snail), Birds Pests (Blue rock pigeon, Rose ring parakeet) and Rodent Pests (Large bandicoot rat). **10 L**

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Practical

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Vermiculture

Unit-1: Definition of vermicompost, difference between compost and vermicompost (*Eisenia foetida*). **08 L**

Unit-2: Factor affecting Earth worm activity and propagation. **07 L**

Unit-3: Vermi unit preparation, Vermicompost preparation-types of substrates and quality improvement, problem in Vermicompost preparations. **08 L**

Unit-4: Uses of Vermicompost, Vermiwash in Organic farming. **07 L**

Suggested Reading:

1. Dropkin, V.H.(1980). Introduction to Plant Nematology. John Willey & Sons, New York.
2. Sasser, J.N and Jetkins, W.R.(1960) Nematology. The University Of North Carolina Pests, North Carolina.
3. Chatterjee, P.B.(1997). Plant Protection Techniques. Bharati Bhawan(Publishers & Distributors).
4. Dasgupta, M.K.(1988). Principles of Plant Pathology. Allied Publishers. Pvt. Ltd. Calcutta.
5. Maggenti, A.(1981). General Nematology. Springer-Verlag, NewYork.

SEC (Skill Enhancement Course)
PLPT1051

(3 Credits)

Green Pesticide

Unit-1: Definitions of green pesticides / Botanical Pesticide. **08 L**

Unit-2: Preparation of pesticide from Neem, Chrysanthemum and Tobacco. Advantages of use of Botanical pesticide or Green pesticide. **07 L**

Unit-3: Green Pesticide: Method of utilization and mode of action. **08 L**

Unit-4: Green pesticides *vis-à-vis* chemical pesticides. **07 L**

Suggested Reading:

1. Atwal, A.S. (1986) Agricultural Pests of India and South- East Asia. Kalyani Publishers, Ludhiana.
2. Chatterjee, P.B. (1997). Plant Protection Technique . Bharati Bhawan (Publishers & Distributors)
3. Anonymous (1967) Pesticides in Indian Agriculture. National Council of Applied Economic Research New Delhi.
4. Huffaker, C.B (1980). New Technology Of Pest Control. John Wiley and Sons , Toronto. 5. Sill, W.H (Jr.) (1985). Plant Protection: An Integrated Interdisciplinary Approach (Indian ed.) Kalyani Publishers, Ludhiana.

SEMESTER-II

**Major
PLPT2011**

(4 Credits)

Pests and Vectors-II

Unit-1: Characteristics, examples, Nature of damage, symptoms of damage and Management of following pests. **10 L**

Nematode (Root Knot nematode), Mite (Yellow mite of chili), Insects (rice yellow stem borer)

Unit-2: Locust:

Migration of Locust, Phase Theory, Origin of New Locust Cycle, nature of damage and management, anti Locust organization. **10 L**

Unit-3: Dissemination of plant pathogen, soil borne, seed borne, air borne and water borne diseases, mode of transmission of viruses and their common vectors. **10 L**

Unit-4: Epidemiology

Endemic, Epidemic, Pandemic and Sporadic diseases, monocyclic and polycyclic diseases.

Strategy of management. **10 L**

Practical:

- I. Slide preparation of Pathogenic fungus, bacteria, insect pest.
- II. Study visit to Agricultural / Horticultural farm or Institute
- III. Report preparation based on major sign and damage due to insect pest and diseases studied in theory syllabus

Suggested reading

1. Atwal, A. S. 1986: Agricultural Pests of India and South-East Asia. Kalyani Publishers, Ludhiana
2. Dasgupta, M K 1988: Principles of Plant Pathology. Allied Publishers Pvt. Ltd., Calcutta
3. Mandahar, C L, 1987: Introduction of Plant Virus. S Chandan Co. (Pvt.) Ltd., New Delhi
4. Basu, A N and Giri, B K 1993: The Essentials of Viruses, Vectors and Plant Diseases. Wiley Eastern Ltd., New Delhi
5. Agarios, GN 1988: Plant Pathology Academic Press Inc, New York
6. TK Prasad. Hand book of Entomology. New Vishal Publications, New Delhi

Pests and Vectors-II

Unit-1: Characteristics, examples, Nature of damage, symptoms of damage and Management of following pests. **10 L**

Nematode (Root Knot nematode), Mite (Yellow mite of chili), Insects (rice yellow stem borer)

Unit-2: Locust:

Migration of Locust, Phase Theory, Origin of New Locust Cycle, nature of damage and management, anti Locust organization. **10 L**

Unit-3: Dissemination of plant pathogen, soil borne, seed borne, air borne and water borne diseases, mode of transmission of viruses and their common vectors. **10 L**

Unit-4: Epidemiology

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3. Mandahar, C L, 1987: Introduction of Plant Virus. S Chandan Co. (Pvt.) Ltd., New Delhi
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5. Agarios, GN 1988: Plant Pathology Academic Press Inc, New York
6. TV Prasad. Hand book of Entomology. New Vishal Publications, New Delhi

Pesticide Application Equipments

Unit-1: Formulation of Pesticides: (Prepare desired strength of pesticides and showing method of calculation). **10 L**

Unit-2: Set the equipments for its implementation and its handling technique; i) Sprayer, ii) Duster, iii) Sprayer-cum-duster, iv) Soil injector, v) Seed dressing Machine, vi) Granule applicator vii) Aerosol generator. **10 L**

Unit-3: Precaution of pesticide handling; during storage, during formulation and application in agricultural crop field. **10 L**

Suggested reading:

1. Matthews,G.A. 1979, Pesticide Application Method. Longman, London.
2. Bindra ,O.S and Singh,H. 1977.Pesticide Application Equipment Oxford and IBH Publishing Co.;;New Delhi
3. Chatterjee,P.B. 1997. Plant Protection Techniques. Bharati Bhawan(Publishers and Distrbutors), Patna.
4. Brent,K.J and Atkin,R.K.(Eds),1987. Rational Pesticide Use. Cambridge University Press, Cambridge.

**SEC (Skill Enhancement Course)
PLPT2051**

(3 Credits)

Pest Survey and Surveillance

Unit-1: Definition and Need.	02 L
Unit-2: Ecological characterization of an area.	02 L
Unit-3: Importance of surveillance.	02 L
Unit-4: Kind of survey: i) Qualitative survey ii) Quantitative survey	07 L
Unit-5: Method of survey: I. Selection of field II. Recording data on survey form III. Analysis of data IV. Preparation of survey reports	07 L
Unit-6: Sampling: Sampling procedure: i) Random Sampling ii) Multistage Random Sampling	08 L
Unit-7: Assessments of pest populations and injury.	02 L

Suggested Reading:

- 1.Chatterjee,P.B. (1997). Plant Protection Techniques. Bharati Bhawan(Publishers and Distributors), Patna.
- 2.Atwal, AS.1986: Agricultural Pests of India and South-East Asia. Kalyani Publishers, Ludhiana.
3. Metcalf, R.L and Luckman, W.H (1975) . Introduction to Insect Pest Management .John Wiley and sons, Toronto.
- 4.Sill, W.H(Jr.), (1985). Plant Protection: An Integrated interdisciplinary Approach (India ed.) Kalyani Publishers, Ludhiana.
5. Pedigo,L.P(1991). Entomology and Pest Management. Macmillan Publishing Company, New York.