

Punyashlok Ahilyadevi Holkar Solapur University, Solapur



NAAC Accredited-2015
'B' Grade (CGPA 2.62)

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Plant Protection

Name of the Course: B.Sc. II (Sem– III & IV)

(Syllabus to be implemented from w.e.f. June 2023)

Core Subject : Plant Protection
PUNYASHLOK AHILYADEVI HOLKAR
Solapur University, Solapur
Faculty of Science
Choice Based Credit System (CBCS) (w.e.f.2020-21)

Subject/ Core Course	Name and Type of the Paper		No. of papers/ Practical	Hrs/week			Total Marks Per Paper	UA	CA	Credits
	Type	Name		L	T	P				
Class :	B.Sc.- II Semester – III									
Core (*Students can opt any Three subjects among the Four Subjects offered at B.Sc.I. Out of Three Subjects offered One Subject will be the Core Subject OR	DSC 1C	Paper-V	3.0	--	--	50	40	10	4.0	
		Paper-VI	3.0	--	--	50	40	10		
	DSC 2C	Paper-V	3.0	--	--	50	40	10	4.0	
		Paper-VI	3.0	--	--	50	40	10		
	DSC 3C	Paper-V	3.0	--	--	50	40	10	4.0	
		Paper-VI	3.0	--	--	50	40	10		
AECC - Environmental Studies			3.0	--	--	-	-	-	NC	
SEC-1				2.5			50	40	10	2.0
Grand Total				23.5	--	--	350	280	70	14
Class :	B.Sc.- II Semester – IV									
Core (*Students can opt any Three subjects among the Four Subjects offered at B.Sc.I. Out of Three Subjects offered One Subject will be the Core Subject OR Students can opt any Two subjects among the Four Subjects offered at B.Sc.I. Out of Two Subjects One Subject will be the Core Subject and any One Subject among the other will be Elective Subject	DSC 1D	Paper-VII	3.0	--	--	50	40	10	4.0	
		Paper-VIII	3.0	--	--	50	40	10		
	DSC 2D	Paper-VII	3.0	--	--	50	40	10	4.0	
		Paper-VIII	3.0	--	--	50	40	10		
	DSC 3D	Paper-VII	3.0	--	--	50	40	10	4.0	
		Paper-VIII	3.0	--	--	50	40	10		

	SEC-2		2.5			50	40	10	2.0
Total (Theory)			20.5	--	--	350	280	70	14
DSE (Practical)	DSC 1C & 1D	Pr. III&IV	--	--	8	100	80	20	4.0
	DSC 2C & 2D	Pr. III&IV	--	--	8	100	80	20	4.0
	DSC 3C & 3D	Pr. III&IV	--	--	8	100	80	20	4.0
Total (Practical)					24	300	240	60	12
Grand Total			43.5		24	1000	800	200	40

Abbreviations:

L: Lectures

T: Tutorials

P: Practicals

UA: University Assessment

CA: College Assessment

DSC / CC: Core Course

AEC: Ability Enhancement Course

DSE: Discipline Specific Elective Paper

SEC: Skill Enhancement Course

GE: Generic Elective

CA: Continuous Assessment

ESE: End Semester Examination

Proposed Syllabus for B.Sc.Part-II (CBCS Semester Pattern)

PLANT PROTECTION

(Introduced from June 2023)

Introduction:

With the view to ensure worldwide recognition, acceptability, horizontal as well as vertical mobility for students completing under graduate degree, Solapur University has implemented Choice Based Credit System of Evaluation at Undergraduate level.

The main objective of this course is to introduce CBCS semester system to the B.Sc-II (Plant Protection) students which covers the basic concepts of **Major crops and methods of integrated plant protection, Crop Diseases and their Management, Introduction to weeds & non insect pests and Insect pests and their Management.**

B.Sc-II (Plant Protection) CBCS Semester wise pattern to be introduced from June 2020. This syllabus of Plant Protection carries 600 marks. In semester-III, University examination will be of theory papers V and VI and in semester-IV, the University examination will be of theory papers VII and VIII. The university examination of practical-I will be based on paper-V, VI and practical-II will be based on paper-VII & VIII. The practical examination will be held annually. The distributions of marks are as below.

Moreover, the grading system of evaluation is introduced for B. Sc. course, wherein process of Continuous Internal Evaluation is ensured. The candidate has to appear for Internal Evaluation of 20 marks and University Evaluation for 8marks. It is 80 + 20 pattern of evaluation. It is applicable for theory and practical as well. The details regarding this evaluation system are as under.

Semester No.	Paper No.	Title of the Paper	University Exam.	Internal Exam.	Total
III	Plant Protection PAPER-V	Major crops and methods of integrated plant protection.	80	20	100
	Plant Protection PAPER-VI	Crop Diseases and their Management.	80	20	100
IV	Plant Protection PAPER-VII	Introduction to weeds & non insect pests.	80	20	100
	Plant Protection PAPER-VIII	Insect pests and their Management.	80	20	100
Annual Examination	Plant Protection PRACTICAL	Plant Protection Practical-I- Based on Paper-V and VI	80	20	100
		Plant Protection Practical-II- Based on Paper-VII and VIII	80	20	100

Note: Nature of Internal examination, Passing standard, ATKT and the conversion of marks into grades and credits are as per guidelines of Science Faculty Credit and Grading System.

Teaching Periods:

- (1) Total teaching periods for each theory paper are six periods per week.
- (2) Total teaching periods for each practical-I and practical-II are eight periods per week per batch of 20 students.

Durartion of University Examinations:

1. For theory paper-V and VI: Two and half hours.
2. For theory paper-VII and VIII: Two and half hours.
3. For practical-I: Four hours for a batch of 20 students.
4. For practical-II: Four hours for a batch of 20 students.

Equivalent Subject for Old Syllabus

Sr. No.	Name of the Old Paper	Name of the New Paper
1)	Paper – I: Major crops and methods of integrated plant protection.	Paper – V: Major crops and methods of integrated plant protection.
2)	Paper-II: Crop Diseases and their Management.	Paper-VI: Crop Diseases and their Management.
3)	Paper –III: Introduction to weeds & non insect pests.	Paper –VII: Introduction to weeds & non insect pests.
4)	Paper-IV: Insect pests and their Management.	Paper-VIII: Insect pests and their Management.

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B.Sc.II (PLANT PROTECTION)

w.e.f. June –2023

SEMESTER-III

Objective and Outcome of Course

PAPER – V: Major Crops and Methods of integrated plant protection.

Unit-1) Objectives – To get the knowledge of significance of plant protection, gross morphology, advanced methods of agricultural practices.

Outcomes – Students can understand the significance of plant protection, gross morphology, advanced methods of agricultural practices.

Unit-2) Objectives – To get the knowledge of general methods of plant protection, methods of management insect pests.

Outcomes – Students can understand the general methods of plant protection, methods of management insect pests.

Paper-VI: Crop Diseases and their Management.

Unit-1) Objectives – To get the knowledge of concept and classification of plant diseases .

Outcomes – Students can understand concept and classification of plant diseases.

Unit-2) Objectives – To get the knowledge of mechanism of plant infection, crop diseases and there management, assessment of diseases and principals of plant diseases management.

Outcomes – Students can understand the of plant infection, crop diseases and there management, assessment of diseases and principals of plant diseases management.

SEMESTER-IV

PAPER -VII: Introduction to Weeds and Non Insect Pests.

Unit-1) Objectives – To get the knowledge of weeds and their classification of weeds and special weeds and weed management.

Outcomes – Students can understand weeds and their classification of weeds, special weeds and weed management.

Unit-2): Objectives – To get the knowledge of non insect pests.

Outcomes – Students can understand the of non insect pests.

PAPER - VIII: Insect Pests and their Management.

Unit-1): Objectives – To get the Knowledge of insect pests introduction, detail study and stored grain pests and their management.

Outcomes – Students can understand insect pests introduction, detail study and stored grain pests and their management.

Unit-2): Objectives – To get the Knowledge of management of insect pests and recent trends in pests management.

Outcomes – Students can understand management of insect pests and recent trends in pests management.

Practical Papers Objective and Outcomes

Objectives–To get the practical knowledge in subject of plant protection.

Outcomes – Students can understand the diseases of crops, preparation of media, micro metry, identification of crops & pesticides, weeds, chromatography, calibration, mode of preproduction and dispersal of weeds insect preservation techniques and preparation of pesticides etc.

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B.Sc.II (PLANT PROTECTION)
w.e.f. June –2023
SEMESTER-III

PAPER – V: Major Crops and Methods of integrated plant protection.

30 Periods

Unit-1) 1.1 Introduction and significance of Plant Protection.

(2)

1.2 Study of following major crops of Maharashtra with reference to gross morphology

(7)

Crop identification, soil types, tillage, seed rate and spacing, Intercultural operations, fertilizers, Irrigation, Intercropping, yield and economic importance: -

- | | | | |
|----|---|-----------------|-------------|
| A | - | Cereals | - Jowar |
| B) | - | Oil Seed Crops | - Soyabean |
| C) | - | Pulse crops | - Tur |
| D) | - | Cash crops | - Sugarcane |
| E) | - | Fruit crops | - Grapes |
| F) | - | Vegetable Crops | - Brinjal |
| G) | - | Floriculture | - Rose |

1.3 Advanced Methods of Agricultural Practices -

(6)

Role of organic farming in Agriculture.

1.4 Definition and types of Biofertilizers and their applications.

Unit-2) General Methods of Plant Protection -

(3)

2.1 Cultural Methods: Tillage, sowing and planting dates, crop hygiene, crop rotation, trap crops and fertilizers.

2.2 Mechanical Methods:

(4)

- i) Field sanitation: a) For diseases collection and destruction of diseased plant-debris;
b) for pests-hand picking and destruction of egg masses
- ii) shaking of plants iii) rope dragging, iv) netting, v) bagging,
- vi) physical barriers, use of sticky bands, tin-bands and light traps

2.3 Physical Methods: Heat and soil solarizations

(2)

2.4 Methods of Management of Insect pests and diseases.

Chemical Methods: Brief account and uses of bactericides, fungicides, insecticides and nematicides **(4)**

Biological Control: Introduction, biological control of Insect pests and diseases. **(2)**

Paper-VI: Crop Diseases and their Management.

30 Periods

Unit-1) Crop diseases

1.1 Definition and concept of Plant disease (2)

1.2 Terminologies in plant Pathology - Host, Pathogen, Pathogenicity, Pathogenesis, Symptoms

Infection, Inoculation, Isolation, Incubation period, Etiology, Susceptibility, Immunity, Hypersensitivity and Resistance. (3)

1.3 Classification of Plant Diseases– Based on a) Pathogens, b) Symptoms, c) Mode of transmission of pathogens through seed, soil, air and insects. (3)

1.4 Methods of studying Plant Pathogens (4)
Methods of Inoculation
Incubation
Isolation
Koch's postulates

1.5 Mechanism of Plant Infection (3)
Mode of infection- Infestation, Host-Pathogen of Interaction and disease development.
Factors affecting the infection.

Unit-2) Study of the following crop diseases and their management.

2.1 Diseases caused by Phytoplasma (1)

a) Little leaf of Brinjal

2.2 Diseases caused by Viruses (1)

a) Yellow vein mosaic of Okra (Bhendi)

2.3 Diseases caused by Bacteria (1)

a) Citrus canker

2.4 Diseases caused by Fungi (8)

a) Downy Mildew of Grapes

b) Rust of Soybean

c) Rust of Groundnut

d) Grain smut of Jawar

2.5 Assessment of diseases in Crop Plants

(4)

Qualitative Methods

Quantitative Methods

SEMESTER-IV

PAPER -VII: Introduction to Weeds and Non Insect Pests.

30-Periods

Unit-1) Weeds:

1.1 Weeds - Definition and losses caused by weeds (2)

1.2 Classification of weeds based on - (3)

a) Ontogeny b) Ecology c) Crop association

1.3 Study of special weeds (3)

1.4 a) Parasitic weeds b) Aquatic weeds c) Poisonous weeds

1.5 Study of following weeds with reference to - (7)

a) Gross morphology b) Reproduction c) Ecology

d) Dispersal e) Management of

1. Parthenium hysterophorus 2. Amaranthus spinosus

3. Argemone mexicana 4. Cyperus rotundus

5. Euphorbia hirta 6. Cynodon dactylon

Unit-2): Non Insect Pests

2.1 Methods of weed management

Cultural methods: Ploughing, Hoeing, Hand Weeding, Field Sanitation, Crop rotation, Mulching and cover crops. (3)

Biological methods: Weed management by bacteria, fungi and Insects. (3)

Chemical methods: Study of weedicides with reference to properties, mode of action, formulation and use of i) 2, 4 - D, ii) Mira -71. (4)

2.2 Study of Non-insect pests

Nematodes: Phytopathogenic nematodes, mode of infestation, Meloidogyne symptoms and management. (1)

Snails and slugs: Nature of damage & their management. (1)

Mites: Morphology, damages in storage and field and their management (1)

Birds: Nature of damage / losses and management (1)

Rat: Damage / losses caused by rats in Storage and field and their management (1)

PAPER - VIII: Insect Pests and their Management.

30 Periods

Unit-1): Introduction to Insect pests

1.1 Definition and loss (qualitative and quantitative) caused by Insect pests. (2)

1.2 General characters of typical Insect with respect to- a) Mouth parts

b) Wings (Venation, coupling apparatus)

c) Types of legs

d) abdomen (structure, Segment, appendages) (2)

1.3 Classification of Insect pests based on - (3)

a) Nature of damage

b) Mouth parts

c) Metamorphosis

1.4 Study of following insect -pests of different crops with reference to: (8)

a) Scientific name b) Marks of identification c) Host range d) Life cycle e) Carryover

f) Nature of damage and management.

Crop Pests:	a) Jawar	-	Stem borer
	b) Sugarcane	-	Wooly aphids
	c) Groundnut	-	White grubs
	d) Gram	-	Pod borer
	e) Mango	-	Jassids
	f) Brinjal	-	Fruit borer
	g) Tomato	-	Red Spider
	h) Rose	-	Trips

Unit-2), 2.1 Stored grain pests and their management. (2)

i) Rice Weevil

ii) Pulse beetle

2.2 Management of insect Pests

2.1.1 Principles of Insect pest control (1)

2.2.2 Causes of insect assuming pest status (2)

2.2.3 Classification of Insecticides based on: (8)

a) Mode of entry - Stomach Contact

b) Mode of Action - Respiratory and Nervous system

c) Chemical Nature:

i) Inorganic

ii) Organic: Chlorinated Hydrocarbons

iii) Plant origin insecticides

d) Nature of Formulation - Emulsifiable, concentrates, Dusts and Granules Wait able power.

2.3 Recent trends in pest management (4)

a) Attractants b) Repellents c) Antifeedents, d) Pheromones, e) Chemosterilants

f) Microbial insecticides.

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Practical's in Plant Protection at B.Sc. Part-II (Semester Course)

(To be implemented from June-2023)

A) Practical Examination-Instructions:

Each candidate must produce a certificate from the Head of the Department stating that he/she has completed practical course in satisfactory manner as recommended by Board of Studies and Laboratory Journal has been properly maintained. Every candidate must have recorded his/her observations in the laboratory journal and written report on each exercise performed. Every journal is to be checked and signed periodically by a teacher in-charge and certified by the Head of the Department at the end of academic year. Candidates have to produce their journals at the time practical examination without which he/she will not be allowed to appear for practical examination.

B) Excursions:

There should be frequent visits to local areas for the study of crop plants, weeds, insect pests, crop diseases; non insect pests etc and report should be submitted. One of the excursions shall be to a research institute or Agricultural centers actively engaged in plant protection studies for not more than five days. There shall be one teacher in-charge for not more than 16 students and one additional lady teacher, one field collector and one peon are to be allowed for study Tour. T. A. and D. A. be paid to the concerning staff as per University rules.

C) Submission:

Each candidate must maintain a submission as per the format provided and it should be certified from the in charge teacher and Head of the department.

D) Submission:

Candidate should submit the following record at the time of practical examination.

- a) Certified Laboratory Journal
- b) Certified Tour report
- c) Certified field diary / field note book
- d) Submission of preserved or dry specimens of diseased plants (at least ten), preserved insect pest (at least three), herbaria of weeds (at least ten), (Candidates will be orally examined for their submission work.)

Distribution of Marks**Practical–I: (Based on Paper-V and VI) Marks-80**

1)	Study of diseases of crops	24
2)	Preparation of Culture/medium/inoculation/isolation	14
3)	Micrometry	10
4)	Identification of Crops (Agronomy) and pesticides (each for six Marks)	12
5)	Field diary/field note book	10
6)	Journal	10

Total 80

Practical – II (Based on Paper-VII and VIII) Marks -80

1)	Study of weeds	16
2)	Study of insect pest	10
3)	Chromatography	10
4)	Soil pH/Sucrose percentage	06
5)	Calibration	08
6)	Mode of reproduction and dispersal of weeds	02
7)	Insect preservation Techniques	02
8)	Herbicidal action on weed seed germination	02
9)	Use of sprayer/duster	02
10)	Preparation of pesticides / calibration of sprayer	02
11)	Submission	10
12)	Tour Report	10

Total 80

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B.Sc. Part – II Practical Examination

MARCH / APRIL –2023

PLANT PROTECTION

PRACTICAL – II

Date-

Centre-

Time: 11.00 am onwards

Marks 80

N. B.: Draw neat labeled sketches wherever necessary.

- Q. 1 : Identify and describe the taxonomy, gross morphology, reproduction, dispersal and management of specimen 'A' and 'B'. (10)
- Q. 2 : Sketch and label the damaging stage in life cycle of specimen 'C' and 'D' Comment upon the nature of damage, marks of identification and the management. (10)
- Q. 3 : Find out the amino acid composition in the sample E₁ and E₂ with the help of Circular paper chromatography. (Show your results to the examiner.) (10)
- Q. 4 : Find out the Sucrose percentage in the sample F1 and F2 by hand refractometer (06)
- or
- Q. 4 : Find out the pH of given soil samples, F1 and F2. (06)
- Q. 5 : Solve the given problem on calibration of sprayer/preparation of pesticide solution. (08)
- Q. 6 : Identifications.
- a) Give marks of identification of specimen G. (02)
- b) Identify and comment upon the specimen-H. (02)
- c) Write the mode of reproduction and dispersal of specimen – I (02)
- d) Comment upon the herbicidal action in experiment – J (02)
- e) Identify and Comment upon the working of instrument – K (02)
- Q. 7 : Tour report (10)
- Q. 8 : Submission (10)

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B.Sc. Part-II (Plant Protection) Semester Course

Practical-I

1-3) Agronomic studies of following crops with reference to gross morphology, crop identification, agronomic conditions -

Jowar, Wheat, Gram, Groundnut, Sunflower,

Tur, Sugarcane, Mango, Brinjal, Tomato.

4-12) Study of following diseases in crop plants with reference to host, causal organism, symptoms and management.

A. Phytoplasmal diseases

a) Little leaf of Brinjal

B Viral diseases

a) Yellow vein mosaic of Okra (Bhendi)

C Bacterial diseases.

a) Citrus canker

D Fungal Diseases

a) Downy Mildew of Grapes

b) Rust of soybean

c) Rust of Groundnut

d) Grain smut of Jowar

13) Preparation the culture media

Nutrient Agar (N.A.)

Potato Dextrose Agar. (P.D.A.)

14-15) Isolation of pathogen from diseased plant (Koch's postulates)

a) Inoculation b) Incubation c) Reproduction and Symptoms (Select any one suitable disease Ex. Downy Mildew of Grapes, Rust of Soyabean, Rust of Groundnut and Grain Smut of Jowar.

16-17) Study of Pesticides with reference to chemical nature, characters, properties, mode of action and uses. (At least two from each group.) Groups- Bactericides, Fungicides, Nematicides, Insecticides, Rhodenticides and Herbicides.

18) Micrometry of fungal spores (Any suitable material)

19-20) Submission

(20 Practicals)

Practical – II

1-2) Study of following weeds with reference to gross morphology, identification, reproduction, dispersal and management.

- A. Dicot weeds -
- a) *Argemone mexicana*
 - c) *Parthenium hysterophours*
 - d) *Euphorbia hirta*

- B. Monocot Weeds
- a) *Cyperus rotundus*
 - b) *Amaranthus spinosus*
 - c) *Cynodon dactylon*

3-4) Study of weeds reference to reproduction and ecology.

- A. Estimation of seeds by seed count method.
- a) *Argemone mexicana* b) *Celosia argentia*
 - c) *Portulaca oleracea* or any locally available weed
- B. Study of mode of dispersal in following weeds:
- a) *Parthenium hysterophorus*
 - b) *Tridax procumbens*
 - c) *Xanthium strumarium*
 - d) *Alternanathera tenatea*
 - e) *Cynodon dactylon*

5) Action of Herbicides (2,4 ,D./Glyphosate) on germination of seeds of *Amaranthus viridis*, or *Protulaca oleracea* or *Argemone mexicana*

6) Techniques of collection and preservation of insect pests –

a) Wet preservation

b) Dry preservation

c) Technique of collection and disposition of weeds

7-13) A) Study of following Insect pests with reference to scientific name, host range; lifecycle, marks of Identification, nature of damage and management.

	Crops infested		Name of the pest
a.	- Jawar	-	Stem borer
b.	- Sugarcane	-	Wooly aphids
c.	- Gram	-	Pod borer
d.	- Mango	-	Jassids
e.	- Brinjal	-	Fruit borer
f.	- Tomato	-	Leaf miner
g.	- Rose	-	Trips

B. Study of stored grain pests with reference to above points as in -

Rice weevil, Pulse beetle

C. Study of root knot nematode of vegetable with reference to above points as in - A

14) Separation of amino acids from healthy and diseased plant using Circular paper chromatography technique.

- 15) Determination of Sucrose percentage in healthy and infected fruits by hand refractometer.
- 16) i) Determination of pH of two soil samples.
ii) Preparation of pesticides for applications.
- 17) Calibration of the sprayer.
- 18) Study of pesticide application equipments- Duster -Hand rotary duster, Sprayer-Knap-sac Sprayer
- 19-20) Submission

(20 Practical's)

References

Paper – V- Major Crops and Methods of Integrated Plant Protection

Paper- VI – Crop Diseases and their management

Sr. No.	Name of the Book	Author (s)
1	Agronomy	V. J. Vaidya et. al.
2	Biofertilizers in Agriculture	Subba Rao
3	Commercial Vegetable Growing	Tindall
4	Crop Production and Field Experimentation	Vaidya, Shahastrabuddhe and Khupse
5	Cropping System and Theory	Chattarjee
6	Floriculture	Waurie and Ries
7	Handbook of Agriculture	IARI, New Delhi
8	High Yielding Varieties of Crops	Mahabal Rani
9	Identification of Crop Varieties	Agarwal
10	Irrigation	Michael
11	Plant Pathology	R. S. Malhaotra
12	Plant Protection	Mukundan
13	Principles and Procedures of Plant Protection	Chattopadhyay
14	Roses	Tony Gregory
15	Scientific Crop Production	Mathur
16	Sugarcane	C. N. Babu
17	Sugarcane Cultivation	M. G. Jadhav
18	The Culture of Vegetables and Flowers from Seeds and Roots	Martin Sutton
19	Vegetable growing in India	P. S. Arya Prakash
20	Chemistry of insecticides and Fungicide	D. S. Sreeramalu
21	Disease of Crops Plants in India	Rangaswami
22	Fungi and Diseases in Plants	Butler
23	Fungicides in Disease Control	Y. L. Nene
24	Introduction to Plant Viruses	C. L. Mandahar
25	Plant Diseases and Epidemiology	Narayanan
26	Plant Diseases	Singh
27	Plant Diseases	Mathur
28	Plant Diseases	Gopa S. Dasgupta
29	Plant Pathogens	Singh R. S.
30	Plant Pathologist Pocket Book	EMI
31	Plant Pathology	P. D. Sharma
32	Plant Pathology	Walker
33	Post Harvest Technology of Cereals, Pulses and Oilseeds	Chakravarty
34	Viruses and Mycoplasma Diseases of Plants	Ray Chaudhari

References-

Paper VII : Introduction to Weeds and Non-insect Pests

Pests Paper-VIII: Insect Pests and their Management

Sr.No.	Name of the Book	Author (s)
1	Agriculture Pests of India and Southeast Asia	Atwal
2	An Introduction to Entomology	P. D. Srivastava
3	Entomology	Pramod Kumar
4	General Entomology	M. S. Mari
5	Insect Pests of Crops	Pradhan and Jotwam
6	Introduction of Pest Management	Dhaliwal and Arora
7	Introduction of Insect Pest Management	Metculf
8	Modern Entomology	Tembhare
9	Nematode Diseases of Agricultural Crops	Abstract of 8 th All Union Conference
10	Pest Control	Van Emden
11	Plant Protection (Principles and Practice)	Mukundan J. R.
12	Principles of Weed Science	Rao V. S.
13	Scientific Weed Management	Gupta O. P.
14	Weed Control and as Science	Klingmom
15	Weed Science	Thakur
16	Weeds of the World	King
17	World Guide to Insects Vol. I & II	Packard A. S.

Other Reference Books: -

Sr.No.	Name of Book	Author
1	Plant Disease Epidemiology	Nagrajan
2	Experimental and Conceptual Plant Pathology	Singh et.al.
3	Weed Weedicides and Weed control Principle and Practice	R. C. Mandal
4	Soils and Soil Management	Gustafson
5	Concepts in Integrated Pest Management	Nori is et. al.
6	Seed Science and Technology Lab manual	Mc Donald & Copeland
7	Seed Technology	Agrawal
8	Vegetable Crops Vol. I & II ed	Bose et. al.
9	Hand Book of Horticulture	ICAR, K. L. Chadha
10	Commercial Flowers – Vol. I, II	Bose et. al.
11	Fruits – Tropical & Subtropical – Vol. I	Bose et. al.
12	Irrigation	Micheal
13	Plant Protection and Pest Management	Dr. Shubhrata R. Mishra
14	Application of Pesticides to crops	Graham A. Mathews
15	Stored Grain pests & Pest Management	B. P. Khare
16	Weed Science – Principles	R – Jaya Kumar
17	Plant – diseases	Rajni Sharma
18	A Text Book of Entomology	B. D. Patnaik
19	Principles of Insect Pest Management	G. S. Dhaliwal & Ramesh Arora
20	Plant Pathology	B. P. Pandey

P.A.H. SOLAPUR UNIVERSITY, SOLAPUR
B.Sc.II (PLANT PROTECTION)
w.e.f. June –2023
SEMESTER-III
Objective and Outcome of Course

PAPER – V: Major Crops and Methods of integrated plant protection.

Unit-1) Objectives – To get the knowledge of significance of plant protection, gross morphology, advanced methods of agricultural practices.

Outcomes – Students can understand the significance of plant protection, gross morphology, advanced methods of agricultural practices.

Unit-2) Objectives – To get the knowledge of general methods of plant protection, methods of management insect pests.

Outcomes – Students can understand the general methods of plant protection, methods of management insect pests.

Paper-VI: Crop Diseases and their Management.

Unit-1) Objectives – To get the knowledge of concept and classification of plant diseases .

Outcomes – Students can understand concept and classification of plant diseases.

Unit-2) Objectives – To get the knowledge of mechanism of plant infection, crop diseases and there management, assessment of diseases and principals of plant diseases management.

Outcomes – Students can understand the of plant infection, crop diseases and there management, assessment of diseases and principals of plant diseases management.

SEMESTER-IV

PAPER -VII: Introduction to Weeds and Non Insect Pests.

Unit-1) Objectives – To get the knowledge of weeds and their classification of weeds and special weeds and weed management.

Outcomes – Students can understand weeds and their classification of weeds, special weeds and weed management.

Unit-2): Objectives – To get the knowledge of non insect pests.

Outcomes – Students can understand the of non insect pests.

PAPER - VIII: Insect Pests and their Management.

Unit-1): Objectives – To get the Knowledge of insect pests introduction, detail study and stored grain pests and their management.

Outcomes – Students can understand insect pests introduction, detail study and stored grain pests and their management.

Unit-2): Objectives – To get the Knowledge of management of insect pests and recent trends in pests management.

Outcomes – Students can understand management of insect pests and recent trends in pests management.

Practical Papers Objective and Outcomes

Objectives–To get the practical knowledge in subject of plant protection.

Outcomes – Students can understand the diseases of crops, preparation of media, micro metry, identification of crops & pesticides, weeds, chromatography, calibration, mode of preproduction and dispersal of weeds insect preservation techniques and preparation of pesticides etc.