SOLAPUR UNIVERSITY SOLAPUR

B.Sc. Part-II (Plant Protection)

Syllabus of Semester Pattern

To be implemented from June, 2011

Solapur University, Solapur

B.Sc. Part – II (Plant Protection)-Semester Pattern

There shall be two papers of 50 marks each for each semester. Theory examination will be held at the end of each semester and practical exam will be held at the end of the academic year. The details of course are as follows.

Distribution of Marks

(To be implemented from June, 2011)

A) Semester -III Marks – 100

a) Theory Paper I: Major crops and methods of integrated plant protection -50Mars.
b) Theory Paper II: Crop Diseases - 50Marks.

B) Semester-IV Marks – 100

a) Theory Paper III: Introduction to weeds & non insect pests. -50Marks
b) Theory Paper IV: Insect pests . -50Marks

C) Practical Course: **100 Marks**

Practical - I Marks - 50
Practical – II Marks – 50

The practical course is to be covered in 50 practicals. The practicals should be divided into practical No.I which will comprise 25 practicals based on paper No.I & II and the practical No.II will comprise 25 practicals based on paper No. III & IV.The practical examination based on the above practical course shall be conducted at the end of semester II on two successive days.

Paper Titles

SEMESTER -III

Paper- I MAJOR CROPS, METHODS OF INTEGRATED PLANT PROTECTION

Paper – II CROP DISEASES

SEMESTER – IV

Paper – III INTRODUCTION TO WEEDS, NON INSECT PESTS

Paper – IV INSECT PESTS.

SOLAPUR UNIVERSITY, SOLAPUR

SYLLABUS OF B.Sc. II **(PLANT PROTECTION)**

To be implemented from June – 2011

SEMESTER -III

PAPER –I Major Crops, Methods of Integrated Plant Protection

1) Introduction and significance of Plant Protection. (02)

2) Study of following major crops of Maharashatra with reference to gross morphology for crop identification, soil types, preparatory tillage, seed rate and spacing, Intercultural operations, fertilizers, Irrigation Intercropping, yield and economic importance: - (20)

A	-	Cereals	- Jowar, Wheat, Rice
B)	-	Oil Seed Crops	- Ground nut, Sunflower
C)	-	Pulse crops	- Tur, Gram
D)	-	Cash crops	- Sugarcane, Cotton
E)	-	Fruit crops	- Pomegranate, Grapes
F)	-	Vegetable Crops	- Brinjal, Cabbage
G)	-	Floriculture	- Rose, Tuberose

3) General Methods of Plant Protection: -

a) *Cultural* - Tillage, sowing and planting dates, crop hygiene, crop rotation, trap crops, fertilizer (4)

b) *Mechanical* - Field sanitation: For diseases – collection and destruction of diseased plant-debris; for pests-hand picking and destruction of egg masses; shaking of plants, rope dragging, netting, bagging, physical barriers, use of sticky bands, tin-bands and light traps (4)

c) *Physical* - Heat and soil solarizations (1)

d) *Chemical* - Brief account and uses of Bactericides, Fungicides,

			Insecticides, Nematicides, Acaricides, Molluscicides, Rhodenticides and Herbicides. (4)
e)	*Biological*	-	Introduction, biological control of Insect pests and diseases (2)
f)	*Legal (Plant quarantine)*	-	Introduction, domestic quarantine, need of plant quarantine in India (2)
g)	*Crop Resistance*	-	General account (1)

(Total 40Lecture periods)

Paper -II

Crop Diseases

1)	Crop diseases	-	Definition, disease concept and terminologies in plant pathology – Host, Pathogen, Pathogenicity, Pathogenesis, Symptoms, Infection, Incubation period Susceptibility, Immunity, Hypersensitivity, Resistance (2)

2) Classification of Plant Diseases – Based on Pathogens, Symptoms, Severity of Disease-sporadic, epidemic and epiphytotic; transmission of pathogens through seed, soil, air and insects (4)

3) Methods of studying Plant Pathogens (4)

a) Isolation

b) Methods of Inoculation

c) Incubation

d) Reproduction of disease

e) Koch’s postulates

4) Mechanism of Plant Infection (5)

a) Mode of infection

b) Factors affecting the infection

c) Etiology

5) Study of following crop diseases and their management

A) Diseases caused by Phytoplasma (2)

a) Little leaf of Brinjal

b) Grassy shoot disease of Sugarcane(GSD)

B) Diseases caused by Viruses (2)

a) Yellow vein mosaic of Okra (Bhendi)

b) Leaf curl of Chilli

C) Diseases caused by Bacteria (2)

a) Citrus canker

b) Bacterial wilt of tomato/chilli

D) Diseases caused by Fungi (12)

a) Powdery Mildew of Cucurbits

b) Downy Mildew of Grapes

c) Rust of Soybean

d) Rust of Groundnut

e) Grain smut of Jowar

f) Whip smut of Sugarcane

g) Brown leaf spot of Rice

h) Early blight of Tomato

6) Assessment of diseases in Crop Plants (3)

a) Qualitative

b) Quantitative

7) Principles of Plant disease management (4)

a) Exclusion

b) Eradication

c) Protection (Physical, Chemical)

d) Resistance

(Total 40 Lecture period)

SEMESTER-IV

PAPER – III INTRODUCTION TO WEEDS AND NON INSECT PESTS

1) Weeds – Definition and losses caused by weeds (2)

2) Classification of weeds based on – (3)

a) Ontogeny b) Ecology c) Crop association

3) Reproduction and mode of dispersal of weeds (2)

4) Study of special weeds: (2)

a) Parasitic weeds b) Aquatic weeds

c) Poisonous weeds

5) Study of following weeds with reference to: - (8)

a) Gross morphology b) Reproductive ability c) Ecology

d) Dispersal e) Management

1.	***Parthenium hysterophorus***	***5.***	***Amaranthus spinosus***
2.	***Argemone mexicana***	***6.***	***Alternanthera tenella***
3.	***Portulaca oleracea***	***7.***	***Cyperus rotundus***
4.	***Euphorbia hirta***	***8.***	***Cynodon dactylon***

6) Methods of weed management: -

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

b) Biological methods: - Weed management by bacteria, fungi and Insects. (2)

c) Chemical methods: - Classification of weedicides on the basis of chemical nature, mode of action on the basis of range of effectiveness (2)

d) Study of weedicides with reference to properties, mode of action, formulation and use of i) 2, 4 – D, ii) Glyphosate, Pendimethalin (Stomp 30 EC), Alachlor (Lasso 50 E.C.) (7)

7) Study of Non-insect pests:

a) Nematodes – Phytopathotgenic nematodes, mode of infestation, typical life cycle pattern, Meloidogyne symptoms and management. (2)

b) Snails and slugs – Nature of damage & management (1)

c) Mites – Morphology damages in storage and field and management (2)

d) Birds – Nature of damage / losses and management (2)

e) Rat – Damage / losses caused by different species of Rat in storage and field and management (2)

(Total 40lectures)

Paper-IV Insect Pests

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

2 Causes for Insect assuming pest status. (2)

3 General characters of typical Insect (2)

4 Classification of Inset pests based on. (3)

a) Nature of damage

b) Mouth parts

c) Metamorphosis

5. Study of following Insect pests of different crops with reference to

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

e) Carryover, f) Nature of damage and management. (10)

(I)Crop Pests:-	a) Paddy	-	Grass hopper
	b) Jowar	-	Stem borer
	c) Sugarcane	-	Leaf Hopper
	d) Groundnut	-	White grub
	e) Gram	-	Pod borer
	f) Mango	-	Mealy Bug
	g) Brinjal	-	Fruit borer
	h)Pomegranate	-	Anar Butterfly
	i) Rose	-	Aphid

(II) Stored grain pests and their management.

a) Rice Weevil and

b) Pulse beetle (3)

6. Principles of Insect pest control (2)

7. Classification of Insecticides based on: (10)

(a) Mode of entry – Stomach Contact

(b) Mode of Action – Respiratory and Nervous system

(c) Chemical Nature –

(i) Inorganic

(ii) Organic – Chlorinated

hydrocarbons, Organophosphates, Carbamets, Synthetic pyrethroids,

(iii) Plant origin insecticides

(d) Nature of Formulation – Emulsifiable, concentrates, Dusts.

8. Recent trends in pest management –

a) Attractants, b) Repellents, c) Antifeedents,

d) Pheromones, e) Chemosterilants (4)

9. Safety applications of pesticides. (2)

(40 lecture period)

Solapur University, Solapur

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

(To be implemented from June-2011)

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) Field Diary/Field Note Book:

Each candidate must maintain a field diary/field note book 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.

1. Certified Laboratory Journal
2. Tour report
3. Certified field diary / field note book

4. 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			**Marks**
1)	Study of diseases of crops		16
2)	Preparation of Culture/medium/inoculation/isolation		06
3)	Micrometry		05
4)	Identification of Crops (Agronomy) and pesticides (each with four Marks)		08
5)	Field diary/field note book		10
6)	Journal		05
		Total	**50**

Practical – II			**Marks**
1)	Study of weeds		06
2)	Study of insect pest		08
3)	Chromatography		05
4)	Soil pH/Sucrose percentage		04
5)	Mode of reproduction and dispersal of weeds		02
6)	Insect preservation Techniques		02
7)	Herbicidal action on weed seed germination		02
8)	Use of sprayer/duster		02
9)	Preparation of pesticides / calibration of sprayer		04
10)	Submission		10
11)	Tour Report		05
		Total	**50**

Field diary / Field note book

For preparing field diary / Field note book at least two field visits each in Kharif and Rabi seasons shall be arranged. During the visit candidates have to collect the data as per format.

Format for field note book –

1. Name of the locality / farm visited and date
2. Name of the crops observed or varieties.
3. Season
4. Soil type
5. Cultivation methods
6. Manures/fertilizers dose used
7. Irrigation practices
8. Intercropping / mixed cropping (if any)
9. Weeds associated with crop/s
10. Diseases observed
11. Insect pests observed
12. Control measures/Management practices
13. Performance of Crop
14. Remarks
15. Name of the Candidate
16. Signature of the In-charge teacher
17. Signature of the head of the department.

SOLAPUR UNIVESITY, SOLAPUR

B.Sc. Part – II (Semester Course) EXAMINATION

MARCH / APRIL – 20

PLANT PROTECTION

PRACTICAL – I

Time: 11.00 am onwards **Marks: 50**

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

Q. 1	:	Identify and describe symptoms of the specimen ‘A’ and ‘B’ (Leave your preparation for inspection)	(12)
Q. 2	:	a) Prepare and sterilize culture medium PDA/NA	(03)
		b) Isolation and inoculation of pathogen from specimen ‘C’	(03)
Q. 3	:	Measure the given fungal spore from specimen ‘D’ with the help of micrometry technique.	(05)
Q. 4	:	Identification	
		i) Identify the crop and describe the agronomical conditions of specimen ‘E’ and ‘F’	(04)
		ii) Identify and describe the symptoms of specimen ‘G’ and ‘H’	(04)
		iii) Comment on the properties and uses of ‘I’ and ‘J’	(04)
Q. 5	:	Field Note Book (Submission)	(10)
Q. 6	:	Journal	(05)

SOLAPUR UNIVESITY, SOLAPUR

B.Sc. Part – II (Semester course) EXAMINATION

MARCH / APRIL – 20

PLANT PROTECTION

PRACTICAL – II

Time: 11.00 am onwards **Marks 50**

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

Q. 1 : Identify and describe taxonomy, gross morphology, reproduction, dispersal and management of specimen 'A' and 'B' (06)

Q. 2 : Sketch and label the damaging stage in life cycle of specimen 'C' and 'D' Comment on nature of damage, marks of identification and its management. (06)

Q. 3 : Find out the amino acid composition in E_1 and E_2 with the help of Circular paper chromatography. (Show your results to the examiner.) (05)

Q. 4 : Find out Sucrose percentage in F1 and F2 by hand refractometer (04)

or

Q. 4 : Find out pH of given soil samples, F1 and F2. (04)

Q. 5 : Solve the given problem on calibration of sprayer/preparation of Pesticide solution. (04)

Q. 6 : Identification.

1. Give marks of identification of specimen G. (02)
2. Give scientific name, host range and management of specimen H. (02)
3. Mode of reproduction and dispersal of specimen – I (02)
4. Comment on herbicidal action in experiment – J (02)
5. Comment on use and working of – K (02)

Q. 7 : Submission (10)

Q. 8 : Tour Report (05)

Solapur University, Solapur

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

Practical-I

1 -4) Agronomic studies of following crops with reference to gross morphology for crop identification, agronomic conditions: Jowar, Wheat, Gram, Groundnut, Sunflower, Tur, Sugarcane, Mango, Brinjal, Tomato.

5-16) 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) Grassy shoot disease of Sugarcane (GSD)
   (Percentage leaf area reduction by graph paper method or by using leaf factor)

B. Viral diseases
   a) Yellow vein mosaic of Okra (Bhendi)
   b) Leaf Curl of Chilli

C. Bacterial diseases.
   a) Citrus canker (gram staining)
   b) Bacterial wilt of Tomato / Brinjal / Chilli
   (gram staining & Oozing)

D. Fungal Diseases
   a) Powdery mildew of cucurbits
   b) White rust of ***Amaranthus*** / Crucifers
   c) Rust of soybean
   d) Brown rust – (***Puccinia graminis – tritici.***) on Wheat
   e) Grain smut of Jowar
   f) Whip Smut of Sugarcane
   g) Early blight of tomato

17-18) Preparation and Sterilization of

a) Nutrient Agar (N.A.)

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

19-20) Isolation of pathogen from diseased plant (Koch's postulates)

a) Inoculation b) Incubation c) Reproduction of Symptoms (Select any one suitable disease – eg. Purple leaf blotch of Onion (***Alternaria porri***), Early blight of tomato ***(Alternaria solani)***, Brown leaf spot of rice ***(Drechslera oryxae)***, Leaf spot of Crucifers ***(Alternaria brassicola)*** Leaf spot of maize ***(Helminthosporium maydis)***.)

21-22) 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, Ascaricides, Insecticides, Rhodenticides, Herbicides.

23) Micrometry of fungal spores (Any suitable material)

24-25) Field visits

(25 Practicals)

Practical – II

1-3) Study of following weeds with reference to gross morphology for identification, reproduction, dispersal and management.

A. Dicot weeds -

a***) Argemone mexicana*** ***b) Protulaca oleracea***

c) Parthenium hysterophours ***d) Amaranthus spinosus***

e) Alternanthera tenella ***F) Euphorbia hirta***

g) Striga lutea

B. Monocot Weeds

a) Cyperus rotundus ***b) Cynotis cristata***

c) Commelina benghalensis ***d) Cynodon dactylon***

4-5) Study of weeds reference to reproduction and ecology.

A. Estimation of seeds by 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) Vernonia cinerifolia

d) Xanthium strumarium

e) Alternanathera tenatea

f) Achyranthus aspera

g) Cynodon dactylon

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

7-8) Techniques of collection and preservation of insect pests –

a) Wet preservation

b) Dry preservation

c) Technique of collection and disposition of weeds

9-16) Study of following Insect pests with reference to scientific name, host range;

A) life cycle, marks of Identification, nature of damage and management.

		Crops infested		Name of the pest
a.	-	Paddy	-	Grass hopper
b.	-	Jowar	-	Stem borer
c.	-	Sugarcane	-	Leaf Hopper
d.	-	Groundnut	-	White Grub
e.	-	Gram	-	Pod borer
f.	-	Mango	-	Mealy Bug
g.	-	Brinjal	-	Fruit borer
h.	-	Pomegranate	-	Anar Butterfly
i.	-	Rose	-	Aphid

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

Rice weevil, Pulse beetle

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

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

18) Determination of Sucrose percentage in healthy and infected fruits by hand refractometer.

19) Determination of pH of two soil samples.

20) Preparation of pesticides for application

21) Calibration of the sprayer.

22-23) Study of pesticide application equipments.

a. Duster - Hand rotary duster.

b. Sprayer - Knap-sac Sprayer

24-25) Field diary

(25 Practicals)

References

SEMESTER -III

Paper – I & II: "Major Crops, Methods of Integrated Plant Protection and Crop Diseases"

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

SEMESTER -IV

Paper III &IV : "Introduction to Weeds, Non-insect Pests and Insect Pests"

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 8th 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.
18	ELEMENTS OF ENTOMOLOGY	Dr.Rajendra Singh Rastogi publ.
19	Agricultural insect pest of crops and their control	V.P.S.Panwar Kalyani publ.
20	A Text book of applied entomology	K.P.Shriwastav Kalyani publ.

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
21	Production of Field crop (A textbook of Agronomy)	T. K. Wolee & M. S. Kipps

SOLAPUR UNIVERSITY ,SOLAPUR

Nature of Question Paper For Semester Pattern

(For Paper I,II,III &IV)

Faculty Of Science

(w .e .f. June 2011)

Time: 2 hrs. **Total Marks: 50**

Q.No. 1) Multiple Choice questions. **(10)**

1) ----------

a) b) c) d)

2)

3)

4)

5)

6)

7)

8)

9)

10)

Q.No. 2) Answer any five of the following. **(10)**

i)

ii)

iii)

iv)

v)

vi)

Q.No.3) A) Answer any two of the following. **(06)**

i)

ii)

iii)

B) Write the answer / Solve/problem/Note. **(04)**

Q.No.4) Answer any two of the following. **(10)**

i)

ii)

iii)

Q.No.5) Answer any two of the following. **(10)**

i)

ii)

iii)