SOLAPUR UNIVERSITY, SOLAPUR

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

CBCS

Pattern Syllabus

B.Sc.Part-II (Sem. III & IV)

PLANT PROTECTION

With effect from June-2017

SOLAPUR UNIVERSITY, SOLAPUR

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

PLANT PROTECTION

(Introduced from June 2017)

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 2017. This syllabus of Plant Protection carries 600 marks. In semester-III, University examination will be of theory papers I and II and in semester-IV, the University examination will be of theory papers III and IV. The university examination of practical-I will be based on paper-I, II and practical-II will be based on paper-III & IV. 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 30 marks and University Evaluation for 70 marks. It is 70 + 30 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-I	Major crops and methods of integrated plant protection.	70	30	100
	Plant Protection PAPER-II	Crop Diseases and their Management.	70	30	100
IV	Plant Protection PAPER-III	Introduction to weeds & non insect pests.	70	30	100
	Plant Protection PAPER-IV	Insect pests and their Management.	70	30	100
Annual Examination	Plant Protection PRACTICAL	Plant Protection Practical-I- Based on Paper-I and II	70	30	100
		Plant Protection Practical-II- Based on Paper-III and IV	70	30	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-I and II: Two and half hours.
2. For theory paper-III and IV: 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 – I: Major crops and methods of integrated plant protection.
2)	Paper-II: Crop Diseases and their Management.	Paper-II: Crop Diseases and their Management.
3)	Paper –III: Introduction to weeds & non insect pests.	Paper –III: Introduction to weeds & non insect pests.
4)	Paper-IV: Insect pests and their Management.	Paper-IV: Insect pests and their Management.

SOLAPUR UNIVERSITY, SOLAPUR

B.Sc.II (PLANT PROTECTION)

w.e.f. June – 2017

SEMESTER-III

PAPER – I: Major Crops and Methods of integrated plant protection. 45 Periods

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

Unit-2) Study of following major crops of Maharashatra with reference to gross morphology -

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

(15)

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

Unit-3-Advanced Methods of Agricultural Practices (6)

3.1) Role of organic farming in Agricultuire.

3.2) Definition and Types of Biofertilizers and their applications

Unit-4)-General Methods of Plant Protection: -

4.1 **Cultural** Methods - Tillage, sowing and planting dates, crop hygiene, crop rotation, trap crops and fertilizers. (3)

4.2 **Mechanical** Methods 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)

4.3 **Physical Methods** - Heat and soil solarizations (2)

Unit-5) Methods of Management of Insect pests and diseases.

5.1 **Chemical Methods** - Brief account and uses of Bactericides, Fungicides, Insecticides, Nematicides, Acaricides, Molluscicides, Rhodenticides and Herbicides. (5)

5.2 **Biological Control** - Introduction, biological control of Insect pests and diseases (3)

5.3 **Legal (Plant** - **quarantine)** Introduction, domestic quarantine, need of plant Quarantine in India (3)

5.4 **Crop Resistance** - General account of use of resistant varieties (2)

Paper-II: Crop Diseases and their Management. 45 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, Innoculation, Isolation, Incubation period, Susceptibility, Immunity, Hypersensitivity,Resistance. (3)

Unit-2) Classification of Plant Diseases – Based on a) Pathogens, b)Symptoms, c) Severity of disease(sporadic, epidemic and epiphytotic;) d)transmission of pathogens through seed, soil, air and insects. (4)

Unit-3) Methods of studying Plant Pathogens (6)

3.1 Isolation

3.2 Methods of Inoculation

3.3 Incubation

3.4 Reproduction of disease

3.5 Koch's postulates

Unit-4) Mechanism of Plant Infection (5)

4.1 Mode of infection

4.2 Factors affecting the infection

4.3 Etiology

Unit-5) Study of the following crop diseases and their management.

5.1) Diseases caused by Phytoplasma (2)

a) Little leaf of Brinjal

b) Grassy shoot of Sugarcane

5.2) Diseases caused by Viruses (2)

a) Yellow vein mosaic of Okra (Bhendi)

b) Leaf curl of Chilli

5.3) Diseases caused by Bacteria (2)

a) Citrus canker

b) Bacterial wilt of tomato

5.4 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) Early blight of Tomato

Unit-6) Assessment of diseases in Crop Plants (3)

6.1 Qualitative Methods

6.2 Quantitative Methods

Unit-7) Principles of Plant disease management (4)

a) Exclusion

b) Eradication

c) Protection (Physical, Chemical)

d) Resistance

SEMESTER-IV

PAPER – III: Introduction to Weeds and Non Insect Pests. 45-Periods

Unit-1) Weeds:

1.1)Weeds – Definition and losses caused by weeds (3)

Unit-2-Classification of weeds based on –

a) Ontogeny b) Ecology c) Crop association (3)

Unit-3- Reproduction and mode of dispersal of weeds (3)

Unit-4- Study of special weeds: (3)

4.1)-a) Parasitic weeds b) Aquatic weeds

c) Poisonous weeds

4.2). Study of following weeds with reference to: - (9)

a) Gross morphology b) Reproductive ability c) Ecology

d) Dispersal e) Management of weeds

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

Unit-5) Methods of weed management: -

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

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

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

5.4) 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.). (8)

Unit-6) Study of Non-insect pests:

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

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

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

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

6.6 Rat – Damage / losses caused by Rats in Storage and field and their management (2)

PAPER – IV: Insect Pests and their management. **45 Periods**

Unit-1) Introduction to Insect pests:

1..1.) Definition and loss (qualitative and quantitative) caused by Insect pests. (3)

1.2.) General characters of typical Insect with respect to -
a) Mouth parts. b) Wings (Venetion, coupling apparatus)

c) Types of legs d) abdomen (structure, Segment, appendages) (4)

1.3) Classification of Insect pests based on. (4)
a) Nature of damage
b) Mouth parts
c) Metamorphosis

Unit-2) Study of following Insect pests of different crops with reference to (13)
a) Scientific name, b) Marks of identification, c) Host range d) Life cycle,

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

2.1) Crop Pests:	a) Jowar	-	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	-	Thrips

Unit-3) Stored grain pests and their management. (4)

a) Rice Weevil and
b) Pulse beetle

Unit-4. Management of insect Pests-

4.1)Principles of Insect pest control (1)

4.2) Causes of insect assuming pest status (2)

4.3) 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, Organophosphates, Carbamets, Synthetic pyrethroids,

(iii) Plant origin insecticides

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

Wettable power.

Unit-5-.Recent trends in pest management – (4)

a) Attractants, b) Repellents, c) Antifeedents,
d) Pheromones, e) Chemosterilants f) Microbial insecticides.

Unit-6). Precautionary measures used during pesticide applications.. (2)

Solapur University, Solapur

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

(To be implemented from June-2017)

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. Certified 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	**(Based on Paper-I and II)**	**Marks-70**
1)	Study of diseases of crops	20
2)	Preparation of Culture/medium/inoculation/isolation	10
3)	Micrometry	8
4)	Identification of Crops (Agronomy) and pesticides (each for six Marks)	12
5)	Field diary/field note book	10
6)	Journal	10
	Total	**70**

Practical – II	**(Based on Paper-III and IV)**	**Marks -70**
1)	Study of weeds	10
2)	Study of insect pest	08
3)	Chromatography	10
4)	Soil pH/Sucrose percentage	05
5)	Mode of reproduction and dispersal of weeds	03
6)	Insect preservation Techniques	03
7)	Herbicidal action on weed seed germination	02
8)	Use of sprayer/duster	02
9)	Preparation of pesticides / calibration of sprayer	07
10)	Submission	10
11)	Tour Report	10
	Total	**70**

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/s 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 –Practical Examination

MARCH / APRIL – 201

PLANT PROTECTION

PRACTICAL – I

Date- **Centre-**

Time: 11.00 am onwards **Marks: 70**

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

Q. 1 : Identify and describe symptoms of the diseased specimen (20)

'A' and 'B' (Leave your preparation for inspection)

Q. 2 : a) Prepare the culture medium (PDA/NA) (05)

b) Isolate and inoculate the pathogen from specimen 'C' (05)

Q. 3 : Measure the dimension of given fungal spore from specimen 'D' using micrometry technique. (08)

Q. 4 : Identifications

a) Identify the crop and describe the agronomical conditions of specimen 'E' (04)

b) Identify and describe the symptoms of specimen 'F' (04)

c) Comment upon the properties and uses of 'G' (04)

Q. 5 : Journal- (10)

Q. 6 : Field Note Book (Submission) (10)

SOLAPUR UNIVESITY, SOLAPUR

B.Sc. Part – II Practical Examination

MARCH / APRIL – 201

PLANT PROTECTION

PRACTICAL – II

Date- **Centre-**

Time: 11.00 am onwards **Marks 70**

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. (08)

Q. 3 : Find out the amino acid composition in the sample E_1 and E_2 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 (05)

or

Q. 4 : Find out the pH of given soil samples, F1 and F2. (05)

Q. 5 : Solve the given problem on caliberation of sprayer/preparation of pesticide solution. (07)

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)

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, 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 of Sugarcane

B **Viral diseases**

a) Yellow vein mosaic of Okra (Bhendi)

b) Leaf Curl of Chilli

C Bacterial diseases.

a) Citrus canker

b) Bacterial wilt of Tomato

D **Fungal Diseases**

a) Powdery mildew of cucurbits

b) White rust of Crucifers

c) Rust of soybean

d) Brown rust – (***Puccinia graminis – tritici.***) on Wheat

e) Grain smut of Jowar

f) Early blight of tomato

17-18) Preparation the culture media

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 and Symptoms (Select any one suitable disease – eg. 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 and 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, 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 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) A) Study of following Insect pests with reference to scientific name, host range; life cycle, marks of Identification, nature of damage and management.

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

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 applications.

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

Paper – I "Major Crops and Methods of Integrated Plant Protection

Paper- II – 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 III : Introduction to Weeds and Non-insect Pests

Paper-IV: 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 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.

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

Solapur University, Solapur

Nature of Question Paper for Choice Based Credit System
Faculty of Science
B.Sc.II
(w.e.f. June 2017)
Time: - 2.1/2 hrs. Total Marks- 70

Q. No.1) Multiple choice questions (14)

1) ----------
a) b) c) d)
2)
3)
4)
5)
6)
7)
8)
9)
10)
11)
12)
13)
14)

Q.No.2) Answer any seven of the followings (14)

i)
ii)
iii)
iv)
v)
vi)
vii)
viii)
ix)

Q.No.3) A) Answer any two of the followings (10)

i)
ii)
iii)

B) Compulsory **(4)**

Q.No.4) Answer any two of the followings (14)

i)
ii)
iii)

Q.No.5) Answer any **two of the following** (14)

i)
ii)
iii)