

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Semester : III Plant Protection - Paper I

Plant Protection - DSC

"General Agriculture and Plant Pathology"

Theory: 60 Hours(75 Lectures)Credits : 4

Section –I

"General Agriculture "

Unit : I. Introduction of agriculture and study of major crops

06 hrs

1a: Introduction and importance of agriculture.

1b: Study of following crops of Maharashtra with reference to gross morphology, economic importance, soil, field preparation, cultivars, seed and sowing, inter culture operations, fertilizers, irrigation, intercropping, yield, major diseases and pests.

A. Cereal – Jowar

B. Oil seed crop – Groundnut

C. Pulse crop - Gram

D. Cash crop - Sugarcane

Unit . II. Study of crops with reference gross morphology, economic importance, soil, field preparation, cultivars, seed and sowing, inter culture operations, fertilizers, irrigation, intercropping, yield, major diseases and pests.

07 hrs

2a: E. Fruit crop – Mango

F: Vegetable crop – Brinjal

G: Spice –Turmeric

H: Floriculture – Rose

2 b: Advanced Agricultural practices with reference to concept and applications

A) Organic Farming

B) Transgenic methods (*Agrobacterium* mediated gene transfer) , Examples of Transgenic crops.

Unit. III. Methods of Plant Protection part -I .

06 hrs

3a: Cultural methods – Tillage, crop rotation, trap crops, fertilizer applications

3b: Mechanical methods – Field sanitation, Hand picking, Destruction of infected plants / plant parts, Destruction of egg masses, light traps, use of sticky bands, bagging for the pests.

3c: Physical methods – Heat and soil solarisation

Unit . IV. Methods of Plant Protection part – II.

10 hrs

4 a: Chemical methods –Definition, uses with two suitable examples of each

Bactericides, Fungicides, Insecticides, Nematicides, Acaricides,

Molluscicides and Rodenticides

4b: Biological methods – Definition, Important biocontrol agents.

a) Fungi : (*Trichoderma, Metarhizium, Verticillium*)

b) Bacteria : *Pseudomonas, Bacillus*

c) Insect : *Crysopyrilla*

4c: Legal methods – Plant quarantine in India.

4d: Crop resistance – Uses of resistant varieties and their examples

Total hours : 30

Section –II
“Plant Pathology”

Unit . I . Crop diseases

07 hrs

- 1a: Introduction and importance of Plant Pathology.
- 1b: Definition and concept of disease, Terminologies used in Plant Pathology: Host, Pathogen, Inoculum, Virulence, Pathogenicity, Pathogenesis, Predisposition, Symptoms, Infection, Incubation period, Etiology, Disease cycle, Resistance, Susceptibility, Immunity, Hypersensitivity, Cross protection, Phytoalexins, Siderophores.
- 1c: Classification of plant diseases – Based on a) Pathogens, b) Symptoms, c) Severity, spread and occurrence of disease d) transmission of pathogens through e) Host f) Cause (Biotic, Abiotic and Mesobiotic)
- 1d. Symptoms and signs of plant diseases (Chlorosis, Necrosis, Mildew, Rust and Smuts)
- 1e: Methods of studying plant pathogens and Kochs Postulates
 - a) Isolation of Fungi and Bacteria
 - b) Methods of purification of Fungi and Bacteria
 - c) Kochs Postulates

Unit .II. Mechanism of plant infection

05 hrs

- 2a: Mechanism of infection (Fungi, Bacteria and Virus)
- 2b: Factors affecting infection

Unit . III. Study of following crop diseases with reference to pathogen, symptoms, disease cycle and their management.

12 hrs

- 3a: Diseases caused by phytoplasma-Little leaf of Brinjal
- 3b: Diseases caused by Viruses - Yellow vein mosaic of Okra (Bhendi),
- 3c: Diseases caused by Bacteria - Citrus canker,
- 3d: Diseases caused by Fungi - Rust of soybean,
White Rust of Crucifers,
Grain smut of Jowar,
Tikka disease of Groundnut,

Powdery mildew of Rose

Downey mildew of Grapes

Unit. IV. Management of crop diseases and pathophysiological skills 06 hrs

4a: Principles of plant disease management

4b: Classification of fungicides based on chemical nature and Mode of action.

4c: Study of fungicides with reference to properties, formulation, mode of action and uses of Carbendazim and Copper Oxychloride (COC).

Total hours : 30

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Semester : IV Plant Protection - Paper II

Plant Protection - DSC

"Weed Science and Insect Pest"

Theory: 60 Hours (75 Lectures) Credits : 4

Section –I

"Weed Science "

Unit. I . Introduction of weeds 06 hrs

1a: Weeds – Definition and losses caused by weeds

1b: Characteristic of Beneficial Weed

1c: Classification of weeds based on : a) Ontogeny, b) Ecology, c) Crop association

1d: Weed Biology and Ecology

1e: Study of parasitic , aquatic, poisonous and noxious weeds.

Unit. II. Study of following weeds with reference to 10hrs

a) Gross morphology b) Reproduction c) Ecology d) Dispersal e) Management

1. *Argemone mexicana*

2. *Portulaca oleracea*

3. *Parthenium hysterophorus*

4. *Eupatorium species*

5. *Alternanthera sessilis*

6. *Amaranthus spinosus*

7. *Euphorbia hirta*

8. *Cyperus rotundus*

9. *Cynodon dactylon*

Unit. III. Methods of weed management 08 hrs

3a: Mechanical methods - Ploughing, Hoeing, Hand weeding, Mowing, Burning, flooding,

Mulching.

3b: Biological methods - Weed management by bacteria, fungi and insects

3c: Chemical methods - Classification of weedicides on the basis of chemical nature, mode of action and its applications.

3d: Study of weedicides with reference to properties, mode of action, formulations and uses of i) Glyphosat ii) Gramoxone (Paraquat) iii) Atrazin.

Unit . IV. Non Insect Pest and House Hold Pest.

06 hrs

4a: Nematodes

4b: Birds

4c: Rats

4d: Household Pests - *Drosophila* , House fly, Mosquito

Total hours : 30

Section –II

“ Insect Pest ”

Unit. I. Introduction to insect pests

04hrs

1a: Definition and losses caused by insect pests

1b: Causes for Insects to assume pest status.

1c: Classification of insect pests based on

- a) Occurrence of Pest
- b) Intensity of Pest
- c) Level of Infestation
- d) Food requirement

Unit . II. Study of insect pests

12hrs

2a: Study of following insect pests of different crops with reference to –

- a)Scientific name b) Marks of identification c) Life cycle d) Nature of damage
- e) Management practices

Jowar – Stem borer

Sugarcane – White grub

Gram – Pod borer

Mango – Hoppers

Brinjal – Fruit borer

Rose – Bud borer

2b: Stored grain pests and their management.

- i) Rice weevil ii) Pulse beetle

Unit. III. Management of Insect pests.

10 hrs

3a: Principles of insect pest control.

3b: Classification of insecticides based on:

- a) Mode of entry – stomach, contact, systemic and fumigants
- b) Mode of action – Respiratory, Nervous
- c) Chemical nature –
 - i) Inorganic
 - ii) Organic – Chlorinated hydrocarbons, Organophosphates,
Carbamates, Synthetic pyrethroids
 - iii) Plant origin pesticides (Syn. Green pesticides, Botanical pesticides)
- d) Need of Formulation and Adjuvant
- e) Nature of formulation – Dusts, Granules, Wettable powder, Emulsifiable concentrates.

Unit No. 4 Recent trends in pest management

04 hrs

Sub unit 4.1 a) Attractants b) Repellents c) Antifeedents

d) Pheromones e) Chemosterilants

f) Precautionary measures used during pesticide application.

Total hours : 30

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Plant Protection

“General agriculture and Weed Science ”

PRACTICAL – I (Section I of Paper I and II)

1-8] Agronomic studies of following crops with reference to gross morphology and agronomic conditions :-

Jowar, Groundnut, Gram, Sugarcane, Mango, Brinjal, Turmeric, Rose.

9-17] Study of following weeds with reference to gross morphology, reproduction, dispersal and management.

A. Dicot weeds :

Argemone mexicana
Parthenium hysterophorus
Amaranthus spinosus
Alternanthera sessilis
Euphorbia hirta
Eupatorium species
Portulaca oleracea

B. Monocot weeds

Cyperus rotundus
Cynodon dactylon

18] Study of Weed Population by Quadrat method.

19] Study of mode of dispersal in following weeds.

Parthenium hysterophorus
Tridax proucbens
Xanthium strumarium
Alternanthera sps.
Achyranthus aspera
Cynodon dactylon

20] Herbicidal action on seed germination of any local available weed as per syllabus.

- 21] Study of Herbicides, Nematicides and Rodenticides with reference to properties, mode of action formulation and uses.
- 22] Collection of weed and Preparation of Weed Herbarium.
- 23] Determination of sucrose percentage by Hand refractometer in Sugarcane and Grape.
- 24] Determination of pH and electrical conductivity of two soil samples from Crop fields.
- 25] Determination of soil moisture from crop fields (Two samples).
- 26] Study of Herbicide label information and preparation of list of commonly available herbicide.
- 27] Demonstration of method of herbicide application.
- 28] Tour and visit to problematic weed areas.

Distribution of Marks	
PRACTICAL – I	Marks
1) General Agriculture	20
2) Weed Science	20
3) Journal	05
4) Field visit / Tour report	05
Total	50

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Plant Protection

“ Plant Pathology and Insect Pest ”

PRACTICAL – II (Based on Section II of Paper I and II)

1-9] Study of following diseases of crops with reference to host, causal organism, symptoms and management.

A) Phytoplasmal Disease- Little leaf of Brinjal

Compare healthy and infected specimens by observing external symptoms and leaf area by graph method.

B) Viral Disease- Yellow vein Mosaic of Okra (Bhendi) / Leaf Curl of Chilli

C) Bacterial Disease - Citrus canker / Wilt of Brinjal (Ooze test)

D) Fungal Diseases:

a) White rust of *Amaranthus* / Crucifers

b) Rust of Soybean

c) Grain smut of Jowar

d) Tikka disease of Groundnut

e) Powdery mildew of Rose

f) Downy mildew of Grapes

10] Methods of sterilization and disinfection.

11] Preparation and sterilization of Potato Dextrose Agar (P.D.A.) / Nutrient Agar (N.A).

12] Soil Fungi : Isolation, Inoculation and quantification of soil fungi.

13] Soil Bacteria : Isolation, Inoculation and quantification of soil bacteria.

14] Technique of collection and preservation of insect pests.

a. Wet preservation b. Dry preservation

15- 20] Study of following insect pests with reference to scientific name, life cycle, marks of identification, nature of damage and management.

- a. Jowar – Stem borer
- b. Sugarcane –White grub
- c. Gram – Pod borer
- d. Mango – Hoppers
- e. Brinjal – Fruit borer
- f. Rose – Bud Borer

21] Study of following stored grain pests as per above points.

- a.Rice weevil
- b.Pulse beetle

22-23] Separation of amino acids from healthy and diseased plants using paper chromatography technique.

24] Study of pesticide application equipment: Sprayer and its types.

25] Preparation of pesticides for application (Examples).

26-27] Study of Bactericides and Fungicides (Preparation of Bordo mixture and Bordo paste) with reference to properties, mode of action formulation and uses.

27] Project work.

Distribution of Marks	
PRACTICAL – II	Marks
1) Plant Pathology	18
2) Insect pests	17
3) Project Work	5
4) Journal	5
5) Submission	5
Total	50

PRACTICAL EXAMINATION INSTRUCTIONS:

- A.** Each candidate must produce a certificate from Head of the Department stating that he/she has completed practical course in satisfactory manner recommended by Board 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 Incharge and certified by the Head of the Department at the end of the year. Candidates are to produce their journals at the time of practical examination. Without which he/she shall not be allowed to appear for practical examination.
- B.** Excursions for the study of crops, plants, weeds in local areas should be frequent and report thereon should be submitted. One of excursions shall be to research institute or Agricultural centre's actively engaged in Plant Protection for not more than 5 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. Each candidate must submit tour report of the same.
- C.** Each candidate must complete the project work as per the guidelines provided and it should be certified from the Incharge teacher and head of the Department.
- D.** Candidate shall be required to submit the following records at the time of practical examination.
1. Certified laboratory Journal
 2. Tour Report - visit to fields, Agricultural Institutes, Polyhouses
 3. Project Work
 4. Submission of preserved or dry specimens of diseased plants
(at least ten), preserved insect pests (at least ten), herbaria of weeds (at least ten).
- E.** Candidate will be orally examined in their project work and submission.

GUIDELINES FOR PROJECT REPORT SUBMISSION:

1. It should be of 10 to 15 pages, well certified by the teachers Incharge & H.O.D.
2. It should contain index, introduction, matter, conclusion and list of reference.
3. It should be based upon any article related to advanced agriculture.
4. Following topics may be included for the **project work**.
 - i. **Group of pesticides** - Commercial name, manufacturer, Chemical nature, dosages, season of application, diseases controlled.
 - ii. **Growth hormones** - Commercial name, manufacturer, Chemical nature, dosages, various applications.
 - iii. Cultural practices, economics, and marketing of any crop.
 - iv. Govt. schemes for the welfare of farmers.
 - v. Losses due to mineral deficiencies in the crops.
 - vi. Breeding Programme of any crop.
 - vii. Herbicides - Commercial name, Chemical content, manufacturer, weed management.
 - viii. Toxic hazards due to pesticides and precautions during their applications.
 - ix. Identification of crop varieties.
 - x. Common diseases / pests of particular crop.

References

PAPER I: “General Agriculture and Plant Pathology ”

Sr. No.	Name of the Book	Author (s)
1.	Agronomy	V. J. Vaidya <i>et. al.</i>
2	Biofertilizers in Agriculture	Subbo Rao
3	Commercial Vegetable Growing	Tind all
4	Crop production and field experimentation	Vaidya Sahastrabudhe 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 Ram
9	Identification of Crop Varieties	Agarwal
10	Irrigation	Michael
11	Plant Pathology	R. S. Malhotara
12	Plant Pathology (S Chand Publication)	Dr. P. B. Pandey
13	Plant Protection	Mukundan
14	Principles and Procedures of Plant Protection	Chattopadhyay
15	Roses	Tony Gregory
16	Scientific Crop Production	Mathur
17	Sugarcane	C. N. Babu
18	Sugarcane Cultivation	M. G. Jadhav
19	The culture of Vegetables and Flowers from Seeds and Root.	Martin Sutton

20	Vegetable growing in India	P.S. Arya Prakash
21	Chemistry of insecticides and fungicide	D. S. Sreeramalu
22	Disease of crops plants in India	Rangaswami
23	Fungi and Diseases in Plants	Butler
24	Fungicides in Disease Control Y	. L. Nene
25	Introduction to plant viruses	C. L. Mandahar
26	Plant disease and epidemiology	Narayanan
27	Plant disease	R. S.Singh
28	Pla nt Pathology	R. P. Singh
29	Pla nt disease	Mathur
30	Plant disease Gopal	S. Dasgupta
31	10. Pla nt Pathogens	Singh R. S.
32	Plant Pathology	P. D. Sharma
33	Pla nt Pathology	Walker
34	Post Harvest technology of Cereals, Pulses and Oilseeds	Chakravarty
35	Viruses and Mycoplasma Diseases of Plants	Ray Chaudhari

PAPER II: “ Weed Science and Insect Pest ”

Sr. No.	Name of the Book	Author (s)
1.	Agricultural 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 Aruna
7	Introduction to Insect Pest Management	Metcalf
8	Modern Entomology	Tembhare
9	Nematode Diseases of Agricultural Crops	Abstracts 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 its Science	Klingmeier
15.	Weed Science	Thakur
16.	Weeds of the world	King
17.	World Guide to Insects Vol. I & II.	Paekard A.S
18.	Plant Disease Epidemiology	Nagrajan
19.	Experimental and Conceptual Plant Pathology	Singh <i>et al</i>
20.	Weed Weedicides and Weed control Principle and Practice	R. C. Mandal

21.	Soils and Soil Management	Gustafson
22.	Concepts in Integrated Pest Management	Norris <i>et al</i>
23.	Seed Science and Technology La b manual	McDonald & Copeland
24.	Seed Technology	Agarwal

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Plant Protection

EXAMINATION MARCH / APRIL - 2019

PRACTICAL - I

Time : 5 Hours 11.00 am onwards

Marks : 50

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

Que. 1) Identify and describe gross morphology and agronomical conditions of specimen 'A' and B. (10)

Que. 2) Identity and describe gross morphology, reproduction and management of specimen 'C' and 'D' (Leave your preparation for inspection.) (10)

Que. 3) Study of Quadrat. (07)

Que. 4) Find out sucrose percentage by Hand Refractometer of specimens E₁ and E₂.

OR

Determine the soil moisture from the given soil samples of specimens E₁ and E₂.

OR

Determine the pH from the given soil samples of specimens E₁ and E₂. (05)

Que. 5) **Identification**

i) Identify the crop and describe the agronomical conditions of specimen 'F' (03)

ii) Identify and comment on specimen 'G' (03)

Que. 6) Field Visit Report (05)

"Education for Knowledge, Science and Culture."

– Shikshanmaharshi Dr. Bapuji Salunkhe

VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR.

B.Sc. Part II CBCS syllabus with effect from June 2019

Plant Protection

EXAMINATION MARCH / APRIL - 2019

PRACTICAL - II

Time : 11.00 am onwards

Marks : 50

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

- Que. 1) Identify and describe the symptoms of specimen 'A' and 'B' (Leave your preparation for inspection) (06)
- Que. 2) Sketch and label the damaging stage of specimen 'C' and 'D' comment on nature of damage and its management. (08)
- Que. 3) Find out amino acid composition in E₁ and E₂ with the help of circular paper chromatography (show your results to the examiners). (06)
- Que. 4) Prepare and sterilize the culture medium PDA and Inoculation of specimen 'F'. (04)
- Que. 5) Solve the given problem on preparation of pesticide solution. (05)
- Que. 6) **Identification :**
- i) Identify and comment on damaging stage of specimen 'G'. (02)
 - ii) Identify and comment on Fungicide/Bactericide. (02)
 - iii) Identify and comment on working of Instrument. (02)
- Que. 7) Project (05)
- Que. 8) Journal (05)
- Que. 9) Submission (05)