

SHIVAJI UNIVERSITY, KOLHAPUR.



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(2009)**

**New Syllabus For
Bachelor of Science
SEED TECHNOLOGY**

Paper –IX,X,XI,XII Sem. –V,VI

Syllabus to be implemented from June-2012 onwards.

B.Sc. Part III Seed Technology (SEMESTER PATTERN)

New Syllabus to be implemented from June 2012

Semester V

Paper IX Seed Pathology

Paper X Seed Entomology

Semester VI

Paper XI Seed Processing and Storage

Paper XII Seed Farm Management and Marketing

THIRD YEAR (SEMESTER V/VI) (NO.OF PAPERS 4)

Sr.No.	Papers	Theory	Internal	Total Marks
1.	SEM V Paper IX	40	10	50
2.	Paper X	40	10	50
3.	SEM VI Paper XI	40	10	50
4.	Paper XII	40	10	50
5.	Practical I			50
6.	Practical II			50
	Total			

SCHEME OF EXAMINATION :-

- The examination shall be conducted at the end of each academic year for annual pattern and at the end of each term for semester pattern.
- The Theory paper shall carry 100/80/40 marks (as applicable to the course)
- The evaluation of the performance of the students in theory papers shall be on the basis of Annual Examination /Semester Examination of _____ marks.
- Question Paper will be set in the view of the /in accordance with the entire Syllabus and preferably covering each unit of syllabi.

STANDARD OF PASSING:-

[As Prescribed under rules & regulation for each degree /programme.]

NATURE OF QUESTION PAPER COMMON MENTIONED SPERATELY:

EQUIVALENCE OF SYLLABUS

Old Syllabus Annual Pattern	New Syllabus Semester Pattern
Paper V Seed Pathology and Seed Entomology	Semester V Paper IX Seed Pathology Paper X Seed Entomology
Paper VI Seed Processing, Storage, Seed Farm Management and Marketing	Semester VI Paper XI Seed Processing and Storage Paper XII Seed Farm Management and Marketing

Shivaji University, Kolhapur
B.Sc. Part-III
(SEMESTER V)
SEED TECHNOLOGY (VOCATIONAL COURSE)
(Implemented from June, 2012)
PAPER –IX
SEED PATHOLOGY

Unit I- Seed borne diseases -----(10)

- 1.1 History of seed pathology and economic significance of seed borne diseases.
- 1.2. Seed borne fungi, bacteria, viruses and nematodes.
(Any two examples of each group.)
- 1.3 Inoculum density of seed borne pathogens and its relationship with disease
- 1.4. Ecological relationship of seed borne micro organisms.

Unit II- Seed infection -----(10)

- 2.1 Storage fungi and their impact on animal and human health. (Suitable examples)
- 2.2 Mechanisms of transmission of seed pathogen.
- 2.3 Entry points of seed infection.
- 2.4 Influence of environmental factors on seed borne diseases.

Unit III- Seed treatment -----(13)

- 3.1. Seed treatment, procedures and equipments
- 3.2. Objectives of seed health testing, procedures of sampling methods of seed health testing.

Unit IV -Seed Legislation (07)

- 4.1 Quarantine for seed. (Principle and procedure
- 4.2. Seed certification and tolerance limits of seed borne pathogens
- 4.3. Seed act in relation to seed borne diseases

SEMESTER V
Paper X
SEED ENTOMOLOGY

Unit I - General Organization of insects -----(10)

External morphology and types of appendages Stages of insect development, complete and incomplete metamorphosis Methods of insect classification, orders of class insecta, economic importance and losses caused by them.

Unit II- Insect pests ----- (10)

Study of following insect pests of seed crops; their nature of damage and management.

- 1) Cereals Paddy – grass hopper.
- 2) Maize-Army worm.
- 3) Sorghum – Stem borer.
- 4) Kharip pulse (Pigeon Pea) – Tur pod borer.
- 5) Rabi pulse (Chick Pea) – Gram pod borer.
- 6) Pea – Pea pod borer.
- 7) Oil crop – Castor – semilooper.
- 8) Oil crop- Groundnut – White grub.
- 9) Vegetables- Cabbage-caterpillar.
- 10) Vegetables - Brinjal-fruit borer.
- 11) Vegetables – Tomato-leaf minor.
- 12) Vegetables – Bean aphids.

Unit III- Insect pest control -----(10)

3.1 Methods of insect pest control: cultural, mechanical, physical, chemical Quarantine, pesticides of plant origin, Autocidal and Biological control. (in brief) Insecticide formulations, and preparation of spray solution ,safe application of pesticides.

3.2Types of equipments and their principles: safe handling maintainance and use of machines fumigants and methods of fumigation, seed protectants and their impact on seed viability.

Unit IV- Beneficial insects and Harmful Insects -----(10)

4.1Beneficial insects and their role in seed production (Honey bee), types of insects pollinators and their use in crop pollination.

4.2Types of insect pests and mites in storage seeds and dry fruits:

Nature of damages and losses caused, factors influencing them, sources, development and infestation.

Shivaji University, Kolhapur
B.Sc. Part-III
SEMESTER VI
SEED TECHNOLOGY (VOCATIONAL COURSE)
PAPER-XI
SEED PROCESSING, STORAGE

Unit I- Seed processing -----(10)

1.1. Concept and objectives of seed processing: Basic flow pattern in seed processing, concept and importance of seed processing in the pathway of seed improvement, physical characteristics used to separate seeds.

1.2. Preparing seeds for processing: The scalper, the debearder, the maize scarifier and sheller, licensing of machines.

1.3. Seed drying : Importance and advantages of seed drying ,moisture content, Orthodox / recalcitrant methods of seed moisture measurements, Theory of seed drying (wet dry seeds), advantages of mechanical drying equipments dehumidification and drying of heat sensitive seeds , relative humidity and equilibrium, moisture content of seeds.

Unit II- Seed processing machines ----- (10)

Principle, construction, working, adjustments, cleaning and uses of seed processing machines viz

i) Air screen cleaner cum grader.

ii) Specific gravity separator, aspirators, pneumatic aspirators, stoner-

iii) Roll mill

iv) Magnetic separators

v) Spiral separators, dropper best separator, electrostatic separators

Unit III Seed treatment and Seed processing plant-- (10)

3.1 Seed Treatment: Principle, construction, working, adjustments and uses of slurry seed treater mist -o- matic seed treated, storage and labeling of treated seeds, seed users safety.

3.2. Site selection for seed processing plant on a seed production farm, layout of machines in a seed processing plant for efficient product and man movement, seeds in post harvest phase, conservation of energy and production

3.3 Seed conveyors and elevators, bucket elevator ,belt conveyor, screen conveyor, oscillation conveyor, pneumatic conveyor.

Unit IV- Seed storage and packing -----(10)

4.1 Seed storage – structures and their management.

4.2 Packing and marketing of seeds, bagger weigher, bag closing ,portable and conveyor type of bag closer, labeling and maintaining lot identify, lot numbers, seed pellets, handling and stacking, maintenance of seed processing record. -----

(40)

SEMESTER VI
PAPER XII
SEED FARM MANAGEMENT AND MARKETING

Unit I -Farm management (10)

- 1.1. Scope : Basic principles in farm management, field or farm management, decision making operation & control.
- 1.2 Decision making based on production, cost and capital investment, cost analysis Lawof diminishing returns, opportunity cost, most profitable combination of input and output.

Unit II- Field practices and machinery management (10)

- 2.1 Concepts of various crop production, field practices as tillage, irrigation, sowing, plant protection, harvesting and threshing, maintenance of soil fertility, weeds & their control.
Crop rotation, mixed cropping ,multiple cropping & dry land farming.
- 2.2 . Machinery selection & their management, determinatioin of field capacity & field efficiency.

Unit III- Farm Resource Management and Analysis (10)

- 3.1 Farm planning , Construction of in farm buildings, implement shed, strong structures.
- 3.2. Farm business analysis, farm size, factors affecting profit and economic size of farm.
- 3.3. Farm budgeting procedure and uses, farm efficiency measures, farm records & their uses.
- 3.4. Farm surveys, data collection & analysis.
- 3.5. Acquisition & management of land labour & capital.

Unit IV- Seed marketing (10)

- 4.1. Marketing- Basic concepts, supply & demand, price equilibrium, seed transportation, storage, cost & returns, cost processing, packing and marketing, Organization for seed marketing , seed markets in India, structure & working.
- 4.2. Seed market surveys, seed industry in relation to global market , concept of WTO, GATT, IPR, PBR.

Shivaji University, Kolhapur
B.SC.III
SEED TECHNOLOGY
PRACTICAL-I

Unit I

1. Demonstration & handling of stereobinocular microscope.
2. Characters of important seed borne pathogens. (Any five)
3. Visual examination of dry seeds for disease symptoms. (Any five)
4. Examination of suspensions obtained from washings of seed
- 5 Viability test- space germination test and tetrazolium test.
6. Infection sites studied by planting seed components

Unit II

- 7,8. Detection of important seed borne fungi-various detection methods
- 9,10. Detection of important seed borne bacteria- various methods.
- 11,12. Detection of important seed borne viruses-various methods.

Unit III

- 13,14. External morphology of insect, type of mouth-parts antenna & legs.
- 15,16. Identification of important storage and dry fruit pests and their control.
17. Detection of seed borne insects.

Unit IV

18. Fumigation-principle and practical application.
- 19,20 Types of insecticide formulations ,their preparation & safe use.
21. Plant protection equipments, their safe handling & use.
22. Collection and submission of stored product pests.
23. Visits to warehouse & godowns and market.

Shivaji University, Kolhapur
B.Sc. III
SEED TECHNOLOGY
PRACTICAL-II

Unit I

1. Study of physical characteristics of different crop seeds & their shapes.
2. Determination of physical properties of seeds of different crops.
3. Measurement of seed moisture content by O S W A & moisture meter / oven drying method.

Unit II

4. Study of seed –pre-cleaner ,maize sheller & dehusker.
5. Study of air screen cleaner cum grader.
6. Study of magnetic separator.
7. Study of specific gravity separator.
8. Study of seed treatment machines.
9. Study of seed packaging equipment
10. Study of bucket elevator, screw conveyers and pneumatic elevators

Unit III

11. Study of threshing machine and its use.
12. 13.Determination of water holding capacity /organic content of soil.
14. Soil sampling for fertility & moisture content.

Unit IV

15. Study of farm implements viz. .Weeders, hoes, harrow
16. Cost analysis
17. Farm planning & budgeting
18. Record keeping
- 19.20.Visit to a seed processing & storage complex and familiarization with different machines.

Reference Books

- 1 Neergaard – Seed Pathology vol.I & II.
2. Agarwal.V.E. & Sincelair, J.B.-Principles of seed pathology Vol.I & II.
3. K.A. Jeffs-Seed treatment
4. C.J. Alexopoulos – Introductory mycology.
5. J.P.Shrivastava – An Introduction to fungi
6. R.W. Marsh – Systemic Fungicides6. R.W. Marsh – Systemic Fungicides
7. Y.L.Nene & M.J. Thapliyal –Fungicides in plant disease control.
8. Mary Noble & M.J. Richardson – An annotated list of seed borne diseases
9. S.C. Vyas –Systematic Fungicides
10. Metcalf & Flint –Destructive & useful Insects.
11. J.B. Free – Insect pollination of field crops
12. A.S. Atwal – Agricultural Entomology.
13. D.S. Bindra- Plant Protection and equipments.
14. Billy R. Gregg, Alvin G.Law,S.S. Virde,J.S. Balis-Seed Processing.
15. S.M. Henderson & R. Perry –Agricultural process Engineering.
16. Carl W. Hall – Drying Farm crops
17. A Chakravarty- Post Harvest Technology & cereals ,pulses & oil seeds.
18. Warren L.Melab,Julien C. Smith & Peter Harviot – Unit operation in chemical engineering.
19. ICAR – Handbook of Agriculture
20. Hunt D. – Farm power & machinery management
21. John E. Kadlec – Farm management, decision operation control.
22. Michael D. Boehlje & Verman R. Eidman –Farm management
23. S.S. Johl & T.R. Kator – Fundamentals of farm management.
24. A.S. Kahlona Karam Singh – Economics of farm management in India
25. V.T. Raju & D.V. Rao – Economics of Farm production & management
26. S.S. Acharya – Agricultural marketing in India.
27. Prem Singh and Arya – Vegetable breeding and seed production; Kalyani Publ. Ludhiana.
28. B. D. Singh, - Plant Breeding 2 ed. 2006. Kalyani publ Ludhiana.
29. B. D. Singh, - Plant Breeding Principles and Methods. Kalyani Publ Ludhiana
30. V. L. Chopra, - Plant Breeding Theory and Practices Oxford IBH Pvt.Ltd 31. V. L. Chopra, - Plant Breeding Field crops Oxford IBH Pvt. Ltd. New Dehli. 2001

B. Sc. – III (Seed Technology) Shivaji University, Kolhapur

Practical Examination

- A) Each candidate must produce a certificate from the Head of the department in his College, stating that he/she has completed the practical course in a satisfactory manner and has properly maintained the laboratory journal Every candidate must have recorded his/her observations in the laboratory journal and has written a report on each exercise performed. Every journal is to be checked and signed periodically by a member of the teaching staff 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
- B) Excursion and visits to ware houses godowns ,markets and study farm Machinery. Study of seed processing with different machines, market survey is necessary. One of the excursions shall be to the Research Institute or Agricultural University engaged in seed Technological studies and research
- C) Each practical examination (I&II) shall be of five hours duration & shall test a candidate on two successive days.
- D) Report of job training or seminar or market survey. Students should visit to seed processing units, various crop fields(maintain field diary) at breeding stations and local market and submit the report of the same at the practical examination. They should be duly signed by the teacher in charge and certified by the Head of the department. The same will be assessed by the job training teacher
- E) Field diary
- 1) Locality.
 - 2) Crop-Kharip/Rabi, Type-oil seeds /seeds/cereals/pulses, variety sown
 - 3) Soil.
 - 4) Climate
 - 5) Irrigation facilities.
 - 6) Seed rate.
 - 7) Duration
 - 8) Insect pests and their control, success achieved
 - 9) Diseases and their control, success achieved
 - 10) Weeds and their control, success achieved
 - 11) Farm machinery used at various periods.
 - 12) Productivity (harvesting time)
 - 13) Storage & its management
 - 14) Losses / benefit.

SHIVAJI UNIVERSITY, KOLHAPUR.
Bsc III (Seed Technology)
B.sc. III PRATICAL EXAMINATION MARCH/APRIL
SEED TECHNOLOGY : PRACTICAL –I

Time :- 11.00 am onwards

Marks:- 50

- N.B. 1) Draw neat labeled sketches wherever necessary.
2) Show your preparations to the examiners.

- Q .1 Find out the average % of diseased seeds/ grains of the given sample A / Prepare slides from the given seed sample A Identify the causal Organism. (5)
Q 2 Determine the viability % of the given seed/ grain sample B by using Tetrazolium test, Write in brief the procedure of the test. (5)
Q : 3 Give the classification and description of the specimen C.(5)
Q : 4 Describe the structure and working of the apparatus D (5)
Q: 5 a) Identify and describe E (4)
b) Identify and describe the morphology of F (4)
c) Comment on the specimen G (4)
d) Describe the given specimen H (4)
Q :6 Submission , field diary and viva voce (9)
Q:7 Journal (5)

SHIVAJI UNIVERSITY, KOLHAPUR.
Bsc III (Seed Technology)
B.sc. III PRATICAL EXAMINATION MARCH/APRIL
SEED TECHNOLOGY : **PRACTICAL -II**
Time :- 11.00 am onwards Marks:- 50

- N.B. 1) Draw neat labeled sketches wherever necessary.
2) Show your preparations to the examiners.

- Q .1 Describe external and internal physical properties of given seed / grain A (5)
Q 2 Determine the moisture % of the given seed/ grain sample B Write in brief the procedure of the test.(5)
Q : 3 Describe the structure and working of apparatus C.(5)
Q : 4 Comment on the working and use of the apparatus D (5)
Q: 5 a) Identify and describe E (5)
b) Identify and describe the morphology of F(5)
c) comment on the specimen G(5)
d) Describe the given specimen H (5)
Q :6 Determine WHC/ organic content of soil sample I (5)
Q:7 Prepare a layout plan of a farm by using given data J (5)
Or
Q:7 Prepare a farm record by using given data J (5)
Q: 8 Report of training /seminar /market survey and viva voce.(10)
Q:9 Journal. (5)

B. Sc. – III (Seed Technology)
Shivaji University, Kolhapur
Key To the Practicals
PRACTICAL – I

1. Diseased seeds or their suspension. (5)
2. Viability test / Tetrazolium test. (5)
3. Identification, classification (order) and description of the insect.(5)
4. Apparatus of plant protection / fumigation. (5)
5. Spotting – i) Seed fungi bacteria, viruses. (16)
 ii) mouth parts / legs/antenna/metamorphosis stage of an insect.
 iii) storage pest
 iv) Bees or Bee box
- 6.Submission-storage pest, field diary and viva based on these. (09)
7. Journal. (5)

PRACTICAL-II

1. Physical properties of crop seeds. (5)
2. Moisture content of seed /soil. (5)
 Apparatus and its use (maize sheller and de-husker Air cleaner & grader) (5)
 OR
3. Machine and its working (bucket elevator /pneumatic elevator)(5)
 OR
- 4Machine and its working (Seed treatment /packing equipment)(5)
- 5 To determine water holding capacity / organic content of soil.(5)
- 6Making a cost analysis / budgeting on basis of a given data. (5)
- 7 Making a farm plan / preparation of farm record on basis of given data. (5)
8. Report of training, seminar and market survey. (10)
9. Journal. (5)