RAJA SHANKAR SHAH UNIVERSITY, CHHINDWARA (M.P.)

M.Sc. Seed Technology

Examination Scheme Semester-II

Course Code	Paper No.	Nomenclature of Paper	Max. marks		Minimum Passing Marks	
			Theory	CCE	Theory	CCE
MST-201	I	Seed Production Of Cereals, Pulses & Oil Seeds	40	10	14	4
MST-202	II	Seed Production In Vegetables, Fiber & FODDER Crops	40	10	14	4
MST-203	III	Seed Processing & Storage	40	10	14	4
MST-204	IV	Seed Quality Testing	40	10	14	4
MST-205	V	Practical – I	50		25	
MST-206	VI	Practical - II	50		25	

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RAJA SHANKAR SHAH UNIVERSITY, CHHINDWARA (M.P.)

M.Sc. Seed Technology
Semester-II
Paper-I
MST-201 : SEED PRODUCTION OF CEREALS, PULSES & SEEDS

UNIT- I **MM : 40+10=50**

1- Basic principles in seed production and importance of quality seed.
2- Floral structure, breeding and pollination mechanism in self- pollinated cereals and millets viz, Wheat, Barley, Paddy and Ragi.

UNIT – II

1- Floral structure, breeding and pollination mechanism in cross- pollinated cereals and millets viz Maize, Sorghum, Bajra.

UNIT- III

1- Floral structure, breeding and pollination mechanism; methods and techniques of seed production in pulses viz Pigeon pea, Chick pea, Green gram.

UNIT-IV

1- Floral structure, breeding and pollination mechanism; methods and techniques of quality seed production in minor oil seeds viz Safflower. Mustard, Linseed, and Sesame.

UNIT-V

1- Floral structure, breeding and pollination mechanism; methods and techniques of seed production in major oil seeds viz Groundnut, Castor, Sunflower and Soybean.

Suggested Readings

1- Kelly AF. 1988. Seed Production fo Agricultural Crops.
2- John Wiley. McDonald MB Jr & Copeland Lo. 1997. Seed Production; Principles and Practices. Chapman & Hall.
3- Sinclair T.R. and F.P. Gardner, 1977. Principles of Econogy in plant production, CAB international G.K.
4- Rai, M. and S. Mauria, 1995, Hybrid Resarch and Development. Indian Society of Seed Technology, IARI, New Delhi.
5- Feistrizer, P and A.F. Kelly, 1978. Improved Seed Production, FAO, Rome.
6- Habbiethwaite, P.D., 1980. Seed Production, butter worths, London-Boston, Sydney Wellington-Durban Toronto.
7- Bagga, S.S. and Bagga, S.K. 1998. An introduction in hybrid cultivar development. Narosa Pub.House, New Delhi.
8- Agarwal RL. 1997. Seed Technology. 2nd Ed. Oxford & IBH.
9- Chhabra AK. 2006 Practical Manual of Floral Biology of Crop Plants. Dept. of Plant Breeding CCS HAU, Hisar.

RAJA SHANKAR SHAH UNIVERSITY, CHHINDWARA (M.P.)

M.Sc. Seed Technology
Semester-II
Paper-II
MST-202 : SEED PRODUCTION IN VEGETABLES, FIBER & FODDER CROPS

UNIT- I **MM : 40+10=50**

Floral structure, breeding and pollination mechanism; methods and techniques of seed Production in fiber producing plants/crops viz Cotton Jute and Sun hemp.

UNIT-II

Floral structure, breeding and pollination viz mechanism; methods and techniques of seed production in major vegetable plants/ crops viz Onion. Tomato Radish and Lady's finger.

UNIT-III

Floral structure, breeding and pollination mechanism; methods and techniques of seed production in spices yielding plants viz Chili, Coriander and fennel.

UNIT-IV

Floral structure, breeding and pollination mechanism; methods and techniques of seed Production in vegetatively propagated crops like Sugarcane, Potato, Turmeric and Ginger.

UNIT-V

Floral structure, breeding and pollination mechanism; methods and techniques of seed production in fodder and fiber crop viz Barseem, Lucerne, Maize and oats.

Suggested Readings

1- Kelly AF. 1988, Seed Production of Agricultural Crops.
2- John Wiley Mcdonald MB Jr & Copeland LO. 1997.Seed Production. ---------- and Practieces. Chapman & Hall.
3- Sinclair T.R. and F.P. Gardner, 1977. Principles of Ecology in plant production CAB intereational G.K.
4- Rai. M. and S. Mauria, 1995. Hybrid Research and Developmetn. Indian Society Seed Technology, IARI, New Delhi.
5- Feistrizer, P and A.F. Kelly, 1978, Improved Seed Production, FAO, Rome.
6- Habbiethwaite, P.D. 1980. Seed Production, butter worths, London-Boston, Sydney Wellington-Durban Toranto.
7- Bagga, S.S. and Bagga, S.K. 1998 An introduction in hybrid cultivar development. Narosa Pub.House, New Delhi.
8- Agarwal RL. 1997. Seed Technology 2nd Ed. Oxford & IBH.
9- Chhabra AK. 2006. Practical Manual of Floral Biology of Crop Plants. Dept. of Plant Breeding CCS HAU, Hisar,
10- Pandey, B.P. 2000. Economic Botany. S.Chand & Company Ltd. Ramnagar, New Delhi - 110055

RAJA SHANKAR SHAH UNIVERSITY, CHHINDWARA (M.P.)

M.Sc. Seed Technology
Semester-II
Paper-III
MST-203 : SEED PROCESSING & STORAGE

UNIT- I **MM : 40+10=50**

1- Introduction: Principles of seed processing; methods of seed-drying including dehumidification and its impact on seed quality.
2- Relative humidity and equilibrium. Required moisture content of seed.
3- Thumb rules of seed storage.
4- Loss of viability in important agricultural and horticulture crops, viability equations and application of nomogram.

UNIT-II

1- Seed cleaning equipment and their function, Preparing seed for processing function of scalper, debearder, ccarifier, huller, seed cleaner and grader
2- Screen cleaners, specific gravity separator, indented cylinder, velvet spiral –disc separator.
3- Colour sorter, delintingmachines; seed binding.

UNIT-III

1- Assembly line of processing and storage.
2- Receiving, Elevating and conveying equipment.
3- Plant design and layout.
4- Requirement and economic feasibility of seed processing plant.

UNIT-IV

1- Seed treatment- methods
2- Seed treating formulations and equipmetns.
3- Seed disinfestations, identification of treated seeds.
4- Packaging principles and materials, bagging and labeling with proper tagging (Breeder seeds; golden yellow, foundation seeds, white certified seeds blue) advantages of seed treatment.

UNIT-V

1- Seed storage seed drying and storage; drying methods- importance and factors affecting it, changes it changes during storage.
2- Concepts and significance of moisture equilibrium. Methods of maintaining safe seed moisture content.
3- Methods to minimize the loss of seed vigour and viability.
4- Factors influencing storage losses. Storage methods and godown sanitation storage storage structure. Storage problems of recalcitrant of recalcitrant seeds and their conservation.

Suggested reading-

1- Desai, B.B, P.M. Kotecha and K. Salunkha, 1997. Seeds handbook, Published by mercel Dekker INC, New York.
2- Mather, S.B. and K.N. Mortensen, 1977. Seed health testing in the production of quality seeds ISTA Zurich.
3- Neeergaard, P. 1977. Seed pathology, Macmillan Press Ltd. Lodon.
4- Mehrotra, R.S. and Agrawal, Ashok. 2003 (2nd Ed.) Plant Pathology, McGraw Hill Educaiton (India) Private Limited. New Delhi.
5- Agrios, G.N. 1994. Plant Pathology. Fourth Edition, Academic Press, San Diego, California.
6- Dimcock, N. and S.B. Promrose. 1994. Introduction to Modern Virology, Blackwell Science, Oxford.
7- Singh R.S. 1998. Plant Diseases, Oxford and IBH Publication Co. Pvt.Lt., New Delhi.

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RAJA SHANKAR SHAH UNIVERSITY, CHHINDWARA (M.P.)

M.Sc. Seed Technology
Semester-II
Paper-IV
MST-204 : SEED QUALITY TESTING

UNIT- I **MM : 40+10=50**

1- Objective concept and components and their role in seed quality control
2- Instruments devices and tools used iin seed testing, ISTA and its role in seed testing
3- Seed sampling; definition, objectives, seed lot and its size; types of samples; sampling devices.
4- Procedure of Seed sampling; Sampling intensity, methods of preparing composite and submitted samples; sub- sampling techniques, dispatch receipt and registration of submitted samples in the seed testing loaboratory.

UNIT-II

1- Physical Purity, definition objective and procedure, weight of working samples for physical purity analysis, components of purity analysis and their definitions and criteria.
2- Pure seed definitions applicable to specific genera and families multiple seed units; general procedure fo purity analysis.
3- Calculation and reporting of results prescribed seed purity standards.
4- Determination of weed seeds and other sees by number per kilogram; determination of Other Distinguishable Varieties (ODV) determination of test weight and application of heterogeneity test.

UNIT-III

1- Seed moisture content; importance of equilibrium principles and methods of moisture estimation- types, instruments and devices used.
2- Pre-drying and grinding requirements, procedural steps in moisture estimation; calculation and reporting of results.
3- Germination; importance; definitions; requirements for germination, instrument and substrata required; principle and methods of seed germination testing; working sample and choice of method.
4- General procedure for each type of method; duration of test; seedling evaluation; calculation and reporting of results.
5- Dormancy; definition, importance, causal mechanisms, types and methods for breaking dormancy.

UNIT-IV

1- Viability and Vigour Testing: definition and importance fo viability test; different viability test; quick viability test (TZ-test), advantages.
2- Principle, preparation of seeds and solutions, procedure, evaluation and calculation of test results
3- Vigour testing: concept, historical development, definitions, principles and procedures of different methods used for testing vigour.

UNIT-V

1- Genetic purity testing: objective and criteria for genetic purity testing.
2- Types of test; laboratory, growth chamber and field testing based on seed, seedling and mature plant morphology; principles and procedures of chemical, biochemical and molecular test. Roughing; definition stages plants to be rougher.
3- Seed health Testing: field and seed standards; designated diseases, objectionable weeds.
4- Significance of seed borne disease as seed quality- seed health testing and detection methods for seed borne fungi, bacteria and viruses, Isolation distance.

Suggested Readings

1- Agrawal Pk & Dadlani M. 1992. Techniques in Seed Science and Technology. 2nd Ed. South Asian Publ.
2- Agrawal RL. 1996. Seed Technology. Oxford & IBH. Pulising Co., New Delhi.
3- Agrawal PK (Ed). 1993. Handbook of Seed Testing. Ministryof Agriculture, GOI, New Delhi.
4- Anon 1965. Field Inspection Manual and Minimum Seed Certification Standards, NSC Publications, New Delhi
5- International Seed Testing Association (ISTA) 1997. Hand book of seedling evaluations, Scientific Publishers, Jodhpur.
6- Martin, C. and D. Barkley, 1961. Seed identification manual, Oxford and IBH Publishing Co, Calcutta,
7- Nema, N.P. 1987. Principles of Seed Certification and Testing. Allied Publishers Pvt.Ltd, New Delhi.
8- Tunwar, N.S. and S.V. Singh, 1988 Indian Minimum Seed Certification Standards, Central Seed Certification Board, New Delhi.

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M.Sc. Seed Technology
Semester-II
Paper - V
MST-205 : Practical- (Based on Paper I-II)

TIME= 4 Hrs **MAX MARKS= 50**

1- Major Exercise = 1 (Bassed on Paper I)	-8
2- Major Exercise = 2(Bassed on Paper II)	-8
3- Minor Exercise = 1 (Bassed on Paper I)	-5
4- Minor Exercise =2 (Bassed on PaperII)	-5
5- Sporting (1-5)	-10
6- Viva	-04
7- Seasonal / Seed album	-10
	-50

Suggested Practical –

1. Floral structure, breeding and pollination mechanism of cross and self-pollinated crops.
2. Seed production of cross-pollinated plants (land, isolation, planting ratio, emasculation, pollination etc.).
3. Identification of rogues and pollen shedders.
4. To study of major fiber, fodder, vegetables, spices and aromatic plants of our locality.
5. Visit to seed production centers.

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M.Sc. Seed Technology
Semester-II
Paper - VI
MST-205 :Practical – II (Based on Paper III-IV)

TIME= 4 Hrs **MAX MARKS= 50**

1- Major Exercise = 1 (Bassed on Paper I)	-8
2- Major Exercise = 2(Bassed on Paper II)	-8
3- Minor Exercise = 1 (Bassed on Paper I)	-5
4- Minor Exercise =2 (Bassed on PaperII)	-5
5- Sporting (1-5)	-10
6- Viva	-04
7- Seasonal / Seed album	-10
	-50

Suggested Practical –

1. To study Seed health testing in production of good quality seeds.
2. To study Seed storage and Seed treatment methods.
3. To study the Packaging, bagging and labelling techniques with proper tagging of different seeds.
4. Identification methods for maintain the safe seed moisture content.
5. To study different methods of minimizing losses seed vigour and viability.
6. Identification of Storage methods and godown sanitation.
7. Identification of Storage problems of seed.
8. To study the Seed structure of monocot and dicot seeds.
9. Identification of seeds of weeds and crops.
10. Estimation of seed moisture content.
11. Identification of physical purity analysis of sample of different crops.

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