DEVI AHILYA VISHWAVIDYALAYA, INDORE (MP)

M.Sc. Seed Technology

Syllabus 2017-2018

Examination Scheme Semester-I

Paper No.	Nomenclature of Paper	Max. Marks		Minimum Passing Marks	
		Theory	CCE	Theory	CCE
I	Introduction To Seed Technology	85	15	28	05
II	Floral Biology, Seed Development And Maturation	85	15	28	05
III	Seed Physiology	85	15	28	05
IV	Principles Of Seed Production	85	15	28	05
Practical		100		40	

Examination Scheme Semester-II

Paper No.	Nomenclature of Paper	Max. Marks		Minimum Passing Marks	
		Theory	CCE	Theory	CCE
I	Seed Production Of Cereals, Pulses & Oil Seeds	85	15	28	05
II	Seed Production In Vegetables, Fiber & Fodder Crops	85	15	28	05
III	Seed Processing & Storage	85	15	28	05
IV	Seed Quality Testing	85	15	28	05
Practical		100		100	

Examination Scheme Semester-III

Paper No.	Nomenclature of Paper	Max. Marks		Minimum Passing Marks	
		Theory	CCE	Theory	CCE
I	Seed Legislation And Certification	85	15	28	05
II	Seed Pathology	85	15	28	05
III	Seed Entomology	85	15	28	05
IV	Plant Breeding	85	15	28	05
Practical		100		100	

Examination Scheme Semester-IV

Paper No.	Nomenclature of Paper	Max. Marks		Minimum Passing Marks	
		Theory	CCE	Theory	CCE
I	Seed Marketing & Management	85	15	28	05
II	Statistic And Computer Application In Agriculture	85	15	28	05
III	Project/Thesis	200			
IV	Two Seminars (based on Paper I and II)	100			

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Recheckes by me 5.9.17

DEVI AHILYA VISHWAVIDYALAYA, INDORE (M.P)

Syllabus 2017-2018

M.Sc. Seed Technology

Semester-I (Paper – 1)

INTRODUCTION TO SEED TECHNOLOGY

85+15=100

UNIT I

1- **Seed technology** - Seed technology-introduction, aims of seed technology, role of seed technology in modern agriculture, relation of seed technology with other disciplines.
2- History of seed technology in India, seed development programme, basis and types of seed programme.
3- Characteristics of good seed.
4- National Seed Corporation (NSC) and State farm corporation (SFC).

UNIT II

Seed –

1- definition, types of seeds, difference between seed and grain, class of improved seed.
2- External and Internal morphology of seeds of Rice, Wheat, Maize, Chickpea and Soybean.
3- Factors affecting seed morphology.

UNIT III

1- **Terminator seed**- method, terminator technology, advantages and disadvantages of terminator seed.
2- BT cotton & its modern agriculture.
3- **Synthetic seed**-introduction, components of synthetic seed technology.
4- Somatic embryo, production of synthetic seed, application of synthetic seed.

UNIT IV

1- **Plant tissue culture** –introduction, nutrient media, utilization.
2- **Transgenic seeds**-introduction, GEAC (Genetically Engineered Agricultural Crops).
3- Development and Utilization of transgenic seed. Testing for the presence of GE (Genetically engineered)/GM (Genetically modified) seeds.
4- Transgenic Crops- Tomato, Brinjal and Soybean.

UNIT V

1- **Variety of seeds** -characteristics and maintenance.
2- Patent- requirement, limits and breeding procedure with special reference to India.
3- Plant variety protection, World trade organization, the protection of plant varieties and farmers right act 2001.

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Suggested Readings

1- Jaima Kigel,J and G.Galili,1997. Seed development and germination,Marcel Dekker, New York.
2- Kozlowaski,T.T. 1972.Seed Biology, Volume 1, Academic Press, London.
3- Kha,A. 1977. The Physiology and Biochemistry of seed dormancy and germination, North Holland Publishing Co., Amsterdam.
4- Rai,M. and S. Mauria,1995. Hybrid Research and Devlopment. IARI, New Delhi.

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Syllabus 2017-2018

M.Sc. Seed Technology

(Semester-I (Paper – 2)

FLORAL BIOLOGY, SEED DEVELOPMENT AND MATURATION

85+15=100

UNIT I

1- **Floral biology**-floral types, structure and biology in relation to pollination mechanisms.
2- Microsporogenesis and megasporogenesis.
3- Development of male and female gametophytes and their structures.
4- Effect of environmental factors on floral biology.

UNIT II

1- **Pollination**- types adaptation, advantages & disadvantages, differences between self & cross pollination.
2- Structure, development and types of ovules.
3- Embryosac- Structure and types (mono, bi and tetrasporic embryo sacs).
4- Fertilization –Double fertilization and triple fusion, factors affecting fertilization.

UNIT III

1- **Embryogeny** - development of typical monocot and dicot embryos;
2- Endosperm development and types.
3- Modification of food storage, structures with reference to crop plants.
4- Cotyledons, development and their structure in representative crop plants with reference to food storage.
5- Seed coat structure and development in representative crop plants.

UNIT IV

1- **Apomixis** – identification, classification, significance and its utilization in different crops for hybrid seed production.
2- Polyembryony - types and significance; haplontic and diplontic sterility.
3- Embryo abortion- causes & rescue.

UNIT V

1- **Parthenogenesis and Parthenocarpy** – Definition, natural and induced parthenocarpy
2- Development of seedless fruit crops and their commercial exploitation
3- Advantages and disadvantages of parthenogenesis and parthenocarpy.

Suggested Readings

1- Bewley, J.D. and L. Black. 1982. Physiology and Biochemistry of seeds in relation to germination, Vol. 1 and Vol. 11 , Springer Verlag, Berlin Heiderbe New York.
2- Jaima Kigel, J and G. Galili, 1997. Seed development and germination Marcel Dekker, New York.
3- Kha, A. 1977 The Physiology and Biochemistry of seed dormancy and germination Nirth Holland Publishing Co., Amsterdam, New York

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4- Kozlowski, T.T. 1972 Seed Biology, Vol 1 Academic Press London.
5- Bhojwani SS & Bhatnagar SP. 1999. *The Embryology of Angiosperm*. Vikas Publ.
6- Black M, Bewley D & Halmer P. 2006.*The Encyclopedia of SeedsScience, Technology and Uses. CABI.*
7- Chhabra AK. 2006. Practical Manual of Floral Biology of Crop Plants. Deptt. Of Plant Breeding, CCS HAU, Hisar.

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Syllabus 2017-2018

M.Sc. Seed Technology

Semester-I (Paper – 3)

SEED PHYSIOLOGY

85+15=100

UNIT I

1- Steps of seed formation, Physiology of seed development and maturation.
2- Chemical composition of seed.
3- Synthesis and accumulation of seed reserves such as lipid, protein, carbohydrates.
4- Induction of desiccation tolerance, hormonal regulation of fruit, seed development.

UNIT II

1- Seed germination; factors affecting seed germination.
2- Physiological processes during seed germination.
3- Role of embryonic axis; growth hormones and enzyme activities, effect of age, size and position of seed on germination.
4- Seed respiration, breakdown of stored reserves in seeds, mobilization and inter conversion pathways.

UNIT III

1- Seed germination in pea, chick pea, castor, soybean, radish, maize, and wheat.
2- Seed dormancy- types, significance, mechanism, endogenous and exogenous factors regulating dormancy.
3- Role of phytochrome and PGR, genetic control of dormancy.

UNIT IV

1- Seed viability and longevity, pre and post-harvest factors affecting seed viability.
2- Seed ageing, physiology of seed deterioration causes of seed deterioration.
3- Lipid per oxidation and other viability theories.
4- Means to prolong seed viability; mechanism of desiccation sensitivity and recalcitrance with respect to seed longevity.

UNIT V

1- Seed vigour and its concept.
2- Vigour test methods, factors affecting seed vigour.
3- Physiological basis of seed vigor in relation to crop performance and yield.
4- Seed invigoration and its physiological and molecular control.

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Practical

Proximate analysis of chemical composition of seed; methods of testing viability; kinetics of seed imbibitions and solute leakage; seed germination and dormancy breaking methods; seed invigoration and priming treatments; accelerated ageing and controlled deterioration tests; enzymatic activities and respiration during germination and effect of accelerated ageing; vigour testing methods etc.

Suggested Readings

1- Agrawal PK & Dadlani M. (Eds.). 1992. *Techniques in Seed Science and Technology*. South Asian Publ.
2- Baskin CC & Baskin JM. 1998. Seeds: Ecology, Biogeography and Evolution of Dormancy and Germination. Academic Press.
3- Basra AS. 2006. Handbook of SeedScience and Technology. Food Product Press.
4- Bench ALR & Sanchez RA. 2004. *Handbook of Seed Physiology*. Food Product Press.
5- Bewley JD & Black M. 1982. Physiology and Biochemistry of Seeds in Relation to Germination. Vols. I, II. Springer Verlag.
6- Bewley JD & Black M. 1985. Seed: Physiology of Seed Development and Germination. Plenum Press.
7- Copeland LO & Mc Donald MB. 1995. *Principles of Seed Science and Technology*. 3rd Ed. Chapman & Hall.
8- Khan AA. 1977. Physiology and Biochemistry of Seed Dormancy and Germination. North Holland Co.
9- Kigel J & Galili G. (Eds.). *Seed Development and Germination*. Marcel Dekker.
10- Murray DR. 1984. *Seed Physiology*. Vols. I, II. Academic Press.
11- Sadasivam S &Manickam A. 1996. *Biochemical Methods*. 2nd Ed. New Age.

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DEVI AHILYA VISHWAVIDYALAYA, INDORE (M.P)

Syllabus 2017-2018

M.Sc. Seed Technology

(Semester-I (Paper – 4)

PRINCIPLES OF SEED PRODUCTION

85+15=100

UNIT I

1- Introduction: Seed as basic input in agriculture.
2- Seed development in cultivated plants; seed quality concept and importance of genetic as physical purity in seed production.
3- Types of cultivars, their maintenance and factors responsible for deterioration.
4- Seed production in self and cross (Pigeon pea, Maize, Wheat, and Soybean) pollinated crops.

UNIT II

1- Mode of pollination and reproduction in crop plants and their modification in relation to hybrid seed production.
2- Principles of hybrid seed production, isolation distance, synchronization of flowering, rouging etc.
3- Male sterility and incompatibility system in hybrid seed production.
4- Role of pollinators and their management.

UNIT III

1- Seed multiplication ratios, seed replacement rate, demand and supply.
2- Suitable areas of seed production and storage, agronomy of seed production agro climatic requirements and their influence on quality seed production.
3- Generation system of seed multiplication; Production technology of Nucleus Breeder, Foundation and Certified seeds.
4- Causes for its deterioration of seed quality certification standards for self and cross pollinated and vegetatively propagated crops.

UNIT IV

1- Hybrid Seed - Methods of development of hybrids.
2- One, two (A, B) and three line (A, B and R) system; maintenance of parental lines of hybrids.
3- Planning and management of hybrid seed production technology of major field crops (Maize, Sorghum) and vegetables (Tomato, Brinjal).

UNIT V

1- Planning of seed production for different classes (Nucleus, breeder, foundation &Certified) of seeds for self and cross pollinated crops.
2- Seed quality control system and organization, seed village concept.
3- Seed production agencies, seed industry and custom seed production in India.

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Suggested Readings

1- Anon 1997 Seed Technology in Tropoes ISTA Zurich.
2- Desai. B.B., P.M. Kotecha and DK Salunkha 1997 Seeds hand book biology, production, processing and storage. Marcel Dekker New York.
3- Sinclair T.R. and F.P. Gardner, 1977. Principles of Ecology in plant production, CAB international G.K.
4- Rai, M. and S. Mauria, 1995. Hybrid Research 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.

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DEVI AHILYA VISHWAVIDYALAYA, INDORE (M.P)

Syllabus 2015 -2016

M.Sc. Seed Technology

Semester-I

Practical – I (Based on Paper I-II)

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

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

Practical – II (Based on Paper III-IV)

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

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

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