



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. I (Seed Technology)

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2024-2025

Bachelor of Science (B. Sc.) Part - I

1. **TITLE:** Seed Technology

2. **YEAR OF IMPLEMENTATION:** 2024 - 2025

3. PREAMBLE:

The B. Sc. Seed Technology Course-under autonomy will be effective from the academic year 2024 - 2025. It has been prepared to keep in view the unique requirements of B. Sc. Seed Technology students as per NEP-2020. The contents have been drawn up to accommodate the widening horizons of the discipline of biological sciences. The emphasis is to provide students with the latest information along with due weightage to the concepts of classical botany so that they can understand and appreciate the current interdisciplinary approaches in the study of plant sciences and their role in societal development. The Course-content also lists new practical exercises so the students get a hands-on experience with the latest techniques that are currently in use. The Course-will also inspire students to pursue higher studies in Seed Technology, for becoming an entrepreneur, and enable students to get employed in plant-based industries.

4. GENERAL OBJECTIVES OF THE COURSE:

- i. To introduce the concept of the new concepts in seed technology.
- ii. To enrich students training and knowledge that would be useful in seed industries so that the farmers will get quality seeds.
- iii. To develop skill in practical work, experiments and laboratory materials in seed technology.
- iv. To help students build up a progressive and successful career in seed industry.
- v. To inculcate the sense of job responsibilities and to promote the possibilities of self-employment.

5. PROGRAMME OUTCOMES

After completing B. Sc. Programme the students will.....

1. Graduate with proficiency in the subject.
2. Develop scientific attitude and become open minded, critical and curious so that they enter research field with a positive approach.
3. Develop skill in practical work, experiments and laboratory materials.
4. Become eligible to continue higher studies in their subject in India as well as abroad.

5. Become eligible to appear for the examinations for jobs in government organizations.
6. Become eligible to appear for jobs with minimum eligibility as science graduate.
7. Be able to establish their own entrepreneurial ventures.
8. Acquire increased ability of critical thinking, development of scientific attitude, handling of problems and generating solution, improve practical skills, enhance communication skill, social interaction, increase awareness in judicious use of plant resources by recognizing the ethical value system

6. PROGRAM SPECIFIC OBJECTIVES:

1. The students are expected to understand the fundamentals, principles, concepts and recent developments in the seed technology.
2. The practical course is framed in relevance with the theory courses to improve the understanding of the various concepts in seed technology.
3. It is expected to inspire and boost interest of the students in seed technology.
4. To develop the power of appreciations, the achievements in science and role in nature and society.
5. To enhance student sense of enthusiasm for science and to involve them in an intellectually stimulating experience of course in a supportive environment.

7. PROGRAMME SPECIFIC OUTCOMES:

After completing B. Sc. (Seed Technology) Programme the students will.....

1. Recall the diversity, classification, evolution and developmental changes among the plants with reference to lower and higher plant groups and create a knowledge base in understanding the basis of Seed Science and Technology.
2. Acquire and utilize the skills of post-harvest, flower design, fruit processing and dehydration techniques, organic farming and various plant processing technologies for developing the economy to the growing world.
3. Know about the importance of seeds and its relevance in modern agriculture.
4. Become competent seed technologist who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare and environment to provide sustainable development.
5. Demonstrate knowledge and scientific understanding to identify research problems, design experiments, use appropriate methodologies, analyze and interpret data and provide solutions.
6. Exhibit organizational skills and the ability to manage time and resources.

1. **TITLE:** Seed Technology
2. **YEAR OF IMPLEMENTATION:** 2024 - 25
3. **DURATION:** 01 year
4. **PATTERN:** Semester examination.
5. **MEDIUM OF INSTRUCTION:** English
6. **EVALUATION STRUCTURE:**

Theory

Assessment Category	Internal Evaluation				ESE	Total Marks	Credits
	CCE-I	CCE-2	Mid Sem	Total			
Theory of 2 Credits	05	05	10	20	30	50	02

Practical

Assessment Category	Internal Evaluation		ESE	Total Marks	Credits
	Journal / Viva/Activity				
Practical of 2 Credits	20		30	50	02

7. STRUCTURE OF COURSE:

Course Structure as per NEP-2020

Level	Semester	Course	DSC	OE	AEC/VEC/IKS	Total	Degree/Cum. Cr. MEME
4.5	I	I	DSC-I (2) DSC-II (2) DSC P-I (2)	2	IKS (2)	22	UG Certificate 44
		II	DSC-I (2) DSC-II (2) DSC P-I (2)				
		III	DSC-I (2) DSC-II (2) DSCP-I (2)				
4.5	II	I	DSC-I (2) DSC-II (2) DSC P-I (2)	2	VEC (2)	22	
		II	DSC-I (2) DSC-II (2) DSC P-I (2)				
		III	DSC-I (2) DSC-II (2) DSC P-I (2)				

1) FIRST SEMESTER

Sr. No.	Subject Title	Theory				Practical		
		Course No. & Course Code	Title of Paper	No. of lectures per week	Credits	Course No. & Course Code	No. of Practical Per week	Credits
1.	Seed Technology	Course- - I (BSTT 111)	Seed Development and Morphology	4	4	Practical Course- I BSTP 113	2	2
		Course- -II (BSTT 112)	Instrumentation and Techniques in Seed Technology					

2) SECOND SEMESTER

Sr. No.	Subject Title	Theory				Practical		
		Course No. & Course Code	Title of Paper	No. of lectures per week	Credits	Course No. & Course Code	No. of Practical Per week	Credits
1.	Botany	Course – III (BSTT 121)	Fundamentals of Seed Technology	4	4	Practical Course- II BSTP 123	2	2
		Course – IV (BSTT 122)	Vegetable Seed Production					

8. COURSE TITLES OF PAPERS OF B. Sc. -I

B. Sc. I Semester I

Course-I (BSTT 111): Seed Development and Morphology

Course-II (BSTT 112): Instrumentation and Techniques in Seed Technology

Practical Course- I (BSTP 113): Practicals based on Courses- I and II

B. Sc. I Semester II

Course-III (BSTT 121): Fundamentals of Seed Technology

Course-IV (BSTT 122): Vegetable Seed Production

Practical Course- II (BSTP 123): Practicals based on Courses -III and IV

9. OTHER FEATURES:

A) LIBRARY:

Reference Books, Textbooks, journals, and Periodicals are available in Institute and Departmental Library. (Separate reference lists are attached along with the respective Course-syllabus)

B) EQUIPMENTS:

i. Computer, LCD projector, visualizer, smart board

ii. Laboratory Equipment:

1. Microscope with a digital camera

2. Digital weighing balance

3. pH meter

4. Microtome

5. Autoclave

6. Hot Air Oven

7. Incubator

8. Refrigerator

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester- I

Course-I (Course Code: BSTT 111)

Seed Development and Morphology

Course Objectives: The student should be able to.....

1. understand the concept of seed technology.
2. identify seeds based on morphological characters.
3. impart Knowledge about reproduction in plants.
4. know about seed structure and development.

Unit	Course-I (Course Code: BSTT 111) Seed Development and Morphology	No. of hours per unit/credits
Unit I	Introduction to Seed Technology	07
	1.1 Need and Role of Seed Technology. 1.2 Concept of Seed, Definition and types (based on endosperm, no. of cotyledons and viability), difference between Seed and Grain, importance of seed to plant and human. 1.3 Morphology of crop and seed for identification of varieties of following crops- Potato, Onion, Jowar, Wheat, Soybean & Sugarcane. (Any two locally cultivated varieties).	
Unit II	Crop Families and Embryology	08
	2.1 Classification of crops (based on season, lifecycle, uses), Major crops belonging to the Dicotyledons and Monocotyledons families –Fabaceae (<i>Phaseolus</i> , <i>Glycine</i>), Brassicaceae (<i>Brassica</i> , <i>Raphanus</i>), Solanaceae (Brinjal, Tomato), Poaceae (Jowar, Maize). 2.2 Structure of anther and ovule. 2.3 Fertilization, Endosperm formation & Embryo.	
Unit III	Reproductive Biology	08

	<p>3.1 Structure of Dicotyledonous and Monocotyledonous flowers- Unisexual (Cucurbits and Maize) and Bisexual (Beans and Jowar); Monoecious, Dioecious Plants.</p> <p>3.2 Pollination and Pollinating agents.</p> <p>3.4 Apomixis & Polyembryony.</p>	
Unit IV	Seed structure and Development	07
	<p>4.1 Structure of Dicotyledonous and Monocotyledon seeds, external and internal characters e.g. Cotton, Pea, Castor and Maize.</p> <p>4.2 Seed ripening and maturation process.</p> <p>4.3 Storage of reserve food in seeds.</p>	

Course Outcomes: The student will be able to.....

1. know the concept of Seed Technology and analyze the role in human welfare.
2. know about reproductive biology of plants.
3. learn basic concepts of plant embryology and its importance.
4. basic knowledge about major crop families.

Reference Books:

1. Singh, Pande and Jain, 2019. A text book of Botany Angiosperms, New Delhi: Rastogi publication.
2. Singh B. D., 2018. Plant Breeding: Principles and Methodology, New Delhi: Kalyani Publishers.
3. Joshi A. K., and Singh B. D., 2017. Seed Science and Technology. New Delhi: Kalyani Publishers.
1. Mondal S. S., 2009. Seed Production of field crops, New Delhi: New India Publishers Agency.
2. Bhojwani S. S., and Bhatnagar S. P., 1999. Embryology of Angiosperms, New Delhi: Vikas Publishing Pvt. Ltd.
3. Khan A. A. 1977. Physiology and Biochemistry of Seed Dormancy and Germination, North Holland, Amsterdam,
4. Maheshwari P., 1950. An Introduction to Embryology of Angiosperms, New York: Mc Graw Hill Book Co.
5. ICAR, Hand book of Agriculture, New Delhi.
6. Jha D. K., Seed Pathology, New Delhi: Vikas Publishing House Pvt. Ltd.

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester- I

Course-II (Course Code: BSTT 112)

Instrumentation and Techniques in Seed Technology

Course Objectives: The student should be able to.....

1. understand the basic knowledge about instrumentation.
2. imbibe the knowledge of different seed processing machines.
3. impart the knowledge about principles of seed treatment, seed processing plants.
4. know about the seed storage and packaging.

Unit	Course-II (Course Code: BSTT 112) Instrumentation and Techniques in Seed Technology	No. of hours per unit/ credits
Unit I	Instrumentation for Seed processing	07
	1.1 Concept and objectives of seed processing: concept and importance, Basic flow pattern, seed processing pathway of seed improvement, physical characteristics used to separate seeds. 1.2 Instruments for seeds processing: Scalper, Debarred, Maize Scarifier and Sheller, licensing of machines. 1.3 Seed drying: advantages of seed drying, moisture content, Orthodox/recalcitrant methods of seed moisture measurements, of seed drying (wet and dry seeds), advantages of mechanical drying equipment's dehumidification and drying of heat sensitive seeds, relative humidity and equilibrium, moisture content of seeds.	
Unit II	Seed processing machines	08
	2.1 Principle, construction, working, adjustments, cleaning and uses of seed processing machines: i. Air screen cleaner cum grader ii. Specific gravity separator, aspirators, pneumatic aspirators, stoner iii. Roll mill iv. Magnetic separators, Spiral separators, dropper best separator, electrostatic separators.	

Unit III	Seed treatment and Seed processing plant	08
	3.1 Seed Treatment: Principle, construction, working, adjustments and uses of slurry seed treater, mist-o-matic seed treater, storage and labeling of treated seeds, seed user's safety. 3.2 Seed processing plant: Site selection, layout of machines in a seed processing plant for efficient product, seeds in post-harvest phase, conservation of energy and production. 3.3 Seed conveyors and elevator: bucket elevator, belt conveyor, screen conveyor, oscillation conveyor, pneumatic conveyor	
Unit IV	Seed storage and packing	07
	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 identity, lot numbers, seed pellets, handling and stacking, maintenance of seed processing records.	

Course Outcomes: The student will be able to.....

1. know the concept and objectives of seed processing.
2. know the various techniques of seed packaging.
3. learn principle, construction, working, cleaning and uses of seed processing machines.
4. know the different equipments used for seed processing.

Reference Books:

1. ICAR. 2017. Handbook of Agriculture. 6th ed. New Delhi: Indian Council of Agricultural Research, Joshi A. K., Singh B. D. 2005. Seed Science and Technology. New Delhi: Kalyani Publishers.
2. Chakraverty A. 1988. Post-Harvest Technology of Cereals, Pulses & Oil Seeds, Publisher: New Delhi: Oxford and IBH Publishing Company.
3. Hall, C. W. 1980. Drying and Storage of Agricultural Crops, Westport, conn.: AVI Publishing Company.
4. Henderson S. M., Perry R., 1976. Agricultural Process Engineering. 5th Ed. A Westport CT: AVI Publishing Company, Inc.

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester- I

Practical Course-I (Course Code: BSTP 113)

Practicals based on Theory Course I and II

Course Objectives: The student should be able to.....

1. understand knowledge to students about different families.
2. practical knowledge to students about morphology of dicotyledonous and monocotyledons seeds.
3. to participate students in experiential Course-with these practicals.
4. practical knowledge to students about seed storage and machinery management.

Credits (02)	Practical Course-I (BSTP 113) (Practicals based on Theory Courses- I and II)	No. of hours per unit/credits 60 Hrs (4 Hrs/practical)
Section-I	<ol style="list-style-type: none">1. Study of family Fabaceae.2. Study of family Brassicaceae.3. Study of family Solanaceae.4. Study of family Poaceae.5. Morphology of Dicot seeds (Castor and Groundnut).6. Morphology of Monocot seeds (Maize and Jowar).7. Morphological study of any two varieties of the following crops – Soybean, Sugarcane, Jowar, Wheat.8. Study of floral biology of monocots.9. Study of floral biology of dicots.10. Study of pollen germination by sucrose solution.11. Study of Pollen viability.12. Study of bucket elevator, screw conveyers and pneumatic elevators.13. Study of threshing machine and its use.	

	<p>14. Fumigation-principle and practical application.</p> <p>15. Demonstration & handling of stereo binocular microscope.</p> <p>16. Study of seed processing machines (air screen cleaner cumgrader, magnetic separator, specific gravity separator, seedtreatment machines).</p> <p>17. Measurement of seed moisture content by OSWA & moisture meter/ oven drying method.</p> <p>18. Study seed treating equipment- Seed dresser</p> <p>19. Visits to warehouse, godowns and market.</p> <p>20. Visits to seed processing units in Satara.</p>	
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Course Outcomes: The student will be able to.....

1. observe and describe major crops in different families.
2. recognize the difference between monocot and dicot seeds.
3. observe the seed processing machines and their uses.
4. determine the seed moisture content by different methods.

Books Recommended:

1. Joshi A. K., Singh B. D., 2017. Seed Science and Technology. New Delhi: Kalyani Publishers.
2. Khare D., Bhale M. S. 2014. Seed Technology. 2nd ed. Jodhpur: Scientific Publisher.
3. Bhaskaran, M., et al., 2002. Principles of Seed Production and Quality Control. Department of Seed Science and Technology, Tamil Nadu Agricultural University, Coimbatore. 365.
4. Carl W.H. 1980. Drying. Farm Crops. Westport CT: Avi Publishing Company, Inc.
5. Chakravarty A., 1988. Post-Harvest Technology and Cereals, Pulses & Oil Seeds Unit II. New Delhi: Oxford and IBH Publishing Company,
6. Henderson S. M., Perry R., 1976. Agricultural Process Engineering. 5th ed Unit III. A Westport CT: AVI Publishing Company, Inc.
7. Gregg B.R., et al., 1970. Seed Processing. New Delhi: National Seeds Corporation.
8. Bindra D. S. Plant Protection and Equipment's. New Delhi: Oxford and IBH Publishing Company.

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester I

Open Elective (OE)

(BSTTOE1) Business Management P-I

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester I

(BSTTIKS 1) Introduction to Indian Knowledge System (IKS)

Course Objectives:

Students should be able to

1. understand the concept of Indian knowledge system.
2. study the various Indian art and culture and their influence.
3. know the heritage of Indian science and technology.
4. learn the global influences of IKS.

Unit	Course-I (Course Code: BSTTIKS 1) Introduction to Indian Knowledge System	No. of hours per unit/ credits
Unit I	Fundamentals of Indian Knowledge System	07
	1.1 Definition, Concept and Scope of IKS 1.2 Overview of Indian Knowledge systems 1.3 IKS based approaches on knowledge paradigms 1.4 Applications of Indian knowledge systems in modern times	
Unit II	Indian Art and Culture	08
	2.1 Overview of Indian Art and Culture 2.2 Tribal art and culture 2.3 Folk art and craft traditions 2.4 Influence of Indian Art on western art movements	
Unit III	Indian Science and Technology in IKS	08
	3.1 Indian Science and Technology Heritage 3.2 Case studies of Indian Scientists and technologists 3.3 Applications of Indian Science and technology in modern times 3.4 Relevance of Indian Science and technology in global context	
Unit IV	Indian Knowledge Systems : Global Influence	07
	4.1 Contemporary global interest in Indian culture and spirituality 4.2 Indian influence on development of various sciences. 4.3 Case studies of scientists influenced by ancient Indian knowledge systems crop performance and yield. 4.4 Relevance of Indian Knowledge systems in addressing global challenges.	

Course outcomes:

Students should be able to

1. explain the concept of Indian Knowledge system.
2. identify the various Indian art and culture and their influence.
3. recognize the heritage of Indian science and technology.
4. describe the global influences of IKS.

References:

1. Avari B., 2016. India: The Ancient Past: A History of the Indian Subcontinent from c. 7000 BCE to CE 1200. London: Routledge.
2. Nair Shantha N., 2008. Echoes of Ancient Indian Wisdom. New Delhi: Hindology Books.
3. Chakkrabarty D. K., Makkhan Lal, 2014. History of Ancient India (Set of 5 Volumes), Aryan book International publication.
4. Jha Amit, Traditional knowledge system in India, Atlantic Publisher
5. Potter K.H., 2000. Encyclopaedia of Indian Philosophies, Vol.III. Delhi: Motilal Banarasidass,
6. Kapur K and Singh A.K (Eds) 2005. Indian Knowledge Systems, Vol.1. Indian Institute of Advanced Study, Shimla. Tatvabodh of sankaracharya, Central Chinmay mission trust, Bombay.
7. Satprakashananda 2005. The Methods of Knowledge according to Advaita Vedanta. Calcutta: Advaita Ashram,
8. Singhania Nitin 2022. 5th Edition Indian Art and Culture, McGraw Will Publication: UP

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester II

Course-III (Paper Code: BSTT 221)

Fundamentals of Seed Technology

Course Objectives: Students will be able to.....

1. understand the basic knowledge about fundamentals of seed technology.
2. imbibe the knowledge of different seed types.
3. impart the knowledge about principles of seed development.
4. impart the knowledge about seed viability.

Unit	Course-III (Course Code: BSTT 221) Fundamentals of Seed Technology	No. of hours per unit/ credits
Unit I	Seed Technology and its role	07
	1.5 Seed Technology- Concept and Objective: Concept of Seed and Grain. 1.6 Types of seed, Role of Seed Technology. 1.7 Scope of seed technology in employment generation. 1.8 Seed Industry scenario in India. Seed industry & global market.	
Unit II	Structure of flower and seed development	08
	2.5 Floral structure in relation to seed development, Microsporogenesis and Megasporogenesis. 2.6 Types and mechanism, Self- incompatibility and male sterility. Agencies for pollination. 2.7 Seed Development, Seed coat structure and development. External and internal features of monocot and dicot seeds, Seed Dispersal.	
Unit III	Seed Dormancy and its Germination	08
	3.5 Seed germination; Types of Seed germination (epigeal and hypogeal). 3.6 Physiological process during seed germination; Factors affecting to seed germination. 3.7 Seed dormancy- types, significance, mechanism (endogenous and exogenous). 3.8 Factors regulating seed dormancy, Methods of breaking dormancy, Genetic control of seed dormancy.	

	3.9 Role of phytochrome and PGRs	
Unit IV	Seed Viability and Seed Vigour	
	4.5 Seed viability, causes for loss of seed viability. 4.6 Seed vigour- importance and underlying genetic mechanism. 4.7 Physiological basis of seed vigour. Seed ageing. 4.8 Physiology of seed deterioration; seed viability theories in relation to crop performance and yield.	

Course Outcomes: The student will be able to.....

1. learn about concept of seed technology and objective.
2. learn floral structure in relation to seed development.
3. get knowledge about Types of seed germination.
4. get knowledge of Seed viability and Seed vigor.

Reference Books:

1. Khare D., Bhale M. S., 2023. Seed Technology. 2nd ed. Jodhpur: Scientific Publisher.
2. Black M., Bewley D. and Halmer P. 2006. The Encyclopedia of Seeds: Science, Technology and Uses; CABI.
3. Chhabra A. K. 2006. Practical Manual of Floral Biology of Crop Plants. Dept. of Plant Breeding, CCSHAU, Hisar.
4. Bhojwani, S. S., and Bhatnagar, S. P. 2000. The Embryology of Angiosperms 4th ed., New Delhi: Vikas Publishing House.
5. Agrawal, R. L. 1997. Seed Technology. 2nd ed. New Delhi: Oxford & IBH Publ. Co. Daryaganj.
6. Agrawal P. K. and Dadlani M. 1995. Techniques in Seed Science and Technology. 2nd ed. New Delhi: South Asian Publication.
7. Singh H., Bindra O. S., 1971. Pesticide Application Equipment's, New Delhi: Oxford and IBH Publishing Company,

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester II

Course-IV (Course Code: BSTT 222)

Vegetable seed Production

Course Objectives: Students will be able to.....

1. understand the basic knowledge of different aspects of hybrid vegetable seed production.
2. imbibe the knowledge of hybridization techniques.
3. to impart the knowledge about breeding and recent advances of vegetable seed production.
4. make the students aware of the vegetable crops.

Unit	Course-IV (Course Code: BSTT 222) Vegetable Seed Production	No. of hours per unit/ credits
Unit I	Vegetable Seed Production	07
	1.1 Historical account, present status, importance and future of vegetable seed production, objectives of vegetable breeding.	
	1.2 Classification of vegetable crops- Root crops, bulb crops leafy crops flowering crops and fruit crops. 1.3 Role of Apomixis in Vegetable seed production.	
Unit II	Techniques in Hybridization	08
	2.1 Pollination: Types, natural cross pollination, extent of it in vegetable crops, its role in vegetable seed production and pollination vectors in vegetable crop.	
	2.2 Hybridization: Introduction, definition and role	
	2.3 Steps involved in hybridization (emasculation, pollination, bagging tagging) 2.4 Simple, back and test cross.	
Unit III	Breeding and Recent Advances	08
	3.1 Introduction: Definition, collection, maintenance, evaluation storage, role and utilization.	
	3.2 Selection Methods (Pedigree and Bulk): Definition, methods, and achievements.	

	3.3 Recent advances in vegetable seed production	
Unit IV	Requirements of Vegetable Seed Production	07
	Seed Production of Fruit crop, Root Crop and Bulb crop with respect to following steps: a) Land requirement b) Seedling/Root production c) Nursery management d) Planting e) Cultural practices f) Breeding methods used g) Plant protection h) Seed harvesting i) Seed drying j) Seed grading k) Seed extraction (Wet - dry methods)	

Course Outcomes: The student will be able to.....

1. learn about concept of different aspects of hybrid vegetable seed production.
2. students are able to learn natural cross pollination.
3. understand recent advances in vegetable seed production of hybridization techniques.
4. get knowledge of aware about the breeding and recent advances of vegetable seed production.

Reference Books:

1. Khare D., Bhale M. S. 2016. Seed Technology. 2nd ed. Jodhpur: Scientific Publisher.
2. Prem Singh A. 2016. Vegetable Breeding- Production and Seed Production. Ludhiana: Kalyani Publication.
3. Prasad R. 2015. Textbook of Field Crop Production. New Delhi: Directorate of information and Publication of agriculture.
4. Singh C. B 2014. Handbook of Seed Testing. New Delhi: Anmol Publication Pvt. Ltd
5. Singh B. D. 2006. Plant Breeding: Principles and Methods. Ludhiana: Kalyani Publication.
6. Chopra V. L 2005. Plant Breeding and Practice. New Delhi: Oxford and IBH Publishing Company Pvt. Ltd.
7. Fagaria M. S., Choudhary B. R., Dhaka R. S. 2005. Vegetable Crops Production Technology. New Delhi: Kalyani Publisher.
8. Agrawal R. L. 1998. Fundamentals of Plant Breeding and Hybrid Seed Production. New Delhi: Oxford and IBH Publishing Company Pvt. Ltd.

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester II

Practical Course-II (Course Code: BSTP 223)

Practicals based on Course III and IV

Course Objectives: The student should be able to.....

1. to give practical knowledge to students about floral biology of monocots and dicots.
2. to give practical knowledge to students about Pollen germination, pollen sterility and germination tests.
3. to participate students in experiential Course-with these Practical.
4. to give practical knowledge to students about hybridization techniques.

Credits (02)	Practical Course-II (Course Code: BSTP 223) Practicals based on Theory Course-III and IV	No. of hours per unit/credits 60 Hrs. (4 hrs/practical)
Section-II	<ol style="list-style-type: none">1. Study of Pollen viability.2. Vigour Tests (Brick gravel, Course-piercing, Accelerated Aging and Vigour index)3. Different germination tests by using Course-towel and petridish method.4. Methods of breaking seed dormancy.5. Study of Hybridization technique with respect to any crop.6. Study of self-pollinated crops.7. Study of cross-pollinated crops.8. Study of synthesis of artificial seed.9. Emasculation of various crops.10. Study of epigeal seed germination.11. Study of hypogeal seed germination.12. Study of viviparous seed germination.13. Identification of weed and other crop seeds as per specific	

	<p>crops.</p> <p>14. Study of Fruit crop- Tomato; Root crop- Radish; Bulb crop- Onion</p> <p>15. Study of seed drying methods.</p> <p>16. Study of planting methods.</p> <p>17. Study of nursery management.</p> <p>18. Study of seed harvesting methods.</p> <p>19. Visit to Nursery to understand about horticultural crops.</p> <p>20. Visit to Botanical Garden.</p>	
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Course Outcome: The student will be able to

1. observe and describe floral biology of monocots and dicots.
2. observe Pollen germination, pollen sterility and germination tests.
3. recognize difference between vegetable crops.
4. prepare artificial seeds.

Reference Books

1. Chopra V. L. 2005. Plant Breeding and Practices. New Delhi: Oxford and IBH Publishing Company Pvt. Ltd.
2. Bench ALR & Sanchez RA. 2004. Handbook of Seed Physiology. Food Product Press.
3. Fageria M. S., Choudhary B. R., Dhaka R. S. 2003. Vegetable Crops Production Technology. New Delhi: Kalyani Publisher.
4. Bewley JD & Black M. 1982. Physiology and Biochemistry of seeds in Relation to Germination. Vols. I, II. Springer Verlag.

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester II

Open Elective (OE)

(BSTTOE2) Business Management P-II

Bachelor of Science (B. Sc.) Part – I: Seed Technology

Semester II

VEC

(BSTTVEC1) Democracy, Good Governance and Constitution of India