Savitribai Phule Pune University, Pune
(Formerly, University of Pune)

Under Graduate Degree Program in Botany
(Faculty of Science & Technology)

Revised Syllabi as per National Education Policy (2020) for
B.Sc. Seed Technology
(For Colleges Affiliated to Savitribai Phule Pune University, Pune)

To be implemented from
Academic Year 2024-2025

Framed by
BOARD OF STUDIES IN BOTANY
Savitribai Phule Pune University,
Ganeshkhind, Pune -07.

(Dr. Mahesh N. Khande)
Chairman - BoS Botany

OBJECTIVES

- To promote the possibility of self-employment
- To bridge up the gap between knowledge based conventional education and market demands and to provide an alternative to those pursuing higher education.
- To enrich students' training and knowledge that would be useful in the seed industry so that the farmers will get quality seeds
- To introduce the concepts of experimental design in Seed Technology
- To inculcate sense of job responsibilities, while maintaining social and environment awareness
- To help students build-up a progressive and successful career in industries with a biotechnological perspective

According to NEP-2020 criteria, the Under Graduate degree in Botany (F.Y.B.Sc. Seed Technology) program at Savitribai Phule Pune University, Pune's associated colleges, is structured to provide students with advanced field-related knowledge and essential fundamentals. Through a unique combination of required major core courses with in-depth exposure to multidisciplinary minor, elective, and vocational skill courses, among other courses, students will be trained and acquire the fundamental and advanced knowledge essential to the plant sciences industries.

With the knowledge gained in the field of plant sciences, this upgraded curriculum will develop educated, outcome-oriented candidates who are nurtured through discovery and learning, equipped with practice and skills to deal with practical problems, and competent with recent pedagogical trends in education, including E-learning, flipped class, hybrid learning, and experiential learning. These candidates will become responsible citizens, transforming the nation to lead the world in the future.

After successful completion of the Under Graduate (UG) Degree program, following POs, PSOs, Cos, will be acquired by the students

PROGRAM OUTCOMES (POS)

PO1: Attain thoughtful proficiency in the field of seed sciences.
PO2: Acquire the ability to perform in multidisciplinary domains.
PO3: Attain the ability to exercise intelligence of scientific knowledge for investigation and innovation and nourishment of the world.
PO4: Learn value based ethical practices and principles committed to professional ethics.
PO5: Incorporate 21st century skill oriented self-directed and life-long learning.
PO6: Obtain ability to inculcate the knowledge of plant science in diverse contexts with global perspective.
PO7: Attain maturity to harness the destiny and responds to one’s calling.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: 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.
PSO2: Understand the advanced concepts of Seed Science and Technology and its implementation for the improvement of crop productivity.
PSO3: 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.
PSO4: Know about the importance of seeds and its relevance in modern agriculture.
PSO5: Adapt methods of scientific research in plant improvement program and create entrepreneurships, employment to the society.

PSO6: Enrich the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, and enhance communication skill.

PSO7: Apply the fruitful knowledge of seed sciences and plant resources for the sustainable development, betterment of society and environment by recognizing the ethical values.

PSO8: Demonstrate knowledge and scientific understanding to identify research problems, design experiments, use appropriate methodologies, analyze and interpret data and provide solutions. Exhibit organizational skills and the ability to manage time and resources.

Course Outcomes (Cos)

Course Code: ST-101-T
Course Title: Principles of Seed Science

CO1: Familiarize with structure and function of the flower
CO2: Acquaint with the flower morphology of specific crop
CO3: Learn the technique of pollination and fertilization
CO4: Awareness regarding the aspects of quality seeds

Course Code: OE 101 ST-T
Course Title: Agro-tourism

CO1: Know the needs and opportunities in Agro tourism
CO2: Learn different types of Agro tourism
CO3: Acquire information regarding farm stays and accommodation
CO4: Knowledge to face challenges at agro tourism centres

Course Code: OE 102 ST-T
Course Title: Plants and Human Welfare

CO1: Acquaint with the major and minor food yielding crops
CO2: Techniques regarding the byproducts of cereal and oil yielding crops
CO3: Techniques regarding the byproducts of vegetable and fruit crops
CO4: Techniques regarding the byproducts of spices and condiment crops
CO5: Technique regarding wine production

Course Code: OE 103 ST-T
Course Title: Agriculture for Competitive Exams

CO1: Basic requirements of agricultural knowledge for competitive exams
CO2: Know the cropping systems, meteorology, water and soil parameters
CO3: Acquire information regarding Geo informatics
CO4: Acquaint with the Maharashtra Land Revenue code, agricultural land act, and land requisition act.

Course Code: SECP 101 ST-P
Course Title: Flower Design Techniques

CO1: Know the seasonal flowers
CO2: Information regarding types of flower arrangements
CO3: Familiarize with essential tools and materials for floral arrangements
CO4: Floral Business economics

Course Code: SECP 102 ST-P
Course Title: Post-Harvest Technology

CO1: Acquaint the knowledge of PHT and its need
CO2: Techniques regarding preparation of Jam, Jelly, Candy, Tomato sauce, Puree, Ketchup, Pickles etc.

CO3: Technique for preparation of Aloe gel
CO4: Information regarding fruit processing industry

Course Code: SECP 103 ST-P
Course Title: Application of Pollen Biology in Bee Keeping

CO1: Familiarize with the different types of honey bee colonies
CO2: Know the importance of honey bee in human life
CO3: Tricks to become successful beekeeper
CO4: Hands on training for honeybee production

Course Code: ST-151-T
Course Title: Principles of Seed Technology

CO1: Acquaint with the history of seed technology
CO2: Familiarize with classes of seed
CO3: Learn the crop improvement techniques
CO4: Awareness regarding the components of seed technology

Course Code: OE 151 ST-T
Course Title: Fruit Processing and Dehydration Technology

CO1: Know the needs and opportunities in Fruit Processing and Dehydration Technology
CO2: Learn nutritive values of fruits and vegetables
CO3: Acquire information fruits and vegetable processing
CO4: Knowledge regarding equipment's used in Fruit Processing and Dehydration

Course Code: OE 152 ST-T
Course Title: Mushroom technology

CO1: Acquaint with the edible mushrooms
CO2: Techniques regarding the mushroom production
CO3: Knowledge regarding mushroom receipes
CO4: Economics of mushroom cultivation

Course Code: OE 153 ST-T
Course Title: Vertical and Terrace Gardening

CO1: Know vertical gardening and its need
CO2: Basic requirements of vertical garden and its need
CO3: Acquire information regarding irrigation and fertilizers
CO4: Ideas to become a successful landscaper

Course Code: SECP 151 ST-P
Course Title: Plant Preservation Techniques

CO1: Know the tools and equipment's in plant collection
CO2: Information regarding drying specimens
CO3: Familiarize with herbarium preparation
CO4: Techniques for wet specimen preparation

Course Code: SECP 152 ST-P
Course Title: Millets for Sustainable Agriculture Development

CO1: Acquaint the knowledge of major millets
CO2: Know the nutritive values of millets
CO3: Learn the benefits of millets
CO4: Hands on training of preparation of millet products

Course Code: SECP 153 ST-P
Course Title: Plant Propagation Techniques

CO1: Familiarize with the tools and equipment's
CO2: Know the types of nursery beds
CO3: Study propagation methods
CO4: Hands on training for bonsai techniques

1. Title of the Course: B.Sc. Seed Technology (03 years) / B.Sc. with Honours in Seed Technology (04 years)

Syllabus revised as per National Education Policy (NEP) 2020 for the Colleges Affiliated to Savitribai Phule Pune University, Pune

2. Faculty - Science and Technology

3. To be implemented -For FYBSc (Semester I and Semester II), from August 2024.

4. Preamble -

Preamble:

Vocational Seed Technology is a three year degree course approved by Savitribai Phule Pune University taught at undergraduate level since 1995 under the Vocationalisation of first degree education scheme sanctioned by UGC. The course "Seed Technology" was introduced in 1995 only at Pravara Rural Education Society's Padmashri Vikhe Patil College of Arts, Science and Commerce, Pravaranagar and has fetched employment to most of the students in reputed seed industries. The course is coordinated and conducted by the Department of Botany of the college.

Seed Technology is a science dealing with the methods of improving genetic and physical characteristics of seed. Study of seed technology is necessary for two reasons. Firstly, the introduction of hybrids and high yielding varieties of crop plants of immense importance has necessitated great care in the maintenance and preservation of seed. Secondly, if seed production is to evolve as a prime enterprise, instead of a byproduct as it has been characteristically handled down through the centuries. Development of seed enterprise is absolutely necessary in the context of modern agriculture. It is the quickest way of increasing agricultural production. Much of our success in increasing food production has been due to the development of seed enterprise over the past decade. Seed demand at present is strong and expected to continue expanding.

Indian economy depends on agriculture and about 60 % of Indian population depends on agriculture. For quality production the farmers need quality seeds or propagating materials. Unless the farmer gets seeds, which are genetically pure and possess other desired qualities namely, high germination percentage and vigour, high purity, sound health etc. they cannot obtain the expected yields.

Quality material is provided to the farmers by the seed industries established throughout the country. These industries are in continuous demand for the knowledgeable, trained, talented Seed Technologists. These industries provide career opportunities to the graduate and post graduate students in the following ways:

- Management of seed enterprise (Govt./Semi govt. undertakings and private seed companies)
- State and Central Seed Testing Laboratories
- Seed Certification Agencies
- Seed Law Enforcement Agencies
- Training/Extension Centers
- Research Institutes

The course focuses on training of students in plant breeding, tissue culture, seed health testing techniques, testing for purity of seeds, crop improvement, protection and storage techniques. Seed technology is of prime importance because

- Seed is a carrier of new technologies
- Seed is a basic tool for secured food supply

- Seed is the principal means to secure crop yields in less favourable production areas
- Seed is a medium for rapid rehabilitation of agriculture in cases of natural disaster

The proposed syllabus lays more stress on practical's as compared to theory. It concentrates on experimental practice and theoretical aspects. This approach justifies the term 'vocational'.

The teaching center will develop trained manpower for the industries and employments will be generated. Students can also become entrepreneurs. Trained and competent teachers with experience in industry would be ideal to teach the subject. Besides such teachers, persons from industry could contribute to the course.

Program Duration and Exit Options

The UG Program lasts for four years or eight semesters. Student may leave the program after the third year if, he/she would like to receive a three-year undergraduate degree.

If the student decides to withdraw after the first or second year, he/she will receive a UG Certificate or UG Diploma, depending on how many credits he/she is able to complete. Re-entering within three years to finish the degree program is allowed for students who leave with a UG certificate or UG diploma. A student must earn a minimum of 18 credits and a maximum of 26 credits each semester. It is recommended, nevertheless, that student should opt 22 credits per semester. This clause aims to give student the comfort of a flexible semester-based course load. However, Table 1 lists the minimum number of credits required to be earned in order to be awarded an Undergraduate Certificate/Undergraduate Diploma/Bachelor Degree/Bachelor's Degree with Honors in Botany.

Table1: Type of Awards and Stages of Exit

Sr. No.	Type of Award	Stage of Exit	Mandatory Credits
1.	Undergraduate Certificate in Seed Technology	After successful completion of First year Semesters	44
2.	Undergraduate Diploma in Seed Technology	After successful completion of Second year Semesters	88
3.	Bachelor of Science in Seed Technology	After successful completion of Third year Semesters	132
4.	Bachelor of Science in Seed Technology (Honours)	After successful completion of Fourth year Semesters	176

5. Eligibility Criteria -

The basic criteria for Under Graduate Degree (F.Y.B.Sc. Seed Technology) admission will be 10+2 criteria with Biology, Physics, Chemistry, as Principal subjects OR Crop Science, Animal Science, Dairy Science, MCVC, Crop Production OR Diploma courses related to Plant Sciences. Admissions will be given as per the selection procedure / policies adopted by the college keeping in accordance with the conditions laid down by the Savitribai Phule Pune University, Pune. Reservation and relaxation are as per the State Government rules.

6. Fee Structure – As per the norms of Savitribai Phule Pune University, Pune.

7. Duration of the Course

Certificate Course- 01 year (Completion of 02 Semesters)
Diploma Course- 02 years (Completion of 04 Semesters)
BSc Degree- 03 years (Completion of 06 Semesters)
BSc Degree with Honours- 04 years (Completion of 08 Semesters)

8. No. of semesters – Two semesters per year
9. Medium of instructions and teaching: English
10. Course Implementation criteria for Theory and Practical:

a. Each semester comprises of 15 weeks (12 weeks Actual Teaching + 3 weeks for Continuous Internal Evaluation).

b. One Credit of the Theory is equal to15 clock hours (Teaching 1 hour per week for each credit, 12 hours Actual Teaching + 3 hours Continuous Internal Evaluation – Assignments, Tutorials, Practice, Problem solving sessions, Group discussion, Seminars and Unit Tests.

c. One Credit of Practical = 30 clock hours. (2 Contact hours per credit per week)
One Credit = 30 clock hours (24 hours' Actual Table work + 6 hours for journal competition, and Continuous Internal Evaluation of each practical).

d. Practical for each course comprises of 02 Credits = 60 clock hours. Therefore,

- Minimum 12 laboratory sessions of 04 clock hours must be conducted in one semester.
- In case of short practical, two practical's should be conducted in one session.
- Each practical of 04 clock hours in the laboratory should consist of: Table performance for concerned practical, careful observations, calculation, writing results and conclusion, and submission of practical in written form.
- Pre-laboratory reading and post laboratory assignments should be given on each practical as a part of continuous internal evaluation.

11. Examination Pattern (For each Semester): The examinations will be conducted semester wise for both Theory as well as Practical courses.

- **Theory Paper of 02 Credits -**
  - Internal Exam (15 M) + University Theory Exam (35 M) = Total 50 M
  - Duration: For Internal exam = 40 Min. and For University Exam = 02 hours.
- **Practical Paper of 2 Credits -**
  - Internal Exam (15 M) + University Practical Exam (35 M) = Total 50 M
  - Duration: For Internal exam = 40 Min. and For University Exam = More than 04 hours.

12. Award of Class/Grade: The class / grade for the courses of each semester will be followed as per the norms and conditions laid down by SPPU, Pune.
13. ATKT Rules: As per the norms given by SPPU, Pune.
14. Important Note:

a. There shall be at least a short tour/field visit/industrial visit (1-2 days) per year for all UG students. Tours are the part of curriculum and obligatory to each student, failing which they will not be considered eligible to appear for the practical examination. Under unavoidable circumstances, if the student fails to attend the tour, he/she have to produce justifiable evidence for not attending the tour. However, in lieu of tour the candidate will have to complete the work assigned by the Department.
c. The documents to be produced by each student at the time of practical examination (at the end of each Semester) are:

- Submission of practical records (Journals).
- Submission of a Tour / Visit report duly signed by the concerned practical In-charge and Head of the Department.
- Any submissions / assignments, etc. based on the practical course.

CREDIT FRAMEWORK FOR FYBSc SEED TECHNOLOGY, SEMESTER – I (Level 4.5 / 100)

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Vertical – 1 (V1)			
Subject-1 (1T + 1P) x 2C = 4C	ST 101-T	Principles of Seed Science	**2 C**
	ST 102-P	Practical Based on ST 101 T	**2 C**
Subject-2 (1T + 1P) x 2C = 4C	**Subject-2-T**	---	**2 C**
	Subject-2-P	---	**2 C**
Subject-3 (1T + 1P) x 2C = 4C	**Subject-3-T**	---	**2 C**
	Subject-3-P	---	**2 C**
Vertical – 3 (V3)			
Generic Elective (GE) / Open Elective (OE) - (1T = 2C) (Any one from basket)	OE 101 ST-T	Agro-tourism	**2 C**
	OE 102 ST-T	Plants and Human Welfare	
	OE 103 ST-T	Agriculture for Competitive Exams	
Vertical – 4 (V4)			
Vocational Skill Courses (VSC) – (0C)	-------	---	**0 C**
Skill Enhancement Courses (SEC) – (1T / 1P = 2C) (Any one from basket)	SECP 101 ST-P	Flower Design Techniques	**2 C**
	SECP 102 ST-P	Post-Harvest Technology	
	SECP 103 ST-P	Application of Pollen Biology in Bee Keeping	
Vertical – 5 (V5)			
Indian Knowledge Systems (IKS) – (1T = 2C) (Any one from basket)	ST 101 IKS –T	Generic	**2 C**
Ability Enhancement Courses (AEC) – (1T = 2C)	AEC-101-ENG-T	English	**2 C**
Value Education Courses (VEC) – (1T = 2C)	VEC-101-ENV-T	Environmental Awareness	**2 C**
Vertical – 6 (V6)			
FP / OJT / CEP	**-----**	**------**	**0 C**
Co-curricular Courses (CC)	----	-----	**--**
Total Credits (V1+V2+V3+V4+V5+V6)			**22 C**

CREDIT FRAMEWORK FOR FYBSc SEED TECHNOLOGY, SEMESTER– II (Level 4.5 / 100)

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Vertical – 1 (V1)			
Subject-1 (1T + 1P) x 2C = 4C	ST 151-T	Principles of Seed Technology	**2 C**
	ST 152-P	Practical Based on ST 151 T	**2C**
Subject-2 (1T + 1P) x 2C = 4C	**Subject-2-T**	---	**2 C**
	Subject-2-P	---	**2 C**
Subject-3 (1T + 1P) x 2C = 4C	**Subject-3-T**	---	**2 C**
	Subject-3-P	---	**2 C**
Vertical – 3 (V3)			
Generic Elective (GE) / Open Elective (OE) - (1P = 2C) (Any one from basket)	OE 151 ST-P	Fruit Processing and Dehydration Technology	**2 C**
	OE 152 ST-P	Mushroom technology	
	OE 153 ST-P	Vertical and Terrace Gardening	
Vertical – 4 (V4)			
Vocational Skill Courses (VSC) – (0C)	--------	------	**0 C**
Skill Enhancement Courses (SEC) – (1T / 1P = 2C) (Any one from basket)	SECP 151 ST-P	Plant Preservation Techniques	**2 C**
	SECP 152 ST-P	Millets for Sustainable Agriculture Development	
	SECP 153 ST-P	Plant Propagation Techniques	
Vertical – 5 (V5)			
Indian Knowledge Systems (IKS) – (0C)	-----	-------	**0 C**
Ability Enhancement Courses (AEC) – (1T = 2C)	AEC-151-ENG-T	English	**2 C**
Value Education Courses (VEC) – (1T = 2C)	VEC-151-ENV-T	Environmental Awareness	**2 C**
Vertical – 6 (V6)			
FP / OJT / CEP – (0C)	-----	------	**0 C**
Co-curricular Courses (CC) – (1T = 2C)	CC 151-T	Any one from Basket	**2 C**
		Total Credits (V1+V2+V3+V4+V5+V6)	**22 C**
		Total Credits for FYBSC - Semester I (22 C) + Semester II (22 C)	**44 C**

Exit Option: Award of UG Certificate (UG Certificate Course in Botany) in Major with 44 Credits and an additional 4 Credits core NSQF course / Internship OR Continue with Major and Minor.

Continue option: Student will select one subject among the subject 1, subject 2 and subject 3 as major and another as minor and third subject will be dropped.

Question paper pattern for Theory (2 Credit courses)

A student will have to solve the question paper of 35 marks. The paper setter should set the paper on entire syllabus for total 61 marks, including optional questions. As the course is of 2 Credits (30 clock hour lectures), paper setter should allot 2.03 marks per lecture and accordingly, questions should be set for 30 lectures, 61 marks on entire syllabus.

Note: All questions are compulsory.
Time: 2 Hours

Que. 1) Answer any five of the following in one sentence 05 Marks

- Six questions
- Each for 1 mark

Que. 2a) Write any one of the following 06 Marks

i.
ii.

Que. 2b) Write any one of the following 04 Marks

i.
ii.

Que. 3a) Solve any one of the following 06 Marks

i.
ii.

Que. 3b) Solve any one of the following 04 Marks

i.
ii.

Que. 4) Write notes on (Any four) 10 Marks

a.
b.
c.
d.
e.
f.

FYBSc SEED TECHNOLOGY [Semester - I]

FYBSc SEED TECHNOLOGY [Semester - I]

COURSE DETAILS		COURSE CODE	COURSE TITLE	CREDITS
	Vertical – 1 (V1)			
Major Core Courses – (1T + 1P) x 2C = 4C		ST 101-T	Principles of Seed Science	2 C
		ST 102-P	Practical Based on ST 101-T	2 C
Major Elective Courses - (0C)		-----	------	0 C

FYBSc SEED TECHNOLOGY [Semester - I]
Course Code: ST-101-T
Course Title: PRINCIPLES OF SEED SCIENCE
[No. of Credits: 2 C] **[No. of Lectures: 30 L]**

Sr. No.	Topics	No. of Lectures
	CREDIT-I	
1.	**Chapter-1: Introduction to Flower** • Introduction • Definition • Parts of typical flower (Vegetative and Reproductive) • Functions of flower	4L
2.	**Chapter-2: Study of Flower with reference to following families** • Malvaceae • Fabaceae • Solanaceae • Cucurbitaceae • Liliaceae • Poaceae	6L

3.	**Chapter-3: Micro and Megasporogenesis**
	• Microsporangium
	  ○ Definition of microsporogenesis and microsporangium
	  ○ Structure (T.S of typical anther)
	  ○ Development of microspore and male gametophyte
	• Megasporangium
	  ○ Definition of megasporogenesis and megasporangium
	  ○ Structure (L.S of Ovule)
	  ○ Development of megaspore and female gametophyte
		5L

	CREDIT-II	
4.	**Chapter-4: Pollination** • Definition	4L

	• Types of pollination (Autogamy, Geitonogamy and Allogamy) • Contrivances in self and cross pollination • Agencies of allogamy (Anemophily, Hydrophily, Entomophily, Ornithophily, Cheiropterophily) • Advantages and Disadvantages of self and cross pollination	
5.	**Chapter-5: Fertilization** • Definition of Fertilization • Types of Fertilization: Porogamy, Chalazogamy, Mesogamy • Process of Double Fertilization	**3L**

6.	**Chapter-6: Seed**
	• Definition of Seed
	• Structure of Seed
	• Functions and Importance of Seed
	• Difference between Seed and Grain
	• Types of Seed
	  ○ Based on Structure (Monocot and Dicot)
	  ○ Based on Life Span (Recalcitrant and Orthodox)
		4L

7.	**Chapter-Quality Characters of Good Seeds** • Concept • Germination Percentage • Genetic Purity • Physical Purity • Moisture Percentage • Seed Health • Seed Vigor	**4L**

References:

- Taxonomy of Angiosperms- S. N. Pandey and S. P. Mishra, Ane Books Pvt. Ltd.
- A text book of Botany-Angiosperms- B. P. Pandey, S. Chand and Company Ltd.
- Plant systematics- Gurucharan Singh, Oxford and IBH Publishing Co. Pvt. Ltd.
- Taxonomy of Angiosperm, V. Sing & D. K. Jain, Rastogi Publications ,1997
- Introduction to principle of plant taxonomy (Second Edition), V. V. Sivarajan ,Oxford & IBH Publishing Co. Pvt. Ltd.,1996
- Advance Plant Taxonomy , A. K. Modal, New McGraw- Hill Publishing Company Limited, 2006
- Taxonomy of Angiosperm, Dr. A.V. S. S. Sambamurty, I. K. International Pvt. Ltd.
- A text book of Practical Botany-2, Bendre and Kumar, Rastogi Publications

FYBSc SEED TECHNOLOGY [Semester - I]
Course Code: ST-102-P
Course Title: Practical Based on ST 101-T
[No. of Credits: 2 C] **[No. of Lectures: 60 L**

Sr. No.	Title of the Practical	No. of Practical
1.	Study of typical flower w.r.t pedicel, calyx, corolla, androecium and gynoecium	**1P**
2.	Study of any suitable flower of family Malvaceae in detail	**1P**
3.	Study of any suitable flower of family Fabaceae in detail	**1P**
4.	Study of any suitable flower of family Solaceae in detail	**1P**
5.	Study of any suitable flower of family Cucurbitaceae in detail	**1P**
6.	Study of any suitable flower of family Liliaceae in detail	**1P**
7.	Study of any suitable flower of family Poceae in detail	**1P**
8.	Study of structure of typical anther and microspore	**1P**
9.	Study of structure of male gametophyte	**1P**
10.	Study the germination of pollen grains	**1P**
11.	Study the pollen grains of any five suitable crop plants	**1P**
12.	Study of structure of typical ovule and its types	**1P**
13.	Study the flowers adapted to pollination by different agents such as wind, insects and birds.	**1P**
14.	Study of internal and external structure of Monocot seed with suitable example	**1P**
15.	Study of internal and external structure of Dicot seed with suitable example	**1P**

Note: All practical mentioned in the list are mandatory

FYBSc SEED TECHNOLOGY
Semester – I

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Generic Elective (GE) / Open Elective (OE) - (1T + 1P = 4C) (Any one from basket)	OE-101-ST-T	Agro-tourism	**2 C**
	OE-102-ST-T	Plants and Human Welfare	
	OE-103-ST-T	Agriculture for Competitive Exams	

FYBSc SEED TECHNOLOGY
[Semester - I]
Course Category – Open Elective / Generic Elective (OE)
Course Code – OE-101-ST-T
Course Title: Agro-Tourism
[No. of Credits: 2 C] **[No. of Lectures: 30 L]**

Sr. No.	Topic Details	No. of Lectures
	Credit I	**15**
1	**Introduction to Agro-tourism** 1.1. Definition, nature and scope of agro-tourism. 1.2. Historical background and evolution of Agro-Tourism 1.3. Needs and opportunities of agro-tourism. 1.4. Importance of agro-tourism in rural development.	**03**
2	**Types of Agro-Tourism Activities** 2.1. Types of agro-tourism activities – Farm tours and visits; farm stays and rural accommodations; agricultural festivals and events. 2.2. Concept of food and agriculture tourism.	**03**
3	**Important Factors related to Agro-Tourism** 3.1. Location for agro-tourism center. 3.2. Geographical factors- relief, climate, drainage pattern, soil. 3.3. Socio-economic factors- Capital, transportation facilities, market, landholding of farmers, tradition, cropping pattern.	**05**
4	**Concerns of Agro-Tourism Centers** 4.1. Criteria to start Agro-Tourism centers - Infrastructure Facilities, livestock, Recreation facilities, Other Miscellaneous. 4.2. Benefits of Agro-Tourism Centers. 4.3. Challenges of the Agro-Tourism centers.	**04**
	Credit II	**15**
5	**Activities in Agro-Tourism centers** 5.1. Animal Feeding, Guided field visits and tour, Watching domestic animals, seasonal crop festival.	**05**

	5.2. Rural Festival/Jatra, Marketing of Farmer's produce (local /organic products), Milking the Cow and Buffalos, Religious Temple visits. 5.3. Swimming at well, ponds or river, fishing, Local site seeing. 5.4. Rural/folk games, dance, music etc. - Bullock cart, Bicycle, Tractor rides. *Vittidandu, Surparambhya, Kabaddi, Langadi, Kho-Kho, Bullock ploughing, Lagore & Gallori*. 5.5. Adventure activities- mountaineering, trekking, river crossing, cycling etc.	
6	**Agro-Tourism policies** 6.1. Agro-Tourism policies in Maharashtra state. 6.2. Maharashtra Krishi Paryatan Vistar Yojana- MKPVY 6.3. Introduction and the concept. 6.4. Guidelines for approval and Guidelines of agro- tourism. 6.5. Application form for registration. 6.6. Checklist of facilities for approval. 6.7. Declaration by the farmer. 6.8. Undertaking by the farmer. 6.9. Performa for police verification.	**07**
7	**Tourism Marketing strategy** 7.1. Use of Social Media, Print Media, Attractive booking policies (for group/company/corporate etc.) 7.2. Website/Apps development for online booking and marketing.	**03**

References:

1. Dennis M. Brown and Richard J. Reeder, 'Agri-tourism Offers Opportunities for FarmOperators'2004, U.S.A.
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FYBSc SEED TECHNOLOGY
[Semester - I]
Course Category – Open Elective (OE) / Generic Elective (GE)
Course Code – OE-102-ST-T
Course Title: Plants and Human Welfare
[No. of Credits: 2 C] **[No. of Lectures: 30 L]**

Sr. No.	Topic Details	No. of Lectures
	Credit I	**15**
1	**Introduction** 1.1. Origin of Cultivated Plants- Concept of Centers of Origin. 1.2. Domestication of plants and origin of agriculture. 1.3. Major and Minor food yielding Crops – Cereals, Pulses, Oil Seeds, Vegetables and Fibers.	**04**
2	**Cereals and Pulses** 2.1. Introduction and definition. 2.2. Cereals and Millets - Uses and byproducts of Wheat, Rice, Maize, Jowar, Bajara and Nachani. 2.3. Non-cereals - Uses and byproducts of Potato, Tapioca and Arrowroot. 2.4. Pulses - Uses and byproducts of Bengal gram, Pigeon Pea, Moong bean, Udid, Soybean, etc. 2.5. Importance of cereals, millets and pulses in human diet.	**06**
3	**Oils and Fats** 3.1. Introduction 3.2. Uses of edible oil yielding plants - Groundnut, Safflower, Mustard, Sesame, Coconut, Sunflower, Soybean, Rice-bran. 3.3. Traditional Methods of oil extraction and its health benefits 3.4. Non edible oil yielding plants- Neem oil, Karanj oil, Castor oil	**05**
	Credit II	**15**
3	**Vegetables and Fruits** 3.1. Introduction 3.2. Vegetables - Classification (as per parts used), Uses, processed byproducts of vegetables. 3.3. Fruits - Uses, processed byproducts of fruits – Mango, Grapes, Banana, Cashew Nut, Custard apple, Papaya, Guava, Lemon, Orange, etc. 3.4. Scope and importance of processed vegetables and fruits.	**05**
4	**Spices and Condiments** 4.1. Introduction, difference between spices and condiments 4.2. Importance of spices and condiments in diet - Turmeric, Ginger, Red Chilli, Coriander, Curry leaves, Clove, Saffron, Cardamom, Nutmeg, Cinnamon, Black pepper, Mustard, etc.	**05**
5	**Beverages** 5.1. Definition, types (alcoholic and non-alcoholic)	**05**

	5.2. Processing of beverages – Wine production (Banana and Grapes), Tea Production and coffee production	

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4. Economic Botany B.P. Pandey. -
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7. A Text Book of Economic Botany - V. Verma.
8. A Text Book of Botany Volume III - S.N. Pandey, A. Chaddha.
9. Botany of Field Crops D. Daniel Sundararaj, G. Tulsidas. -
10. Text Book of Biochemistry E.S. West, W.R. Todd, - H.S. Mason, J.T.V. Bruggin.
11. Introductory Taxonomy B.S. Trivedi, B.B. Sharma. -
12. Glossary of Indian Medicinal Plants - R.N. Chopra, S.L. Nayar, I.C. Chopra.
13. Indian Medicinal Plants - A.V. Sale.
14. Compendium of Indian Medicinal Plants - Volume I, Ram P. Rastogi, B.N. Mehrotra.
15. Economic Botany - Beryl Brintnall Simpson, Molly Conner - Ogorzaly.
16. Plant Groups - H. Mukherji.
17. A Text Book of Botany Volume I-S.N.Pandey, P.S. Trivedi.
18. A Text Book of Botany Volume II S.N. Pandey, P.S. Trivedi, S.P. Misra.
19. A Text Book of Botany Volume 1- A.K. Saxena, R.P. Sarabhai.
20. Botany for Degree Students - Fungi - B.R. Vashishta.
21. Botany for Degree Students - Bryophyta - B.R. Vashishta.
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24. Britanica Macropaedia Volume – 19.
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FYBSc SEED TECHNOLOGY
[Semester - I]
Course Category – Open Elective (OE) / Generic Elective (GE)
Course Code – OE-103-ST-T
Course Title: Agriculture for Competitive Exam
[No. of Credits: 2 C] [No. of Lectures: 30 L]

Sr. No.	Topic Details	No. of Lectures
	Credit I - Basics of Agriculture	**15**
1	1.1. Definition, meaning and branches of Agriculture 1.2. Factors affecting crop production 1.3. Cropping Systems: Definition and types of cropping systems 1.4. Meteorology: weather parameters	**02**
2	2.1. Sources of water. 2.2. Absorption and movement of water in soil. 2.3. Soil moisture constants. 2.4. Forms of soil water. 2.5. Factors affecting available soil moisture. 2.6. Absorption of soil moisture by plant.	**03**
3	3.1. Water requirement. 3.2. Irrigation requirement of crops. 3.3. Factors affecting water requirement. 3.4. Measurement of irrigation. 3.5. Water use efficiency. 3.6. Importance of drainage and their types. 3.7. Effect of drainage on soil and crop growth.	**03**
4	4.1. Food production and consumption trends in India. 4.2. Food security and growing population. 4.3. NFSM and other food security related Government Initiatives. 4.4. Availability of food grains, per capita expenditure on food. 4.5. Food based dietary approaches to eliminate hunger. 4.6. Protein Energy Malnutrition or Protein Calorie Malnutrition (PEM or PCM). 4.7. HRD in context of work capacity of women and children.	**05**
5	5.1. Geo-informatics. 5.2. Crop discrimination and Yield monitoring. 5.3. Remote sensing concepts and application in agriculture. 5.4. Global positioning system (GPS).	**02**
	Credit II - Act and Laws related to Agriculture	**15**
6	**Maharashtra land revenue code** 6.1. Classification of land occupancies. 6.2. Responsibilities and duties of revenue officer. 6.3. Use of lands for agriculture and non- agriculture. 6.4. Encroachment of land, Revenue surveys.	**04**

	6.5. Assessment and settlement of land revenue.	
7	**Tenancy and agricultural lands act** 7.1. Concept of tenancy. 7.2. Right of tenancy. 7.3. Condition of purchase of agriculture land in Maharashtra. 7.4. Sale of tenanted land. 7.5. Confiscation of powers of revenue officers.	**03**
8	**Land acquisition acts** 8.1. Essential commodities act in relation to cotton, sugarcane, food grains. 8.2. Right to Fair compensation and Transparency in Land Acquisition. 8.3. Rehabilitation and Resettlement Act, 2013.	**02**
9	**Scopes, benefits coverage and limitations of the amendments** 9.1. Agriculture Pest and Disease Act (1950) 9.2. Prevention of Food Adulteration Act (1954) 9.3. Food production order Act (1956) 9.4. Asian Development Bank Act (1966) 9.5. Indian Seeds Act (1966) 9.6. Vegetable Oil Product Act (1967) 9.7. Insecticides Act (1968) 9.8. Agriculture Produce Market Act (1972) 9.9. Meat Food Products Order (1973) 9.10. Vegetable Oil Product (standard of quality) Order (1975) 9.11. Regional Rural Banks Act (1976) 9.12. Indian Veterinary Council Act (1984) 9.13. Consumer Protection Act (2019) 9.14. Indian Fisheries Act (1897) 9.15. Central Agricultural Universities Act (1992) 9.16. Destructive insects and Pests (Amendment and Validation) Act (1992) 9.17. The Protection of Plant Varieties and Farmers' Rights Act (2001) 9.18. Biodiversity Act (2002).	**06**

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2. Textbook of Field Crops Production-Commercial Crops (Vol-II), ICAR Publication, New Delhi.
3. Handbook of Agriculture, ICAR Publication, New Delhi.
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FYBSc SEED TECHNOLOGY
Semester – I

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Skill Enhancement Courses (SEC) – (1T / 1P = 2C) (Any one from basket)	SEC-101-ST-P	Flower Design Techniques	**2 C**
	SEC-102-ST-P	Post-Harvest Technology	
	SEC-103-ST-P	Algal Technology	

FYBSc SEED TECHNOLOGY
Semester – I
Course Category – Skill Enhancement Course (SEC)
Course Code – SEC-101-ST-P
Course Title: Flower Design Techniques
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Topic Details	Weightage
1	To study the structure of typical flower.	1P
2	To study the seasonal flowers and their characteristics.	1P
3	To study the types/styles of flower arrangements (e.g., Ikebana, European, Contemporary) with the help of ICT tools.	1P
4	To demonstrate the essential tools and materials used in flower arrangement.	1P
5	To study the selection of flowers and foliage types used for flower arrangement.	2P
6	Demonstration of drying and preservation of flowers.	1P
7	Preparation of traditional flower designs -Garland, Gajra, Veni etc.	1P
8	Preparation of floral Rangoli.	1P
9	To study the different type of bouquets.	2P
10	To study the methods of vase life improvement of cut flowers.	1P
11	Visit to floriculture industry and study of floral business economics.	2P
12	To study the role of flower arrangement in event management.	1P

FYBSc SEED TECHNOLOGY
Semester – I
Course Category – Skill Enhancement Course (SEC)
Course Code – SEC-102-ST-P
Course Title: Post-Harvest Technology
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Topic Details	Weightage
1	To demonstrate the methods of post-harvest handling - Harvesting, Precooling, Sorting, Grading, Packaging with the help of ICT Tools	1 P
2	To demonstrate the methods of Sorting and Grading	1 P
3	To study the preparation of Jam, Jellies and Candies.	3 P
4	To demonstrate the equipment's and technology used in Food Processing with the help of ICT tools	1 P
5	To study the preparation of Tomato sauce, puree and ketch up	2 P
6	To study the preparation of crush, squash and syrup	3 P
7	To study the preparation of pickles from fruits /vegetables	1 P
8	To study the preparation of Aloe vera gel	1 P
9	Visit to fruit processing industry/ cold storage/ fruits ripening unit	2 P

FYBSc SEED TECHNOLOGY
Semester – I
Course Category – Skill Enhancement Course – Practical (SECP)
Course Code – SEC-103-ST-P
Course Title: Application of Pollen Biology in Bee Keeping
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Practical	Weightage
1.	Visit to botanical garden and enlist the flowering plants	1P
2.	Survey of the types of honey bee colonies present in the college campus and create the geo-tagging photo album	1P
3.	Anatomical structure of honeybees and importance of pollen basket	1P
4.	Equipment used for pollen collection in beekeeping	1P
5.	To estimate the protein concentration in the pollen grain by Lowry's method	1P
6.	Observation of the pollen grains under microscope	1P
7.	Awareness rally in any one village about importance of Honeybees	1P
8.	Visit to the local commercial apiary	1P
9.	Survey of the flowering plants present in the campus	2P
10.	Collection of the natural honey, market honey and local beekeeper honey	1P
11.	Observation of the collected honey samples under microscope and identification of the pollen morphology and plant source	1P
12.	Collection of the commercial pollens and observation under microscope and identification of morphology and plant source	1P
13.	Preparation of the pollen calendar of the 10 km radius agricultural and horticultural crops through survey.	1P
14.	12 hours for journal competition, and Continuous Internal Evaluation of each practical	1P

Note: All practical are compulsory

FYBSc SEED TECHNOLOGY
Semester – I

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Indian Knowledge Systems (IKS) – (1T = 2 C)	IKS-101-T	Generic	**2 C**
Ability Enhancement Course (AEC) –(1T = 2 C)	AEC-101-ENG-T	English	**2 C**
Value Education Courses (VEC) – (1T = 2 C)	VEC-101-ENV-T	Environmental Awareness	**2 C**

FYBSc SEED TECHNOLOGY [Semester -II]

FYBSc SEED TECHNOLOGY, SEMESTER– II

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Vertical – 1 (V1)			
Subject-1 (1T + 1P) x 2C = 4C	ST 151-T	Principles of Seed Technology	**2 C**
	ST 152-P	Practical Based on ST 151 P	**2C**
Subject-2 (1T + 1P) x 2C = 4C	**Subject-2-T**	---------	**2 C**
	Subject-2-P	---------	**2 C**
Subject-3 (1T + 1P) x 2C = 4C	**Subject-3-T**	---------	**2 C**
	Subject-3-P	---------	**2 C**

FYBSc SEED TECHNOLOGY [Semester - I]
Course Code: ST-151 T
Course Title: PRINCIPLES OF SEED TECHNOLOGY
[No. of Credits: 2 C] **[No. of Lectures: 30 L]**

Sr. No.	Topics	No. of Lectures
	CREDIT-I:	
1.	**Chapter-1: Introduction to Seed Technology** • Definition of Seed Technology • History of Seed Technology in India • Scope and Importance of Seed Technology	**4L**
2.	**Chapter-2 Classes of Seed** • Nucleus Seed • Breeder Seed • Foundation Seed • Certified Seed • Truthful Seed	**3L**
2.	**Chapter-3: Government Organizations and Seed Industries in India** • International Seed Testing Association (ISTA) • National Seed Corporation (NSC) • State Seed Corporation (SSC) • Central Seed Committee (CSC) • Central Seed Certification Board (CSCB) • Seed Certification Agency (SCA) • Seed Testing Laboratory (STL) • Seed Industries in India (Any 10 Industries)	**5L**
3.	**Chapter-4: Plant Introduction and Acclimatization** • Definition	**3L**

	• Types (Primary and Secondary) • Merits and Demerits • Important achievements	
	CREDIT-II:	

5.	**Chapter-5: Selection in relation to Crop Variety Improvement**
	• Definition
	• Types of selection methods
	  • Mass Selection
	  • Pureline Selection
	  • Pedigree Selection
	  • Bulk Selection
	  • Clonal Selection
		4L

6.	**Chapter-6: Hybridization** • Definition and Objectives of hybridization • Procedure for hybridization	**3L**
7.	**Chapter-7: Mutation for crop improvement** • Definition • Mutagens (Physical and Chemical), Mutants • Types of mutation (Point, Chromosomal, Spontaneous and Induced) • Limitations and Achievements of mutation breeding	**4L**
8.	**Chapter-8: Components of Seed Technology** • Seed Production, Processing, Certification, Testing, Storage, Physiology, Entomology, Pathology and Marketing	**4L**

References:

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- Seed Technology and hybrid Seed Production- D. K. Das, Astha Publishers and Distributors
- Seed Production and Seed Quality Control- Brijesh Tiwari, Oxford Book Company
- Handbook of Agriculture- *Indian Council of Agricultural Research, New Delhi*
- Plant breeding-B.D Singh, *Kalyani Publishers, New Delhi*
- Essentials of Plant Breeding- Phundan Singh, 2008
- Experimental Seed Science and Technology -Umarani et. *al.* 2006., *Agrobios, Jodhpur*
- Plant Breeding: Principles and Methods- Phundan Singh, 2009. *Kalyani Publishers, New Delhi*
- Seed Technology- Agrawal, 2005. *Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi*
- Principles of crop production-Reddy, 2008. *Kalyani Publishers, New Delhi*

FYBSc SEED TECHNOLOGY [Semester - I]
Course Code: ST-152 P
Course Title: Practical based on ST- 151-T
[No. of Credits: 2 C] **[No. of Lectures: 60 L]**

Sr. No.	Practical's	Weightage
1.	Study Induced Mutation by Physical/Chemical Mutagen	2P
2.	Study types of Mutants (Xantha, Chlorina, Albino etc.)	1P
3.	Study Hybridization Techniques in Chilli/Brinjal/ Cotton (Any 2)	2P
4.	Study detasseling technique in Maize	1P
5.	Study methods used for Seed storage (Traditional and Industrial)	1P
6.	Study seed storage containers	1P
7.	Demonstration of seed processing equipment's and machineries	2P
8.	Study to read seed tags (Foundation, Certified, Truthful)	1P
9.	Study general layout for Seed Testing laboratory	1P
10.	Submission of Any 5 seed samples of crop[plants	1P
11.	Visit any one Seed Industry/ Processing Plant/ Research Institute	2P

FYBSc SEED TECHNOLOGY
Semester – II

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Generic Elective (GE) / Open elective (OE) – (1P = 2 C) (Any one from basket)	OE-151-BOT-P	Fruit Processing and Dehydration Technology	**2 C**
	OE-152-BOT-P	Mushroom technology	
	OE-153-BOT-P	Vertical and Terrace Gardening	

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Generic Elective / Open Elective (OE)
Course Code – OE-151-ST-P
Course Title: Fruit Processing and Dehydration Technology
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Practical	Weightage
1.	To study the procedure for selection of Fruits and Vegetables for Processing	1P
2.	To study the nutritive values of selected fruits and vegetables	1P
3.	To study the working of equipment's used in fruit processing	1P
4.	To study the working of equipment's used in dehydration techniques	1P
5.	To study the preparation of Fruit Juice and Pulp with suitable examples	1P
6.	To study the preparation of Jam and Marmalade with suitable examples	1P
7.	To study the preparation of Jelly and Tutti Frutti with suitable examples	1P
8.	To study the preparation of Squash, Syrup and Crushes with suitable examples	1P
9.	To study the preparation of Fruit bar and Candy with suitable examples	1P
10.	To study the preparation of Pickles with suitable fruits and vegetables	1P
11.	To study the preparation of Tomato Ketchup and Soup	1P
12.	To study the dehydration technique used in preparation of Onion powder	1P
13.	To study the technique used in preparation of dehydrated vegetables-Potato and Beet root	1P
14.	To study the technique used in preparation of dehydrated vegetables-Fenugreek and Chickpea	1P

15.	To study the technique used in preparation of dehydrated vegetables- Carrot and Pea	1P
16.	To study the quality control parameters in Fruit and Vegetable Processing	1P
17.	Industrial Visit to any one Fruits and Vegetables for Processing Unit	1P

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Generic Elective / Open Elective (OE)
Course Code – OE-152-ST-P
Course Title: Mushroom technology
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Practical	No. of Practical
1	To study the morphology of mushroom.	2 P
2	Demonstrate equipment's required for mushroom production	1 P
3	To demonstrate types of mushrooms.	1 P
4	Demonstrate preparation of spawn with the help of flow diagram	1 P
5	To Prepare any suitable bed for cultivation of Oyster mushroom	2 P
6	To demonstrate harvesting of mushrooms.	1 P
7	To perform any suitable method for mushroom preservation	1 P
8	Preparations of different types of Mushroom recipes. (Any two) Eg. Mushroom Pulao, Mushroom soup, mushroom Omelets, Mushroom Pakora, Mushroom curry, Mushroom pickles etc	4 P
9	Visit to Mushroom Growing Industry / Small scale unit and Submit the report at the time practical examination.	2 P

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Generic Elective / Open Elective (OE)
Course Code – OE-153-ST-P
Course Title: Vertical and Terrace Gardening
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Practical	No. of Practical
1	Study of vertical gardening and its types (Demonstration).	1 P
2	Study of the basic requirements used for vertical gardening.	1 P
3	Preparation of the small and large A-shaped vertical garden.	1 P
4	Preparation of a Vertical Garden with recyclable material.	1 P
5	Preparation of container based vertical gardens.	1 P
6	Preparation of kitchen waste manure for vertical gardening.	1 P
7	Preparation of hydroponic and aquaponics gardening.	1 P
8	Preparation of green roof gardening. (Demonstration).	1 P
9	Study of the permaculture and edible landscaping.	2 P
10	Preparation of herb spiral and terrace vegetable garden.	1 P
11	Study of irrigation and fertilizer application	1P
12	Visit to vertical garden/ Local nurseries and garden centers/workshops and events on vertical gardening. Submit the report at the time practical examination	2 P
13	Visit to Private residency with rooftop gardens/ Green tokri	**1 P**

FYBSc SEED TECHNOLOGY
Semester – II

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Skill Enhancement Courses (SEC) – (1T / 1P = 2C) (Any one from basket)	SEC-151-ST-P	Plant Preservation Techniques	**2 C**
	SEC-152-ST-P	Millets for Sustainable Agriculture Development	
	SEC-153-ST-P	Plant Propagation Techniques	

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Skill Enhancement Course – Practical (SECP)
Course Code – SEC-151-ST-P
Course Title: Plant Preservation Techniques
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Title of the Practical	No. of Practical
1	Study of tools and equipment used in plant collection.	**1 P**
2	Study of preparation of dried specimen using different drying methods - Air drying, Press drying, Desiccant drying, Oven drying and Glycerin drying.	**3 P**
3	Study of preparation of pressed specimen for herbarium preparation.	**1 P**
4	Demonstration of Processing of specimen with respect to Identification, Label preparation, Mounting, Accessioning.	**1 P**
5	Preparation of herbarium sheets of flowering plants.	**1 P**
6	Study of wet preservation techniques for cryptogams.	**2 P**
7	Study of wet preservation techniques for phanerogams.	**2 P**
8	Demonstration of modern preservation methods used in dry floral arrangements.	**2 P**
9	Visit to museum/herbarium/ plant preservation processing unit.	**1 P**
10	Submission of Herbarium, dried preserved specimens and wet preserved specimens.	**1 P**

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Skill Enhancement Course – Practical (SECP)
Course Code – SEC-152-ST-P
Course Title: Millets for Sustainable Agriculture Development
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Title of the Practical	No. of Practical
1	To Demonstrate major millets, nutritive values and benefits	1 P
2	Hands on training on preparation of millet bread	1 P
3	Hands on training on preparation of millet cookies	1 P
4	Hands on training on preparation of flaked jowar	1 P
5	Hands on training on preparation of germinated ragi/multigrain drink	1 P
6	Hands on training on preparation of multigrain pasta	1 P
7	Hands on training on preparation of multigrain halwa	1P
8	Hands on training on preparation of millet based upma	1P
9	Hands on training on preparation of millet pappad	1P
10	Hands on training on preparation of Rajgira ladoo	1P
11	Hands on training on preparation of millet (Ragi) roti	1P
12	Hands on training on preparation of millet muffins	1P
13	Hands on training on preparation of millet noodles	1P
14	Hands on training on preparation of millet Shankarpali (Sweet Diamond Cuts)	1P
15	Collection and submission of millet samples 50 grams each (Any Five)	1P

FYBSc SEED TECHNOLOGY
Semester – II
Course Category – Skill Enhancement Course – Practical (SECP)
Course Code – SEC-153-ST-P
Course Title: Plant Propagation Techniques
[No. of Credits: 2 C] [No. of Lectures: 60 L]

Sr. No.	Title of the Practical	No. of Practical
1	Demonstration of Tools and Equipment's used for plant propagation	1 P
2	Demonstration of Glass house, Green House, Net House and Poly house using ICT tools	1 P
3	Study of plants in ornamental gardens – Climbers, Creepers, Palms, Ferns, Grasses (Cacti) and Succulents.	1 P
4	Demonstration of planting materials and various types of containers used in nursery.	1 P
5	Preparation of nursery beds for raising of seedlings.	1 P
6	To study the natural vegetative methods of plant propagation.	2 P
7	To study the artificial vegetative methods of plant propagation – cutting and grafting	2 P
8	To study the artificial vegetative methods of plant propagation – budding and layering	2 P
9	To study the potting and repotting of ornamental plant.	1 P
10	Demonstration of different types of irrigation systems, fertilizer applications and weed practices in nursery management.	1 P
11	Demonstration of Bonsai techniques, Terrace, Vertical, and Indoor Garden with the help of ICT tools.	1 P
12	Visit to crop/Ornamental /Forest nursery and submission of visit report.	1 P

FYBSc SEED TECHNOLOGY
Semester – II

COURSE DETAILS	COURSE CODE	COURSE TITLE	CREDITS
Ability Enhancement Courses (AEC) – (1T = 2 C)	AEC-151-ENG-T	English	**2 C**
Value Education Courses (VEC) – (1T = 2 C)	VEC-151-ENV-T	Environmental Awareness	**2 C**
Co-curricular Courses (CC) – (1T = 2 C)	CC-151-T	Any one from basket	**2 C**