॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड – ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील खालील विषयाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२५—२०२६ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबधितांना कळविण्यात येते की, प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील C.B.C.S. (Choice Based Credit System) Pattern नुसारचे खालील अभ्यासक्रम शैक्षणिक वर्ष २०२५—२६ पासून लागू करण्यास मा. विद्या परिषदेच्या दिनांक २९ मे २०२४ रोजीच्या बैठकीतील ठराव क्रमांक १६/६१—२०२५ अन्वये मान्यत प्रदान केली आहे.

1. B.Sc. Seed Technology III year

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहे. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शैक्षणिक– /०१/परिपत्रक/UG/
पदवी–सीबीसीएस अभ्यासक्रम/२०२५–२६/185
दिनांक : २५.०७.२०२५

आपला विश्वासू
सहाय्यक कुलसचिव

प्रत माहिती व पुढील कार्यवाहीस्तव :

१) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळवण्यात येते की, सदरील परिपत्रक विद्यापीठाच्या संकेतस्थळावर प्रसिध्द करण्यात यावे.

B. Sc. THIRD YEAR
SEED TECHNOLOGY-CURRICULUM
Revised- 2021-2022

WITH EFFECT FROM JUNE-2021

INTRODUCTION:

The SRTMUN is gearing up for several initiatives towards academic excellence, quality improvement and administrative reforms. In view of this priority and in keeping with Vision and Mission, process was already initiated towards introduction of semester system, grading system and credit system. In the recent past, University had already implemented Credit based grading system to campus schools and Choice Based Credit System (CBCS) pattern for PG in all the affiliated colleges from the academic year 2014-2015. These regulations shall be called as Choice Based Course Credit System & Grading, 2014. In short it will be referred as SRTMUN CBCS REGULATION. Similarly university had implemented Choice Based Credit System (CBCS) pattern at UG level from the academic year 2016-2017 progressively (for B.Sc. first year from 2016-2017, for B.Sc. second year form 2017-2018 and for B.Sc. third year from 2018-2019 respectively).

Revision and updating of the curriculum is the continuous process to provide an updated education to the students at large. In view of this priority and in keeping with vision and mission, process of revision and updating the curriculum is initiated and implemented at UG level from the academic year **2019-2020** progressively (for B.Sc. first year from **2019-2020**, for B.Sc. second year form **2020-2021** and for B.Sc. third year from **2021-2022** respectively). Presently there is wide diversity in the curriculum of different Indian Universities which inhibited mobility of students in other universities or states. To ensure and have uniform curriculum at UG and PG levels as per the SRTMUN CBCS REGULATION, curriculum of different Indian Universities, syllabus of NET, SET, MPSC, UPSC, Forest Services and the UGC model curriculum are referred to serve as a base in updating the same.

The B.Sc. Seed Technology (General) semester pattern course is running in different affiliated colleges of the SRTMUN. The course content has been designed under CBCS pattern. The course content of each theory paper is divided into units by giving appropriate titles and subtitles. For each unit, total number of periods required is mentioned. A list of practical exercises and skills for laboratory work to be completed in the academic year is also given. A common skeleton question paper for all the courses is also provided at the end of the syllabus.

SALIENT FEATURES:

The syllabus of B.Sc. Third year Seed Technology has been framed to meet the requirement of Choice based Credit System. The courses offered herein will train and orient the students in the field of Seed Technology.

The DSCS-I deals with Seed Production in Field Crops and DSCB-II deals with the Seed Legislation and Certification. The DSCBP-I deals with the principles, techniques, and practices involved in producing high-quality seeds of major field crops. It covers varietal identification, field standards, isolation, and post-harvest handling. Students will gain practical skills in seed production planning, field inspection, and maintaining genetic purity. The DECB-I&II deals with the detection, identification, and management of seed-borne pathogens and pests affecting seed quality. It includes seed pathology, seed nematology, quarantine regulations, and seed health testing methods. Students will gain knowledge of disease transmission, diagnostic techniques, and strategies for producing healthy seeds. The DECBP-I deals with scientific methods for producing high-quality seeds and ensuring their health by

managing seed-borne diseases and pests. It covers crop-wise seed production techniques, field and seed standards, seed certification, and seed health testing. Students will gain practical knowledge of seed production, inspection, disease diagnosis, and integrated management for healthy and certified seed lots. Discipline Specific Courses and Discipline Specific Elective Courses offered during this program are designed with the aim of imparting specific practical knowledge to the students which will lead to self-employability through development of their own enterprises.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PE01: To equip students with scientific knowledge and practical skills required for the production of genetically pure and high-quality seeds in field and vegetable crops.

PE02: To develop expertise in seed health diagnostics by studying seed-borne pathogens and nematodes and their management strategies.

PE03: To train students in seed testing techniques as per national and international standards to ensure seed viability, purity, and vigor.

PE04: To prepare students for employment in seed industries, seed certification agencies, and plant protection departments.

PE05: To promote awareness of seed quality regulations, quarantine laws, and certification protocols for domestic and international seed trade.

PE06: To encourage higher studies and research in seed science, plant breeding, pathology, and biotechnology to address future agricultural challenges.

PROGRAM OUTCOMES (POs):

PO1: Students will demonstrate the ability to plan and execute seed production programs for major field and vegetable crops with adherence to quality standards.

PO2: Students will be able to identify and manage seed-borne diseases and nematodes using standard diagnostic and treatment methods.

PO3: Students will accurately conduct seed testing procedures for physical purity, germination, moisture content, and seed health.

PO4: Students will understand and apply seed certification and quarantine regulations in real-world production and trade scenarios.

PO5: Students will gain hands-on experience in laboratory and field conditions related to seed sampling, inspection, and processing.

PO6: Students will exhibit communication, problem-solving, and decision-making skills required for careers in seed industry, extension services, and research organizations.

PREREQUISITE:

The optional courses are offered to the students registered for undergraduate programs. Such students should have the basic knowledge of biological science and willing to gain additional knowledge in the field of Seed Technology. Admissions to B. Sc. Program are given as per the University rules.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programme
CLASS: B. Sc. THIRD YEAR, SUBJECT: SEED TECHNOLOGY

An outline:

Semester/ Annual Pattern	Course No.	Course Name	Instruction Hrs/week	Total Periods	Marks for		Credits (Marks)
					Internal (MSA)	External (ESA)	
Semester-V	DSCS-I	**DSCS-I:** Seed Production in Field Crops **(Theory Paper-XII)**	03	45	10	40	Credits: 02 (Marks:50)
	DECS-I	**DECS-I:** Seed Health Technology-I **(Theory Paper-XIII)**	03	45	10	40	Credits: 02 (Marks:50)
Semester-VI	DSCS-II	**DSCS-II:** Seed Legislation and Certification **(Theory Paper-XIV)**	03	45	10	40	Credits: 02 (Marks:50)
	DECS-II	**DECS-II:** Seed Health Technology-II **(Theory Paper-XV)**	03	45	10	40	Credits: 02 (Marks:50)
Annual Pattern	DSCSP-I	**DSCSP-I:** Practicals based on DSCS-I & II **(Practical Paper-XVI)**	03	16 Practicals/Batch/ Year	10	40	Credits: 02 (Marks:50)
	SECS-III	**SECS-III:** Vegetable Seed Production	03	45 (Theory periods-21/Year, Practicals-08/year)	25	25	Credits: 02 (Marks:50)
Annual Pattern	DECSP-I	**DECSP-I:** Practicals based on DECB-I & II **(Practical Paper-XVII)**	03	16 Practicals/Batch/ Year	10	40	Credits: 02 (Marks:50)
	SECS-IV	**SECS-IV**: Seed Testing	03	45 (Theory periods-21/Year, Practicals-08/year)	25	25	Credits: 02 (Marks:50)
Total Marks & Credits Semester-V and VI					Marks: 110	Marks: 290	Credits: 16 Marks:400

(**DSCS:** Discipline Specific Course in Seed Technology, **DSCSP:** Discipline Specific Course in Seed Technology Practicals**, DECS:** Discipline Elective Course in Seed Technology, **DECSP:** Discipline Elective Course in Seed Technology Practicals, **MSA:** Mid Semester Assessment, **ESA:** End Semester Assessment
SECS: Skill Enhancement Course in Seed Technology,
Distribution of credits (80% of the total credits for ESA and 20% for MSA):
MSA of 10 Marks (Theory): 05 marks for Test and 05 marks for home assignment
MSA of 10 Marks (Practical): 05 marks for Test and 05 marks for Record book & submissions (Excursion report, collected plant material, keys, models etc.)
MSA of Marks 25: 15 for marks Seminar & 10 marks for Test)

SEMESTER–V

DESCIPLINE SPECIFIC COURSE IN SEED TECHNOLOGY-DSCS (A Theory Course)
DSCS-I: Seed Production in Field Crops (**Theory Paper-XII**)

DESCIPLINE ELECTIVE COURSE IN SEED TECHNOLOGY -DECS (A Theory Course)
DECS-I: Seed Health Technology-I (**Theory Paper-XIII**)

Periods: 45
Credits: 02 (Maximum Marks: 50)

SEMESTER–V

DSCS-I: SEED PRODUCTION IN FIELD CROPS

(Theory Paper-XII)

Learning Objectives:

1. To understand the principles and techniques of quality seed production in field crops.
2. To gain knowledge of seed certification standards and field inspection procedures.
3. To learn about post-harvest handling, processing, and storage of seeds.

Learning Outcomes:

1. Students will be able to identify and apply appropriate methods for seed production in major field crops.
2. Students will demonstrate the ability to conduct field inspections and follow certification protocols.
3. Students will manage post-harvest seed operations ensuring viability and purity.

UNIT-I: PRINCIPLES OF SEED PRODUCTION (11 Periods)

Basic principles in seed production and importance of quality seed. Floral structure, breeding and pollination mechanism in self-pollinated cereals and millets viz., wheat, barley, paddy & ragi. Methods and techniques of quality seed production in self-pollinated cereals and millets.

UNIT-II: FLORAL BIOLOGY AND HARVESTING MECHANISM OF CEREALS (12 Periods)

Floral structure, breeding and pollination mechanism in cross-pollinated cereals and millets viz., maize, sorghum and bajra; Methods and techniques of quality seed production in cross-pollinated cereals and millets.

UNIT-III: FLORAL BIOLOGY AND HARVESTING MECHANISM OF PULSES & OIL SEEDS (11 Periods)

Floral structure, breeding and pollination mechanism in Pulses viz., pigeon pea, chick pea, green gram, black gram, field beans and peas ; Methods and techniques of seed production in pulses, groundnut, caster, sunflower and sesame.

UNIT-IV: FLORAL BIOLOGY AND HARVESTING MECHANISM OF OIL SEEDS AND HORTICULTURAL CROPS (11 Periods)

Floral structure, breeding and pollination mechanism in oil seeds viz., groundnut, Castor and sunflower; horticultural crops viz. tomato, bhendi, brinjal, and flower crops Methods and techniques of seed production in major oil seeds and horticultural crops.

Theory Paper-XII: Seed Production in Field Crops
(Unit Wise Distribution of Periods and maximum marks)

Unit	Title of the unit	Periods Distributed	Maximum Marks
Unit-I	Principles of seed production	11	20
Unit-II	Floral biology and harvesting mechanism of cereals	12	20
Unit-III	Floral biology and harvesting mechanism of pulses & oil seeds	11	20
Unit-IV	Floral biology and harvesting mechanism of oil seeds and horticultural crops	11	20
	Total	**45**	**80**

SEMESTER–V
DECS-I: SEED HEALTH TECHNOLOGY-I
(Theory Paper-XIII)

Learning Objectives:

1. To understand seed-borne diseases and their impact on seed quality.
2. To learn methods for detection, diagnosis, and management of seed pathogens.
3. To gain knowledge of quarantine regulations and seed health testing standards.

Learning Outcomes:

1. Students will identify common seed-borne pathogens and their transmission.
2. Students will apply appropriate techniques for seed health testing and diagnosis.
3. Students will implement integrated approaches for managing seed diseases.

UNIT-I: INTRODUCTION TO SEED PATHOLOGY (11 periods)

Concept, scope, and historical development of seed pathology, types of seed-borne pathogens such as fungi, bacteria, and viruses, economic impact of seed-borne diseases on crop production, basic structure of healthy versus infected seeds.

UNIT-II: PATHOGEN TRANSMISSION AND SEED INFECTION (11 periods)
Mechanisms of pathogen entry, establishment and multiplication within seeds, Systemic and non-systemic infections and the role of environmental and biological factors in pathogen transmission, Localization of pathogens in different parts of the seed and seedling.

UNIT-III: SEED HEALTH TESTING AND CERTIFICATION STANDARDS
(12 periods)

Techniques used to detect seed-borne pathogens, including blotter, agar plate, and PCR-based methods, seed certification standards and permissible tolerance limits as per national and international guidelines, procedures for field inspection and laboratory testing in the seed certification process.

UNIT-IV: MANAGEMENT OF SEED-BORNE DISEASES (11 periods)

Strategies for managing seed-borne diseases through physical, chemical, and biological seed treatments, integrated disease management approaches to ensure healthy seed production. Quarantine regulations, phytosanitary measures, and global initiatives like ISHI and PRA are also discussed.

Theory Paper-XIII: Seed Health Technology-I
(Unit Wise Distribution of Periods and maximum marks)

Unit	Title	Period Allotted	Maximum Marks
Unit-I	Introduction to Seed Pathology	11	20
Unit-II	Pathogen Transmission And Seed Infection	11	20
Unit-III	Seed Health Testing And Certification Standards	12	20
Unit-IV	Management Of Seed-Borne Diseases	11	20
	Total	**45**	**80**

SEMESTER–VI

DESCIPLINE SPECIFIC COURSE IN SEED TECHNOLOGY-DSCS (A Theory Course)
DSCS-I: Seed Legislation and Certification (Theory Paper-XIV)

DESCIPLINE ELECTIVE COURSE IN SEED TECHNOLOGY -DECS (A Theory Course)
DECS-I: Seed Health Technology -II (Theory Paper XV)

Periods: 45
Credits: 02 (Maximum Marks: 50)

SEMESTER–VI

DSCS-I: SEED LEGISLATION AND CERTIFICATION

(Theory Paper-XIV)

Learning Objectives:

1. To understand the legal framework governing seed production and distribution.
2. To learn the procedures and standards for seed certification and labeling.
3. To gain knowledge of national and international seed laws and regulatory bodies.

Learning Outcomes:

1. Students will be able to explain key seed laws and their importance in quality assurance.
2. Students will interpret and apply seed certification standards in practical scenarios.
3. Students will assess compliance of seed production with legal and regulatory norms.

UNIT-I: HISTORY OF SEED CERTIFICATION (11 Periods)

Historical development of Seed Industry in India; Seed quality: concept and factors affecting seed quality during different stages of production, processing and handling; seed quality control- concept and objectives; Central seed certification board (CSCB).

UNIT–II: LEGISLATION IN INDIA (12 Periods)

Regulatory mechanisms of seed quality control- organizations involved in seed quality control programme; seed legislation and seed law enforcement as a mechanism of seed quality control; The Seeds Act (1966), Seed Rules (1968), Seed (Control) Order 1983; Essential Commodities Act (1955); Plants, Fruits and Seeds Order (1989); National Seed Development Policy (1988) and EXIM Policy regarding seeds, plant materials; New Seed Bill-2004. Introduction, objectives and relevance of plant quarantine, regulations and plant quarantine set up in India.

UNIT –III: SEED CERTIFICATION (11 Periods)

Seed Certification- history, concept and objectives of seed certification; seed certification agency/organization and staff requirement; legal status and phases of seed certification; formulation, revision and publication of seed certification standards; Indian Minimum Seed Certification Standards (I.M.S.C.S.)- general and specific crop standards including GM varieties, field and seed standards; planning and management of seed certification programmes- eligibility of a variety for certification, area assessment, cropping history of the seed field, multiplication system based on limited generation concept, isolation and land requirements etc.

UNIT –IV: SEED TESTING AND LAW ENFORCEMENT (11 Periods)

Field Inspection- principles, phases and procedures; reporting and evaluation of observations; pre and post-harvest control tests for genetic purity evaluation (grow-out tests); post harvest inspection and evaluation; seed sampling, testing, labeling, sealing and grant of certificate; types and specifications for tags and labels; maintenance and issuance of certification records and reports; certification fee and other service charges; training and liaison with seed growers. OECD seed certification schemes.

Introduction to WTO and IPRs; Plant Variety Protection and its significance; UPOV and its role; DUS testing- principles and applications; essential features of PPV & FR Act, 2001 and related Acts.

Theory Paper-XIV: Seed Legislation and Certification
(Unit Wise Distribution of Periods and maximum marks)

Unit	**Title of the unit**	**Periods Distributed**	**Maximum Marks**
Unit-I	History of Seed Certification	11	20
Unit-II	Legislation in India	12	20
Unit-III	Seed Certification	11	20
Unit-IV	Seed Testing and Law Enforcement	11	20
	Total	**45**	**80**

SEMESTER–VI
DECS-I: SEED HEALTH TECHNOLOGY-II
(Theory Paper-XV)

Learning Objectives:
1. To understand the biology and life cycle of seed-associated nematodes.
2. To study symptoms and economic importance of nematode infestations in seeds.
3. To learn detection, extraction, and control techniques for seed nematodes.

Learning Outcomes:
1. Students will recognize nematode-infested seeds through symptoms and testing.
2. Students will carry out nematode detection and quantification procedures.
3. Students will suggest effective control strategies including quarantine and treatments.

UNIT-I: INTRODUCTION TO SEED NEMATODES (11periods)
Seed-infesting nematodes, their classification, and their economic importance in agriculture. major genera: Anguina and Aphelenchoides that infest seeds. Life cycles, survival mechanisms, and symptom development on host plants.

UNIT-II: SEED INFECTION BIOLOGY AND TRANSMISSION (11periods)
Entry of nematode into seed: colonize seeds and affect seed anatomy. Infection processes and how nematodes are transmitted from seed to seedling. Environmental influences on infection dynamics with examples of crop-specific nematode transmission.

UNIT-III: DETECTION AND IDENTIFICATION OF NEMATODES (11 periods)

This unit discusses techniques for nematode extraction such as sieving and Baermann funnel methods. It includes morphological identification through microscopy and molecular identification using DNA-based tools. It also describes how to quantify nematode populations in seed samples for diagnosis and decision-making.

UNIT-IV: MANAGEMENT AND REGULATORY MEASURES (12 periods)
This unit deals with the integrated management of seed-borne nematodes through crop rotation, chemical nematicides, and biological control agents. It also outlines seed treatment methods and the use of resistant varieties. Regulatory frameworks for quarantine, import/export standards, and seed certification protocols are emphasized.

Theory Paper-XV: Seed Health Technology-II

(Unit Wise Distribution of Periods and maximum marks)

Unit	Title	Period Allotted	Maximum Marks
Unit-I	Introduction to Seed Nematodes	11	20
Unit-II	Seed Infection Biology and Transmission	11	20
Unit-III	Detection and Identification of Nematodes	11	20
Unit-IV	Management and Regulatory Measures	12	20
	Total	**45**	**80**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programme
CLASS: B. Sc. THIRD YEAR, SUBJECT: SEED TECHNOLOGY

Skeleton Question Paper
End Semester Assessment (ESA)
SEMESTER–V&VI
Theory Paper-XII, XIII & XIV, XV

Time: 1Hour 30 Min
Maximum Marks: 40

Note:
1. Attempt all questions
2. All questions carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Long Answer Type Question (LATQ) **15 marks**
OR
a. Short Answer Type Questions (SATQ) **08 marks**
b. Short Answer Type Question (SATQ) **07 marks**
(This question will be based on any two units with equal weightages to each unit)

Q2. Long Answer Type Question (LATQ) **15 marks**
OR
a. Short Answer Type Question (SATQ) **08 marks**
b. Short Answer Type Question (SATQ) **07 marks**
(This question will be based on remaining two units with equal weightages to each unit excluding the units used for Q1.)

Q3. Attempt any two of the four **10 marks**
a. Short note Type Question (SNTQ) 05 marks
b. Short note Type Question (SNTQ) 05 marks
c. Short note Type Question (SNTQ) 05 marks
d. Short note Type Question (SNTQ) 05 marks
(This question will be based on all the four units of the entire syllabus)

Note: The question paper pattern would be subject to directives of the University from time to time.

Annual Pattern

PRACTICAL COURSES

DSCSP-I: Practicals based on theory paper-XII&XIV- Seed Production in Field Crop and Seed Legislation and Certification. (Practical paper-XVI)

DECSP-I: Practicals based on theory paper-XIII&XV- Seed Health Technology - I&II (**Practical paper-XVII)**

Practicals: 16

Credits: 02 (Maximum Marks: 50)

Annual Pattern

DSCSP-I

Practical paper-XVI: Practicals based on theory paper-XII&XIV

(Seed Production in Field Crop & Seed Legislation and Certification)

Learning Objectives:

1. To study Seed Production in Field Crop.
2. To study Seed Legislation.
3. To study Seed Certification.

Learning Outcomes: Students shall

1. Understand Seed Production in Field Crop.
2. Learn the Seed Legislation Process.
3. Understand Seed Certification Process.

Practical Exercises:

1. Planning of Seed Production in self pollinated cereals (**1Practical**)
2. Planning of Seed Production in cross pollinated cereals (**1Practical**)
3. Planning of Seed Production in pulses (**1Practical**)
4. Planning of Seed Production in oilseeds (**6 Practicals**)
5. Planning of Seed Production in fibres and sugars (**1 Practical**)
6. Seed production in self pollinated crops with special reference to land, isolation, planting ratio of male and female lines. (**6 Practicals**)
7. Seed production in cross pollinated crops with special reference to land, isolation, planting ratio of male and female lines. (**6 Practicals**)
8. General procedure of seed certification (**4 Practicals**)
9. Field inspection at different stages of a crop and observations recorded on contaminants and reporting of results. (**1Practical**)

10. Preparation of Field Inspection report (**1Practical**)
11. Field counting procedure for different crops (**1 Practical**)
12. Seed processing, sampling, methods, equipments-mixing and dividing (**1 Practical**)
13. Testing for seed physical purity, Moisture test-equipments used and Methods (**1 Practical**)

Note:
1. Minimum 16 practical are expected to be completed during the academic year.
2. The submission of practical record book, excursion report, wool models, slides etc. are expected for MSA during the academic year. The MSA carries marks.

Skeleton Question Paper
End Semester Assessment (ESA)
DSCSP-I
Practical paper-XVI: Practicals based on theory paper-XII&XIV
(Seed Production in Field Crop & Seed Legislation and Certification)

Time: Four hours
Maximum Marks: 40

Note:
1. Attempt all questions
2. All questions carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Identify and describe **any five** of the following seed or field samples (Include crop name, seed class, varietal purity characteristics, and relevance in seed production. **(08) -A**

a) Breeder seed sample of rice
b) Foundation seed tag of maize
c) Hybrid seed packet of cotton
d) Rogued plant (off-type) sample from soybean)

Q2. a) Prepare a seed production plan for 1 ha wheat certified seed field-**B** (06)
OR
Draw and label the diagram of a hybrid seed production plot (e.g., maize) -**C**

Q3. Solve the problem- Any Two (12)
Q4. Perform the process of emasculation of the given flower (04)
Q5. Identify and describe in brief the given Spot-**D, E** & **F** (06)
(Spot-D Foundation seed tag, Spot-E based on breeder seed tag, Spot- Certified seed tag)
Q6. Viva-Voce (04)

Annual Pattern

DECSP-I

Practical paper-XVII: Practicals based on theory paper-XIII&XV

(Seed Health Technology-I&II)

Learning Objectives:

1. To understand the nature and transmission of seed-borne diseases and pests
2. To learn techniques for seed health testing and pathogen detection.
3. To study the principles of disease management for producing healthy seeds.

Learning Outcomes:

3. Students will accurately detect and identify seed-borne fungi, bacteria, and nematodes using laboratory techniques.
4. Students will perform seed health tests following national/international standards.
5. Students will demonstrate the ability to recommend suitable seed treatment methods based on diagnosis.

Practical Exercises:

1. Study of commonly occurring seed - borne fungi. (Alternaria, Curvularia etc). **(2 practical)**
2. Study of commonly occurring seed - borne fungi. (Drechslera, Fusarium etc). **(2 practical)**

3. **Study of commonly occurring seed - borne fungi. (**Collectotrichum, Phoma, Macrophomina,**) (2 practical)**

4. Study of commonly occurring seed - borne fungi. (Aspergillus, Rhizopus, Penicillium**). (2 practical)**

5. Methods of examination of seed borne fungi. (Visual and microscopic examination of dry seed**) (2 practical)**

6. Methods of examination of seed borne fungi. (Seed washing test.**) (2 practical)**

7. Incubation methods. (Detection of seed borne fungi by blotter method, Detection of seed borne fungi by agar plate method**). (2 practical)**

8. Incubation methods. (Detection of seed borne fungi by freezing method, Detection of seed borne fungi by 2-4 D method**) (2 practical)**

9. Incubation methods. (Detection of internal seed borne fungi by component plating method, Detection of embryo borne (Ustilago nuda tritici) loose smut of Wheat by Embryo count method**). (2 practical)**

10. **Study or seedling symptom test:** a) Test tube plain agar method b) Hiltner's bricks stone method, c) Sand method d)Standard soil method. **(2 practical)**

11. **Detection of seed borne bacteria:** a) Water agar plate method. **(1 practical)**

12. **Detection of seed borne bacteria:** a) Quartze sand method **(2 practical)**

13. **Detection of seed borne viruses:** a) Examination of dry seed sample Growing on test **(2 practical)**

14. **Detection of externally and internally seed borne pathogens by nucleic acid based techniques** a) RFLP, PCR, Serological techniques like ELISA **(6 practical)**

Note:
1. Minimum 16 practicals are expected to be completed during the academic year.
2. The submission of practical record book, excursion report, collected plant material; slides etc. are expected for MSA during the academic year. The MSA carries marks.

Skeleton Question Paper
End Semester Assessment (ESA)
DECSP-I
Practical Paper-XVII: Practicals based on theory paper-XIII& XV
(Seed Health Technology-I&II)

Time: Four hours
Maximum Marks: 40

Note:
1. Attempt all questions
2. All questions carry equal marks
3. Draw neat and well labeled diagrams wherever necessary

Q1. Calibrate the microscope and measure the size of given spore**-A** (10)

Q2. Identify and describe the symptoms and morphology of causal organism from the given specimen-**B** (12)

Q3. Identify and describe the symptoms of diseased specimen-**C&D** (10)

Q4. Identify and describe the given spots-**E, F, G** & **H** (04)
(E-Equipment, F-Diseased seed material, G-Diseased seed material, H- Diseased seed material)

Q5. Viva-Voce (04)

Annual Pattern

SKILL ENHANCEMENT COURSES (SEC)

SEC-III: Vegetable Seed Production Technology

SEC-IV: Seed Testing

Periods (Theory& Practicals): 45
Credits: 02 (Maximum Marks: 50)

SEC-III: VEGETABLE SEED PRODUCTION TECHNOLOGY

UNIT-I: INTRODUCTION TO VEGETABLE SEED PRODUCTION (6 periods)
Introduction, Types: Home or Kitchen garden, Market garden, Truck garden, Garden for Vegetable Processing, Vegetable Farming for Seed Production, Concept, History and objectives, Classification based on growing season and plant part used for consumption.

UNIT-II: VEGETABLE NURSERY MANAGEMENT (15 periods)
Introduction, types of nursery beds (Raised bed, Flat bed and Hi-tech Nursery and Soil less raising of seedlings), Precautions in raising healthy seedlings, Transplantation, Hybridization techniques and breeding methods (Pureline, bulk and pedigree methods) in Vegetable crops. Population Improvement methods (mass selection and progeny selection).

UNIT-III: ROUTINE OF SEED PRODUCTION (8 practicals)
Seed production procedure in the plants- Brinjal, Tomato, Okra, Bitter guard and Onion with reference to (Land requirement, Isolation, Nursery management, Cultural practices, Rouging, Plant protection, Harvesting, Seed extraction method, Seed drying, Storage).

SEC-IV: SEED TESTING

UNIT-I: INTRODUCTION SEED TESTING (6 periods)

Definition, Importance and history, Various Organizations involved in Seed Testing (International seed testing Association, Association of Official Seed Analysts, Central and state Seed Testing Laboratory), Seed Testing Laboratory (Introduction to ISTA, Layout for seed testing laboratory, staff and Equipment).

UNIT-II: Various tests of seed (15 periods)

Moisture Testing (Air oven method, Universal OSAW Moisture Tester and Digital Moisture Meter). Germination testing (Definition and objectives, General principles and requirements, Procedure and methods, Seedling evaluation). Seed Vigour Testing (Definition and Principle and General procedure).

UNIT-III: SEED SAMPLING (8 practicals)

Definition, General Principles of Seed Sampling, Tools/Equipments used for sampling, Kinds and procedure of seed sampling, Receipt and Registration of Samples, Types of seed samples (Service, Certification and Official sample), Precautions during registration of samples, Procedure of registration, Mixing and dividing samples and Heterogeneity test,

Selected Readings for SEC:

(VEGETABLE SEED PRODUCTION TECHNOLOGY)

1. Srivastava, R.P. and Sanjeev Kumar (2005). Fruit and Vegetable Preservation: Principles and Practices. International Book Distributing Company, New Delhi.
2. Varma, L.R. and Joshi, V.K. (2000). Post-Harvest Technology of Fruits and Vegetables: Handling, Processing, Fermentation and Waste Management (Vol. I & II). Indus Publishing.
3. Khader, V. (2010). Preservation of Fruits and Vegetables. ICAR, New Delhi.
4. Danthy, M.G. Fruit and Vegetable Processing. FAO, Rome.
5. Singh, I.S. Post-Harvest Handling and Processing of Fruits and Vegetables. Textbook (Publisher details not specified).
6. Srivastava, R.P. and Kumar, S. (2003). Preservation – Principles and Practices. International Book Distributrs.

(SEED TESTING)

1. Indian Council of Agricultural Research. Handbook of Agriculture. ICAR, New Delhi.
2. Singh, B.D.Plant Breeding. Kalyani Publishers, New Delhi.
3. Singh, Phundan (2008). Essentials of Plant Breeding.
4. Umarani, R. et al. (2006). Experimental Seed Science and Technology. Agrobios, Jodhpur.
5. Singh, Phundan (2009). Plant Breeding: Principles and Methods. Kalyani Publishers, New Delhi.
6. Agrawal, R.L. (2005). Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
7. Reddy, T.Y. (2008). Principles of Crop Production. Kalyani Publishers, New Delhi.
8. Pandey, B.P. (2010). A Textbook of Botany. S. Chand and Company Ltd., New Delhi.
9. Santra, N. and Chatterjee, N. (2007). College Botany. New Central Book Agency (P) Ltd., Kolkata.
10. Dutta, A.C. (1983). A Class Book of Botany. Oxford University Press, Calcutta.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED
Semester Pattern Curriculum Under CBCS For
Faculty of Science & Technology, Under Graduate (UG) Programme
CLASS: B. Sc. THIRD YEAR, SUBJECT: SEED TECHNOLOGY

Mark Sheet
End of Semester Assessment (ESA**)**
SKILL ENHANCEMENT COURSE (SEC)-III&IV

Maximum Marks: 25

Candidate's Seat No:

Sr. No.	**Assessment Criteria**	**Maximum Marks**	**Obtained Marks**
1.	Skill work report submission	10	
2.	Over all skill judgment	10	
3.	Skill work presentation	05	
4.	Total	25	

Name & Signature of:

Examiner- 1:

Examiner- 2:

**********11102021**********