॥ 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

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

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

Fax : (02462) 215572

Phone: (02462)215542

Academic-1 (BOS) Section

website: srtmun.ac.in

E-mail: bos@srtmun.ac.in

विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील B.Sc. Seed Technology First Year विषयाचा CBCS Pattern नुसारचा अभ्यासक्रम शैक्षणिक वर्ष २०२३—२०२४ 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 नुसारचा खालील अभ्यासक्रम शैक्षणिक वर्ष २०२३—२४ पासून लागू करण्याच्या दृष्टीने मा. कुलगुरू महोदयानी मा. विद्या परिषदेच्या मान्यतेच्या अधीन राहून मान्यता दिलेली आहे.

1. B.Sc. Seed Technology I 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/२०२३–२४/296
दिनांक : १३.०९.२०२३

आपली विश्वासू
डॉ. सरिता यन्नावार
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.
४) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
७) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. यांना देवून कळवण्यात येते की, सदरील परिपत्रक विद्यापीठाच्या संकेतस्थळावर प्रसिध्द करण्यात यावे.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERISTY, NANDED

SEMESTER PATTERN CURRICULUM UNDER

CHOICE BASED CREDIT SYSTEM (CBCS)
for
Faculty of Science and Technology
Under Graduate Program

SUBJECT: SEED TECHNOLOGY

B. Sc. First Year

With Effect from June 2023-24

The Objective of this program are :

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

Course Outcomes:

1. Through this course, skilled and technical human resources will be made available to the seed industries so that the farmers will get quality seeds.
2. Students will be acquainted with the fields like plant morphology, plant protection, plant pathology, seed entomology, plant biotechnology, plant breeding, seed production, seed processing, seed treatments, seed storage, seed marketing etc.
3. It will develop self-confident and knowledgeable personnel's.
4. The course will motivate students in the field of research as well as guide to become a successful entrepreneur.
5. It will develop self-awareness to enrich decision making ability among the students.
6. Personal development will increase the clarity and effectiveness in knowing themselves and their strengths.

By the end of the program the students will be able to:

Transformed curriculum shall develop educated outcome-oriented candidature, fostered with discovery- learning, equipped with practice & skills to deal practical problems and versed with recent

pedagogical trends in education including e-learning, flipped class and hybrid learning to develop into responsible citizen for nation-building and transforming the country towards the future with their knowledge gained in the field of seed science.

PO1. CBCS syllabus with a combination of general and specialized education shall introduce the concepts of breadth and depth in learning.

PO2. Shall produce competent seed technologists who can employ and implement their acquired knowledge in fundamental and applied aspects that will profoundly influence prevailing paradigms of agriculture, industry, health care and environment to provide sustainable development.

PO3. Will increase the 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.

PO4. The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, FRI etc.

PO5. Certificate and diploma courses are framed to generate self- entrepreneurship and self-employability, if multi exit option is opted.

PO6. Lifelong learning can be achieved by tapping into the vast world of knowledge of plant breeding and propagation.

Prerequisite:

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

SWAMI RAMANAND TEERTH MARATHWADA UNIVERISTY, NANDED

SEMESTER PATTERN CURRICULUM UNDER

CHOICE BASED CREDIT SYSTEM (CBCS) FOR
Under Graduate Course
Faculty of Science and Technology

SUBJECT: SEED TECHNOLOGY

CLASS: B. Sc. FIRST YEAR
An Outline:

Semester/ Annual	Course Name		Paper No. & Title	Total Periods (periods/ week)	Marks for		Credits (Marks)
					External (ESE)	Internal (CA)	
Semester-I	**CCB-I**	**Section-A**	**Theory Paper-I:** Principles of Seed Technology	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	**Theory Paper-II:** Seed Physiology	45 (03/week)	40	10	Credits: 02 (Marks:50)
Semester-II	**CCB-II**	**Section-A**	**Theory Paper-III:** Principles of Seed Production	45 (03/week)	40	10	Credits: 02 (Marks:50)
		Section-B	**Theory Paper-IV:** Plant Breeding	45 (03/week)	40	10	Credits: 02 (Marks:50)
Annual pattern	**CCBP-I**		**Practical Paper-V:** Practicals based on theory papers of CCB-I&II	24 Prac. (03/week/ batch)	80	20	Credits: 04 (Marks:100)
Total					240	60	Credits: 12 (Marks:300)

CCB: Core Course Botany, **CCBP**: Core Course Botany Practical, **ESE**: End Semester Examination, **CA**: Continues Assessment,

Distribution of Credits: 80 % of the total credits for the ESE and 20% for CA

CA of 10 Marks (Theory) : 05 Marks for test & 05 Marks for Assignment

CA of 20 Marks (Practicals): : 10 Marks for test &10 Marks for Record Book ,Submission of collection and field note and Excursion Report.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Semester pattern curriculum under
Choice Based Credit System (CBCS) for
SEED TECHNOLOGY
B.Sc. F.Y.
Semester – I
CCB-I (A)
Theory Paper –I

Principles of Seed Technology

Credits : 02

Periods – 45 **Maximum Marks – 50**

Learning Objectives

- To introduce the basic concept and various aspects of seed technology.
- To impart knowledge about process of development and germination.
- To provide basic knowledge of differences in internal morphology of different types of seed.

Learning outcomes:

- Student gain basic knowledge regarding structure of different kinds of seeds.
- Student will get knowledge on seed and fruit development of various crop plants.
- Student will get knowledge on composition of seed and food reserves accumulation in seed.

Unit I: Concept of Seed Technology (10 Lectures)

History, Concept and aim of seed Technology, Seed Definition. Types, Characteristics of good seed, Seed development programme (a. Basis of seed programme, b Types of seed programme c. National seed programme), Seed development programme (a. Basis of seed programme, b Types of seed programme c. National seed programme), Role of agencies in the development of Indian Seed Industry. (National Seed Coorporation (NSC), Tarai Development Coorporation (TDC), State Farm Coorporation (SFC).

Unit II: Floral morphology & Seed development (12 Lectures)

Structure of flowers, Microsporangium, Microsporogenesis and Development of Male Gametophyte, Megasporangium, Megasporogenesis and Development of Female Gametophyte, Pollination, Fertilization and Apomixis, Development of Dicot and Monocot Embryo, Types of Endosperm and Types of Fruit.

Unit III: Internal Seed Morphology (13 Lectures)

Structure difference between dicot & monocot Seed, Structure of Imp. Seeds – Pea, Gram, Soyabean and Castor, Chemical composition of seeds, Seed Dormancy- Types, Causes, Methods of breaking Dormancy, Difference between seed and grain.

Unit IV: Seed Germination & Metabolism (10 Lectures)

Seed Germination – Pattern and types, Basic requirements for germination, Normal and abnormal seedlings, Germination inhibitors, Metabolism of storage products during seed germination.

Theory paper-I: Principles of Seed Technology

Unit wise distribution of periods and marks:

Unit	Title	Periods Allotted	Maximum Marks
I	**Concept of Seed Technology**	10	28
II	**Floral morphology & Seed development**	12	28
III	**Internal Seed Morphology**	13	28
IV	**Seed Germination & Metabolism**	10	28
	Total	**45**	**112**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Semester pattern curriculum under
Choice Based Credit System (CBCS) for
SEED TECHNOLOGY
B.Sc. F.Y.
Semester – I
CCB-I (B)
Theory Paper –II
Seed Physiology

Credits :02
Periods – 45 **Maximum Marks – 50**

Learning Objectives:

- To provide an insight into physiological processes regarding seed germination, dormancy.
- To give basic information on Physiological basis of seed vigour and viability in relation to crop

Learning outcomes:

- To enjoy the physiological processes involved in seed.
- To understand the physiological mechanism involved in dormancy and germination.
- To compare the role of growth regulators in seed germination.
- Students will get knowledge on growth hormones, flowering hormones, plant science etc.

Unit I: Physiology of seed development (10 Lectures)

Physiology of seed development and maturation, Chemical composition, synthesis & accumulation of seed reserves, Induction of desiccation tolerance, Hormonal regulation of seed development.

Unit II: Seed germination (11 Lectures)

Factors affecting seed germination, Mobilization of stored reserve food during seed germination. Factors affecting seed dormancy, Genetic control of dormancy.

Unit III: Seed viability & seed deterioration (12 Lectures)

Seed viability concept, pre and post-harvest factors affecting seed viability, Seed ageing ; physiology of seed deterioration ; lipid peroxidation and other viability theories; means to prolong seed viability.

Unit IV: Seed Vigour (12 Lectures)

Concept of seed vigour, Vigour test methods, Factors affecting seed vigour, Physiological basis of seed vigour in relation to crop performance & yield.

Theory paper-II: – Seed Physiology

Unit wise distribution of periods and marks:

Unit	Title	Periods Allotted	Maximum Marks
I	**Physiology of seed development**	10	28
II	**Seed germination**	11	28
III	**Seed viability & seed deterioration**	12	28
IV	**Seed Vigour**	12	28
	Total	**45**	**112**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Semester pattern curriculum under
Choice Based Credit System (CBCS) for
SEED TECHNOLOGY
B.Sc. F.Y.
Semester – II
CCB-II (A)
Theory Paper –III
Principles of Seed Production

Periods – 45 **Credits: - 02**

Maximum Marks-50

Learning Objectives:

- To impart knowledge of basic principles involved in seed production
- To impart comprehensive knowledge of seed production in field crops with adequate practical training.

Learning outcomes:

- To really understand the principles of seed production and the importance of seed labels
- To impart knowledge about various tools involved in hybrid seed production of crop plants
- Students will get knowledge on agronomical principles used in seed production**.**

Unit I: Seed quality concept & seed production (10 Lectures)

Concept of seed vigour, Vigour test methods, Factors affecting seed vigour, Physiological basis of seed vigour in relation to crop performance & yield.

Unit II: Hybrid seed production (13 Lectures)

Seed production in self-pollinated crops, Seed production in cross pollinated crops, Mode of pollination and reproduction in crop plants and their modification in relation to hybrid seed production.. Principles of hybrid seed production, isolation distance, synchronization of flowering, rouging etc.

Unit III: Agronomy of seed production (12 Lectures)

Male sterility and incompatibility system in hybrid seed production, Role of pollinators and their management, Seed multiplication ratios, seed replacement rate, demand and supply; Suitable areas of seed production and storage, agronomy of seed production – agro-climatic requirements and their influence on quality seed production;

Unit-IV: Seed multiplication and hybrid development methods (10 Lectures)

Generation system of seed multiplication; Maintenance of Nucleus seed, production of Breeder, Foundation and Certified seed– criteria involved; Life span of a variety and causes for its deterioration; certification standards for self and cross pollinated and vegetatively propagated crops. Hybrid Seed - Methods of development of hybrids; use of male sterility. Self-incompatibility and CHA in hybrid seed production; One, two and three line system; maintenance of parental lines of hybrids;

Theory paper-III: – Principles of Seed Production

Unit wise distribution of periods and marks:

Unit	Title	Periods Allotted	Maximum Marks
I	**Seed quality concept & seed production**	10	28
II	**Hybrid seed production**	13	28
III	**Agronomy of seed production**	12	28
IV	**Seed multiplication and hybrid development methods**	10	28
	Total	**45**	**112**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

Semester pattern curriculum under
Choice Based Credit System (CBCS) for
SEED TECHNOLOGY
B.Sc. F.Y.
Semester – II
CCB-II (B)
Theory Paper –IV
Plant Breeding

Credits :02
Periods – 45 **Maximum Marks – 50**

Learning Objectives:

- This course is aimed at understanding the basic concepts of Plant Breeding, helping students to develop their analytical, quantitative and problem solving skills.
- To impart theoretical knowledge and practical skills about plant breeding objectives, modes of reproduction and genetic consequences, breeding methods for crop improvement.
- To provide understanding about mechanisms of heterosis and its exploitation for yield improvement through conventional and biotechnological approaches.

Learning Outcomes:

- Students should understand the concept and various aspects of plant breeding.
- Students should learn about resources of seeds along with centers of origin.
- Learn different methods of hybridization.
- Students can be an entrepreneur in seed production

Unit I: Introduction to plant breeding (10 Lectures)

Plant Breeding - Introduction, Objectives, Activities and important achievements, Modes of pollination in crop plants- self and cross pollination. Factors Promoting self & cross pollination, Self

incompatibility - Defination, Types, Methods, induction and application, Male sterility- Defination, Types, Methods, induction and application.

Unit II: Germplasm Conservation Practices (11 Lectures)

Germplasm and it's conservation - Introduction, Germplasm Collection, centre of origin, and diversity, Seed banks and types of seed collection, Plant Introduction - Definition, types, procedure, merits and demerits, Selection - Definition, types, methods, merits and demerits.

Unit III: Hybridizations Techniques (12 Lectures)

Hybridization - Definition objective and types, Techniques of Hybridization – (Selection evaluation of parents, Emasculation, Bagging and Tagging) Pollination, Collection and storage of F1 Seed, Growing of F1 Generation, Improvement of self pollinated crops through hybridization application, Procedure merits and demerits and achievements of pedigree methods. Procedure merits and demerits and achievements of bulk methods.

Unit IV: Heterosis and Mutaion Breeding (12 Lectures)

Heterosis, Definition types and basis, Use of heterosis in crop improvements, Hybrid, Synthetic and Composite Varieties. Mutation Breeding- Mutagens, procedure, precautions, application and achievements.

Theory paper-III: – Plant Breeding

Unit wise distribution of periods and marks:

Unit	Title	Periods Allotted	Maximum Marks
I	**Introduction to plant breeding**	10	28
II	**Germplasm Conservation Practices**	11	28
III	**Hybridizations Techniques**	12	28
IV	**Heterosis and Mutaion Breeding**	12	28
	Total	**45**	**112**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

B.Sc. General (Semester Pattern)

Choice Based Credit System (CBCS) Pattern
B. Sc. F.Y.
Annual Pattern
CCBP- I
PRACTICAL PAPER-V: BASED ON THEORY PAPERS-I, II, III & IV

Practicals–24 **Credits: 04 Maximum Marks – 100**

Practical Exercises:

1. Morphology of Dicot Seed
2. Morphology of Monocot Seed
3. Seedling morphology and adult plan morphology in some major crops for identification of a variety.
4. Seed viability test: Tz test
5. Seed germination test
6. Study of floral morphology
7. Study of different types of Endosperm
8. Factors affecting germination - Temperature, moisture and light.
9. Estimation of starch from given seed sample.
10. To study the kinetics of seed imbibition and solute leakage.
11. To determine the solute leakage with the help of EC/ pH meter.
12. Estimation of seed moisture content from given seed sample.
13. To demonstrate the different methods of dormancy breaking.
14. To study accelerated ageing and controlled deterioration tests.
15. To study the effect of accelerated ageing on seed viability
16. Identification of seed characteristics of agricultural crops
17. Identification of morphological features of horticultural crops
18. Influence of grading techniques on seed quality characters.
19. Planning seed production for different classes of seeds in hybrids of agricultural crops
20. Cost benefit ratio for seed production
21. Plant Breeder's kit

22. Study of germplasm of various crops
23. Study of floral structure of self pollinated crops
24. Study of floral structure of cross pollinated crops
25. Study of male sterility system.

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Text Books:

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- Thomson, J.R. 1979. An Introduction to Seed Technology. Leonard Hill, London.
- Tunwar NS & Singh SV. 1985. Handbook of Cultivars. CSCB, GOI.

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SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

SEED TECHNOLOGY – CURRICULUM

B.Sc. General (Semester Pattern)
Choice Based Credit System (CBCS)

Skeleton Question Paper
B. Sc. First Year (w.e.f. 2019-2020)

Theory Paper

Maximum Marks: 40

Note: - (i) Attempt all questions
(iii) Draw neat and well labeled diagrams wherever necessary

Q1. Essay Type Question 15 marks

OR

a) Short Question 08 marks

b) Short Question 07 marks

(Based On Unit I, II)

Q2. Essay Type Question 15 marks

OR

a) Short Question 08 marks

b) Short Question 07 marks

(Based On Unit III & IV)

Q3. Write short notes on any two of the following (Each of 05 Marks) 10 marks

a)

b)

c)

d)

(Based on all Units)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

SEED TECHNOLOGY – CURRICULUM

B.Sc. General (CBCS Pattern)
Skeleton Question Paper
B. Sc. First Year
Annual Pattern
PRACTICAL PAPER-V: BASED ON THEORY PAPER-I ,II, III & IV
(Compulsory)

Time: Four hours **Maximum Marks: 80**

Note: - (i) Attempt all questions
(ii) Show your preparations to the examiner
(iii) Draw neat and well labeled diagrams wherever necessary

Q1.		15 Marks
Q2.		15 Marks
Q3.		15 Marks
Q4.		15 Marks
Q.5		10Marks
	Visit/ Excursion reports	05 Marks
	Viva- Voce	05 Marks

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