।। सा विद्या या विमुक्तये ।।
स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड
"ज्ञानतीर्थ" परिसर, विष्णुपूरी, नांदेड - ४३१६०६ (महाराष्ट्र)
SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED
"Dnyanteerth", Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)
Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade
ACADEMIC (1-BOARD OF STUDIES) SECTION
Phone: (02462) 229542
Fax : (02462) 229574
Website: www.srtmun.ac.in
E-mail: bos.srtmun@gmail.com

संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे **CBCS Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, **दिनांक २० जून २०२० रोजी संपन्न झालेल्या ४७व्या मा. विद्या परिषद बैठकीतील विषय क्र.११/४७–२०२०**च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या **संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील द्वितीय वर्षाचे** खालील विषयांचे **C.B.C.S. (Choice Based Credit System) Pattern** नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०२०–२१ पासून लागू करण्यात येत आहेत.

1. B.Sc.-II Year-Biophysics	2. B.Sc.-II Year-Bioinformatics
3. B.Sc.-II Year-Biotechnology	4. B.Sc.-II Year-Biotechnology (Vocational)
5. B.Sc.-II Year-Food Science	6. B.Sc.-II Year-Botany
7. B.Sc.-II Year-Horticulture	8. B.Sc.-II Year-Agro Chemical Fertilizers
9. B.Sc.-II Year-Analytical Chemistry	10. B.Sc.-II Year-Biochemistry
11. B.Sc.-II Year-Chemistry	12. B.Sc.-II Year-Dyes & Drugs Chemistry
13. B.Sc.-II Year-Industrial Chemistry	14. B.C.A. (Bachelor of Computer Application)-II Year
15. B.I.T. (Bachelor of Information Technology)-II Year	16. B.Sc.-II Year-Computer Science
17. B.Sc.-II Year-Network Technology	18. B.Sc.-II Year-Computer Application (Optional)
19. B.Sc.-II Year-Computer Science (Optional)	20. B.Sc.-II Year-Information Technology (Optional)
21. B.Sc.-II Year-Software Engineering	22. B.Sc.-II Year-Dairy Science
23. B.Sc.-II Year-Electronics	24. B.Sc.-II Year-Environmental Science
25. B.Sc.-II Year-Fishery Science	26. B.Sc.-II Year-Geology
27. B.Sc.-II Year-Mathematics	28. B.Sc.-II Year-Microbiology
29. B.Sc.-II year Agricultural Microbiology	30. B.Sc.-II Year-Physics
31. B.Sc.-II Year Statistics	32. B.Sc.-II Year-Zoology

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.: शैक्षणिक–१/परिपत्रक/पदवी–सीबीसीएस अभ्यासक्रम/२०२०–२१/**३३३**

दिनांक : १५.०७.२०२०.

स्वाक्षरित/–
उपकुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :
१) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Credit System (CBCS) Course Structure

Subject: Agrochemicals and Fertilizers

B. Sc. Second Year (Semester-III & IV)

Semester Pattern effective from June -2020

Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Credit System (CBCS) Course Structure
Faculty of Science

B. Sc. Second Year Syllabus
Semester Pattern effective from June 2020
Subject: Agrochemicals and Fertilizers

Semester	Course No.	Name of the Course	Instruction Hrs / week	Total period	CA		ESE Total Marks	Credits
III	CCAGF III (Section A)	Plant Nutrition and Fertilizers)	03	45	10		40	2
	CCAGF III (Section B)	Insecticides and Herbicides	03	45			50	2
	CCAGFP II	Practical's based on		Practicals	10		40	
							50	
	[CCAGFIII &	P-VI &	03	08	05	20	25	1
	IV (Section A)]	P-VIII (P-X)	03	08	05	20	25	1
	SECAGF I	SEC I	02	02	25		25	(02)*
							50	
IV	CCAGF IV (Section A)	Manures and Organic farming	03	45	10		40	2
							50	
	CCAGF IV(Section B)	Plant Diseases and fungicides)	03	45				2
	CCAGFP III	Practical's based on		Practicals	10		40	
							50	
	[CCAGF III &	P-VII &	03	08	05	20	25	1
	IV (Section B)]	P-IX (P-XI)	03	08	05	20	25	1
	SECAGF II	SEC II	02	02	25		25	(02)*
							50	
		Total credits semester III and IV						**12(04)***

Note: ESE of CCAGFPII, CCAGFPIII & SECAGF I, SECAGF II should be evaluated at annual

The syllabus is base d on six (3x2) theory periods and 4 practical periods per batch per week. Candidates should require to pass separately in theory and practical examination.

Marks distribution:

1) Theory exam: 40 marks (30+ 10 for each paper) 2) Internal evaluation: 10 marks (Test or Assignment & attendance)

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- III)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

CCAGF III (Section A)

PLANT NUTRITION AND FERTILIZERS (P-VI)

Credits: 02 (Marks: 50) Periods: 45

UNIT- I

1. Plant Nutrition: **08**

Essential plant Nutrients
Functions and deficiency Symptoms of the essential Nutrients. Forms in which Nutrients are utilized by crop plants.
How plants absorb nutrients
Sources of plant Nutrients

2. Nitrogenous Fertilizers: **08**

Introduction
Classification
General Characteristics.
Manufacturing process and Properties of Ammonium Sulphate, Urea & Ammonium nitrate

UNIT-II

3. Phosphatic Fertilizers: **08**

Introduction
Classification
Manufacturing Process and Properties of Super Phosphate.
Rock Phosphates.

4. Potassic Fertilizers. **06**

Introduction.
Classification.
Manufacturing process and properties of muriate of potash and Sulphate of potash. Potash Minerals.

UNIT-III

5. Complex Fertilizers **06**

Introduction.
Advantages
Manufacturing process and properties of Nitro phosphate
Ammonium phosphate.

UNIT-IV

6. Mixed Fertilizers. **06**

Introduction.
Advantages and Disadvantages.

Materials used in mixed Fertilizers.
Method of Preparation.
Granulated Fertilizer mixtures

7. Micro Nutrient Carriers. **03**

Introduction.
Micro Nutrient Fertilizers.
Soil Conditions Conducive to Micro Nutrient deficiency. Methods of Application

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- III)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

CCAGF III (Section B)

Insecticides and Herbicides (P-VII)

Credits: 02 (Marks: 50) Periods: 45

UNIT-I

1. Insecticides: **12**

Introduction and Definition.
Losses Caused by insects
Classification of Insecticides
Insecticidal formulations.
Natural Insecticides: Pyrethroids and Neem based Principals and Methods of Insect Control
Physical and mechanical control.
Cultural Control.
Biological Control.
Chemical Control.
Legal or legislative Control.

UNIT-II

2. Synthetic insecticides and Integrated pest management: **12**

Organo chlorine Insecticides.
Organo Phosphorus Insecticides.
Carbamates & Sulphur Containing Compounds. Synthetic Pyrethroids.
Fumigants.
Control of stored grain pests.
Integrated Pest Management.

UNIT -III

3. Weeds and their Control: **09**

Introduction:- Definition and Characteristics of weeds. Damage Caused by weeds.
Classification of weeds.
Weed Control methods.
Mechanical.
Cultural.
Chemical.
Biological.

UNIT-IV

4. Herbicides: **12**

Definition and Classification.
Some important Herbicides: 2,4-D, 2,4-5-T, simazine, atrazine, TCA, monuron
Dalapon, Glyphoset, (Structure, Chemical Names, Common Names and uses of above herbicides are expected)
Precautions in Storage and handling of herbicides.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- IV)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

CCAGF IV (Section A)

MANURES AND ORGANIC FARMING (P-VIII)

Credits: 02 (Marks: 50) Periods: 45

UNIT –I

1. Bulky organic Manures: **08**

Farm yard Manures: Introduction, composition, losses during handling and storage and improved methods of preparation.
Compost: - Definition, composition, classification, methods of preparation.
Green Manuring:- Introduction, advantages and disadvantages, Green Manuring in situ, Green Leaf Manuring.

2. Concentrated organic Manures: **04**

Oilcakes
Blood meal
Meat Meal
Fish Manure
Bone meal

UNIT-II

3. Time and Methods of Fertilizer applications: **05**

Principles governing selection of proper time and correct method of application, Different Methods of Fertilizer applications.
Fertigation
Liquid Fertilizers.

4. Balanced and Profitable use of Fertilizers: **05**

Principles of balanced Fertilization.
Profitable use of Fertilizers.
Factors affecting optimum use.
Economics of Fertilizer Use.

UNIT-III

5. Biofertilizers: **10**

Introduction
Classification
Importance in Agriculture.
Study of Rhizobium, Azotobacter, BGA and Azolla biofertilizers.

UNIT-IV

6. Concepts of organic farming and sustainable agriculture: **06**

Definition, need, principals and steps to successful organic farming

7. Sustainable agriculture: **03**

Definition, difference between modern and sustainable agriculture, advantages and disadvantages, management practices for sustainable

agriculture

8. Vermicompost: **04**

Introduction, materials for preparation of vermicompost , production methodology, advantages of vermicompost

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- IV)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

CCAGF IV (Section B)

Plant diseases and fungicides

(P-IX)

Credits: 02 (Marks: 50) Periods: 45

UNIT-I

1. Diseases of Crops: **18**

Introduction: Definition, Nature, causes of Plant diseases. Reproduction and Dissemination
Types of Diseases
Seed borne diseases.
Soil borne diseases.
Air borne diseases.
Study of major diseases of following crops in Maharashtra state with reference to causal organism, symptoms, and control measures crops: sorghum, wheat, paddy, sunflower, groundnut, cotton, Sugar cane, bajra, Pigeon pea, citrus, mango, Banana, chillies, Brinjal.

UNIT-II

2. Fungicides: **18**

Introduction and definition.
Classification of Fungicides.
Formulation methods
Sulphur Fungicides.
Copper Fungicides
Mercury Fungicides
Systemic Fungicides
Antibiotics
Precautions taken during handling and storage of Fungicides.
Plant Protection equipments, their proper use and maintenance**.**

UNIT-III

3. Methods of application of fungicides: **03**

Seed treatment.
Soil treatment.
Soil drenching.
Broad Cast
Fumigation
Furrow application.
Spraying.
Dusting

UNIT-IV

4. Agrochemicals and pollution: **06**

Introduction & definition.
Types of Pollution.
Pollution due to use of Agrochemicals.
Pesticides/Insecticides
Herbicides
Fungicides
Pesticide residues in the water system and soil.

Reference Books:

1. Manures and Fertilizers By. K.S. Yawalkar J.P. Agarwal, S. Bokde
2. Soil Fertility and Fertilizers by S.L Tisdale , Nelson W.L.
3. Commercial Fertilizers By Collings.
4. Hand Book of Fertilizer Technology by Fertilizer Association of India.
5. Chemistry of Manures and Fertilizers by Mannickam and Mariakulandai
6. Biofertilizers by Soani L. L. Bhandari S.C. Sxena S.N.
7. Biofertilizers by Subba Rao.
8. Hand Book of Agriculture ICAR New Delhi.
9. Manures and Fertilizers by - FAI
10. Analytical Agril. Chemistry by Chopra and Kanwar.
11. Hand Book of Manures and Fertilizers by ICAR New Delhi.
1. Hand Book of Agriculture- ICAR
2. Diseases of crop plants in India- Rangaswami.
3. Environmental chemistry- A.K. De
4. Crop Production and Field experimentation Vaidhya, Khuspe, Sahasra Budhe.
5. Fungicides in plant disease control- Y.L. Nene, P.N. Thapliyal
6. Plant pathology- R.S. Sing.
7. Plant Pathology- Mehrotra.
8. Weed Science- Gupta.
9. Modern plant pathology-S.C. Dube.
10. Chemistry of Insecticides and Fungicides-U.S. Sree Ramula.
11. Methods of Pesticide analysis-U.S. Sree Ramulu.
12. Analytical Agricultural chemistry- Chopra and Kanwar.
13. Chemistry of Herbicides- Homer.
14. Hand book of Agrochemicals- Royal Society(UK)
15. Text book of Applied Entomology- K.P. Shrivastava
16. Modern Entomology by Dr. DB. Tambhare.
17. General and Applied Entomology- Anant Krishnan Nayar.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. Second year Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

Practical Paper: CCAGFP II [CCAGF III & IV (Section A)]

Credits: 02 (Marks: 50)

(Annual practical Based on [CCAGF III & IV (Section A)] (Practical syllabus requires four periods per batch per week for 2 consecutive days.)

(Note: At least 16 practicals are essential)

1. Identification of different Manures and Fertilizers.
2. Estimation of Moisture and mineral matter from organic Manures (FYM/Compost/Oil Cake).
3. Estimation of organic carbon from FYM or Compost (Walklay and Black Method)
4. Estimation of Total nitrogen from FYM/Compost by Micro Kjeldhal's Method)
5. Determination of Acidity (in terms of H2So4) of ammonium Sulphate.
6. Determination of purity percentage of ammonium sulphate.
7. Estimation of water soluble phosphate from super phosphate.
8. Determination of water soluble Calcium from super Phosphate.
9. Estimation of available zinc from Fertilizer sample.
10. Estimation of Manganese from Micro Nutrient carrier
11. Estimation of molybdenum from Micro Nutrient Carrier.
12. Qualitative test for N-P-K Fertilizer
13. Determination of Sulphate from Super Phosphate.
14. Estimation of Available NPK by using Soil testing Kit.
15. Study of Different types of Biofertilizers.
16. Estimation of Copper from Micro Nutrient Carrier.
17. Estimation of Nitrogen from urea.
18. Preparation and use of soil testing kit.
19. Visit to Manure Pit and Bio gas Plant.
20. Visit to Fertilizer Industry and study of their activities.
21. Visit to Fertilizer Testing Laboratory.
22. Estimation of Potassium in Fertilizers by flame photometer.
23. Determination of oil from oilcakes
24. Analysis of rock phosphate
25. Analysis of Ammonium phosphate
26. Analysis of Potassic fertilizers.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. Second year Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

Practical Paper: CCAGFP III [CCAGF III & IV (Section B)]

Credits: 02 (Marks: 50)

(Annual practical Based on CCAGFP III [CCAGF III & IV (Section B)] (Practical syllabus requires four periods per batch per week for 2 consecutive.) (At least 16 Practicals are Essential)

1. Estimation of Copper pesticides by iodometric methods.
2. Estimation of zinc from zinc containing fungicides by EDTA method.
3. Estimation of chlorine from Dichlorophenyl Trichloro ethane (DDT)
4. Estimation of Sulphur from sulphur containing Fungicide.
5. Estimation of hydrolysable chlorine from BHC
6. Determination of moisture content from pesticides/fungicides
7. Estimation of mercury from mercury containing fungicide
8. Determination of percentage purity of zinc fungicide in commercial sample
9. Determination of dissolved carbon dioxide from water sample.
10. Determination of gamma isomer of BHC by column chromatography
11. Determination of chemical oxygen demand (COD) from water sample.
12. Gravimetric determination of zinc as Pyrophosphate from zinc containg funqicide.
13. Collection and identification of plant diseases.
14. Collection and identification of weeds.
15. Collection and identification of insects/pests.
16. Visit to the Agrochemicals Industry.
17. Study and market survey of different agricultural chemicals.
18. Study of Plant protection appliances.
19. Preparation and use of Bordeux mixture.
20. Determination of percentage purity of phosphomidon form commercial sample.
21. Study and application of herbicides (demonstration).
22. Extraction of pesticide/fungicide from plant material.
23. Determination of PH/acidity/alkalinity of the formulation.
24. Isolation of microorganisms/ soil pathogens by culture.
25. Estimation of Fe^{2+} from $FeSO_4$ from micro nutrient carrier.
26. Analysis of Bordeux mixture
27. Estimation of hardness of water
28. Estimation of phosphorus from given sample of organo phosphorus insecticide.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- III)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

Skill Enhancement Course SECAGF-I

Weed identification Techniques and their control

Objective: To identify various obnoxious weeds occurring in our region and find their effective control.

Skill component: Weed survey, collection of samples, identification and classification, preservation as herbaria, digital imaging, finding effective control of these weeds.

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. second year (Semester- IV)
Semester Pattern effective from June -2020

Agrochemicals and Fertilizers

Skill Enhancement Course SECAGF-II

Diagnosis of plant diseases and their control

Objective: To diagnose various plant diseases of major crops of our region and finding their effective controls.

Skill components: plant disease survey of major crops of our region, their identification and diagnosis, collection of disease samples, preservation as herbaria, digital imaging, study of causal organisms, finding effective strategies for their control.

Objectives of the course

The students of subject Agrochemicals and fertilizers are catering to the needs of the agricultural manpower in the region. The revised syllabus of B.Sc. second year has been designed with well defined objectives

1. Higher crop production requires proper management of soils and their nutrient content and availability.

Plant nutrition, if properly taken care of , will result in achieving desired level of farm production.

2.Current trends in organic farming also need to be dealt with for higher quality crops with maintenance of soil health. Soils must be kept in good ecological balance for sustainable agriculture.

3. In view of present food crisis all over the world plant protection strategies need to be properly taken care of so as not to lose the valuable crops to crop enemies like insects, plant diseases and weeds. Detailed focus is maintained on the proper use of insecticides , fungicides and herbicides.

4.Important diseases of major crops , their symptoms and proper contol measures have been dealt with.

Course Outcome:

1.Students of Agrochemicals and fertilizers can serve as persons well acquainted with proper management of soil resources by caring for adequate plant nutrition and use of balanced and cost effective use of fertilisers.

2.Use of chemical fertilizers is to be supplemented by use of organic manures.

3.Students can become expert in plant protection and use of different methods for the control of insects , diseases and weeds including the use of agrochemicals like insecticides ,fungicides and herbicides.

4. Students can go for identification of plant diseases and use of various disease control methods for saving valuable crops.

5.Students can be aware of methods of plant protection measures which aim at avoiding or reducing the pollution by the use

of various agrochemicals.

6. Students can serve as valuable resource persons in agriculture helping the nation in enriching farmers and national economy.