॥ 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

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत राष्ट्रीय शैक्षणिक धोरण २०२० नुसार पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २७ मे २०२५ रोजी संपन्न झालेल्या मा. विद्यापरिषद बैठकीतील विषय क्रमांक १६/६१–२०२५ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण–२०२० नुसारचे पदवी द्वितीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यास मा. विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी. एस्सी द्वितीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२५–२६ पासून लागू करण्यात येत आहेत.

01	B.Sc. Agriculture Microbiology	11	B.Sc. Physics
02	B.Sc. Botany	12	B.Sc. Seed Technology
03	B.Sc. Dairy Science	13	B.Sc. Horticulture
04	B.Sc. Electronics	14	B.Sc. Statistics
05	B.Sc. Environmental Science	15	B.Sc. Biochemistry
06	B.Sc. Fishery Science	16	B.Sc. Analytical Chemistry
07	B.Sc. Food Science	17	B.Sc. Agrochemical & Fertilizers
08	B.Sc. Geology	18	B.Sc. Industrial Chemistry
09	B.Sc./B.A. Mathematics	19	B.Sc. Industrial Microbiology
10	B.Sc. Microbiology		

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

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड – ४३१ ६०६.
जा.क्र.:शै–१/एनइपी/विवत्रंविपदवी/२०२५–२६/११६
दिनांक ०५.०६.२०२५

सहाय्यक कुलसचिव
शैक्षणिक (१–अभ्यासमंडळ) विभाग

प्रत : माहितीस्तव तथा कार्यवाहीस्तव.

१) मा. कुलगुरू महोदयांचे कार्यलय, प्रस्तुत विद्यापीठ.
२) मा. प्र. कुलगुरू महोदयांचे कार्यलय, प्रस्तुत विद्यापीठ.
३) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
४) मा. संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
५) मा. प्राचार्य, सर्व संबधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
६) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, परिपत्रक अभ्यासक्रम संकेतस्थळावर प्रसिध्द करण्यात यावेत.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

UNDERGRADUATE PROGRAMME OF SCIENCE & TECHNOLOGY

B.Sc. SECOND YEAR

SUBJECT – AGROCHEMICALS & FERTILIZERS

Effective from the Academic Year 2025-2026
(As per NEP-2020)

Swami Ramanand Teerth Marathwada University, Nanded

Faculty of Science and Technology

UNDERGRADUATE PROGRAMME

Subject: Agrochemicals and Fertilizers

Course pre-requisite:

The world is facing unprecedented food shortages due to several natural and manmade factors. Food security has become a major focus of policy of governments all over the world. The Indian scenario is not much better. After IT revolutions the next and most urgent need is another green revolution in agriculture to feed the humans. It can best be done by, among other methods, creation of well taught and trained manpower in the field of agriculture. The NEP 2020 aims at producing such a manpower for raising quality and higher production from India's fields. India being a chiefly agrarian economy and focus of future development would be agriculture. The subject Agrochemicals and Fertilizers aim to cater to the needs of the agriculture and required manpower of the region. The revised syllabus at B.Sc. Second year has been designed with well-defined objectives.

Course objectives:

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.
2. Plant nutrition, if properly taken care of, will result in achieving desired level of farm production.
3. 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.
4. 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.
5. Important diseases of major crops, their symptoms and proper control measures have been dealt with.

Course outcomes:

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 fertilizers.
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.
7. This will equip learners with the knowledge and skills necessary to practice sustainable agriculture and the production of healthy, organic food.
8. Introducing the concept of organic ecosystem and learn about biological magnification & its significance in present day scenario.

Agrochemicals and Fertilizers

B.Sc. II Year Semester III (Level 5.0)

Teaching Scheme

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Major	**SAGFCT1201**	Plant Nutrition and Fertilizers	02	--	**02**	02	--
	SAGFCP1201	Practical based on SAGFCT1201	--	02	**02**	--	04
	SAGFCT1202	Insecticides and Herbicides	02	--	**02**	02	--
	SAGFCP1202	Practical based on SAGFCT1202	--	02	**02**	--	04
Minor	**SAGFMT1201**	Plant Nutrient Management	02	--	**02**	02	--
	SAGFMP1201	Practical based on SAGFMT1201	--	02	**02**	--	04
Generic Electives *(from other Faculty)*	**SAGFGE1201**	Crop Production Technology I (*Kharif* crops)	02	--	**02**	02	--
Skill Based Course (*related to Major*)	**SAGFSC1201**	Biofertilizer and Biopesticide Technology	--	02	**02**	--	04
Ability Enhancement Course	**AECENG1201**	L_1 – Compulsory English	02	--	**02**	02	--
Ability Enhancement Course	**ACEMIL1201**	(MAR/HIN/URD /KAN/PAL)	02	--	**02**	02	--
NCC/NSS/SPT/ CLS/HWS/YGE/ FIT(Fitness)	**CCCXXX1201**	Select from Basket 5	02	--	**02**	02	--
Total Credits			**14**	**08**	**14**	**08**	**22**

Agrochemicals and Fertilizers

B.Sc. II Year Semester III (Level 5.0)

Examination Scheme

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7)/ Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Average of T1 & T2	Total	CA	ESA	
01	*02*	*03*	**04**	**05**	**06**	**07**	**08**	**09**	**10**
Major	**SAGFCT1201**	Plant Nutrition and Fertilizers	10	10	10	**40**	--	--	**50**
	SAGFCP1201	Practical based on SAGFCT1201	--	--	--	--	20	30	**50**
	SAGFCT1202	Insecticides and Herbicides	10	10	10	**40**	--	--	**50**
	SAGFCP1202	Practical based on SAGFCT1202	--	--	--	--	20	30	**50**
Minor	**SAGFMT1201**	Plant Nutrient Management	10	10	10	**40**	--	--	**50**
	SAGFMP1201	Practical based on SAGFMT1201	--	--	--	--	20	30	**50**
Generic Electives *(from other Faculty)*	**SAGFGE1201**	Crop Production Technology-I (*Kharif* crops)	10	10	10	**40**	--	--	**50**
Skill Based Course (*related to Major*)	**SAGFSC1201**	Biofertilizer and Biopesticide Technology	--	--	--	--	20	30	**50**
Ability Enhancement Course	**AECENG1201**	L_1 – Compulsory English	--	--	--	--	20	30	**50**
Ability Enhancement Course	**ACEMIL1201**	(MAR/HIN/URD /KAN/PAL)	--	--	--	--	20	30	**50**
NCC/NSS/SPT/ CLS/HWS/YGE/ FIT	**CCCXXX1201**	Select from Basket 5	10	10	10	**40**	--	--	**50**

Agrochemicals and Fertilizers

B.Sc. Second Year Semester IV (Level 5.0)

Teaching Scheme

Subject	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major	**SAGFCT1251**	Manures and Organic Farming	02	--	**02**	02	--
	SAGFCP1251	Practical based on SAGFCT1251	--	02	**02**	--	04
	SAGFCT1252	Plant Diseases and Fungicides	02	--	**02**	02	--
	SAGFCP1252	Practical based on SAGFCT1252	--	02	**02**	--	04
Minor	**SAGFMT1251**	Agrochemicals in Crop Protection	02	--	**02**	02	--
	SAGFMP1251	Practical based on SAGFMT1251	--	02	**02**	--	04
Generic Electives *(from other Faculty)*	**SAGFGE1251**	Crop Production Technology-II (*Rabi* crops)	02	--	**02**	02	--
Skill Based Course (*related to Major*)	**SAGFSC1251**	Organic Farming Production Technology	--	02	**02**	--	04
Ability Enhancement Course	**AECENG1201**	L_1 – Compulsory English	02	--	**02**	02	--
Ability Enhancement Course	**ACEMIL1201**	(MAR/HIN/URD /KAN/PAL)	02	--	**02**	02	--
NCC/NSS/SPT/ CLS/HWS/YGE/ FIT(Fitness)	**CCCXXX1201**	Select from Basket 5	02	--	**02**	02	--
Total Credits			**14**	**08**	**22**	**14**	**16**

Agrochemicals and Fertilizers

B.Sc. Second Year Semester IV (Level 5.0)

Examination Scheme

Subject	Course Code	Course Name	Theory				Practical		Total Col (6+7)/ Col (8+9)
			Continuous Assessment (CA)			ESA			
			Test 1	Test 2	Average of T1 & T2	Total	CA	ESA	
01	*02*	*03*	**04**	**05**	**06**	**07**	**08**	**09**	**10**
Major	**SAGFCT1251**	Manures and Organic Farming	10	10	10	**40**	--	--	**50**
	SAGFCP1251	Practical based on SAGFCT1251	--	--	--	--	20	30	**50**
	SAGFCT1252	Plant diseases and fungicides	10	10	10	**40**	--	--	**50**
	SAGFCP1252	Practical based on SAGFCT1252	--	--	--	--	20	30	**50**
Minor	**SAGFMT1251**	Agrochemicals in Crop Protection	10	10	10	**40**	--	--	**50**
	SAGFMP1251	Practical based on SAGFMT1251	--	--	--	--	20	30	**50**
Generic Electives *(from other Faculty)*	**SAGFGE1251**	Crop Production Technology-II (*Rabi* crops)	10	10	10	**40**	--	--	**50**
Skill Based Course (*related to Major*)	**SAGFSC1251**	Organic Farming Production Technology	--	--	--	--	20	30	**50**
Ability Enhancement Course	**AECENG1201**	L_1 – Compulsory English	--	--	--	--	20	30	**50**
Ability Enhancement Course	**ACEMIL1201**	(MAR/HIN/URD /KAN/PAL)	--	--	--	--	20	30	**50**
NCC/NSS/SPT/ CLS/HWS/YGE/ FIT	**CCCXXX1201**	Select from Basket 5	10	10	10	**40**	--	--	**50**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

Faculty of Science and Technology

B. Sc. Second Year

Semester – III

Subject: Agrochemicals and Fertilizers

Syllabus

(*As Per NEP- 2020*)

To be Implemented from

Academic Year 2025-2026

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)

Major Core Theory Course

Course Code – SAGFCT1201

Title of the Course: Plant Nutrition and Fertilizers

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFCT1201: Plant Nutrition and Fertilizers

Module No.	Unit No.	Topic	Hrs.
1.0		**Plant Nutrition**	**07**
	1.1	Essential plant nutrients: Introduction, Definition	
	1.2	Criteria of essentiality	
	1.3	Forms of nutrients in soil	
	1.4	Functions & deficiency symptoms of essential nutrients	
2.0		**Fertilizers**	**08**
	2.1	Fertilizers: Introduction, Definition & Classification	
	2.2	Nitrogenous fertilizers: Introduction, Definition & Classification	
	2.3	Manufacturing process & properties of N fertilizers	
	2.4	Fate of N fertilizers and reactions in soil	
3.0		**Phosphatic & Potassic Fertilizers**	**07**
	3.1	Phosphatic fertilizers: Introduction, Definition & Classification	
	3.2	Manufacturing process & properties of phosphatic fertilizers	
	3.3	Potassic Fertilizers: Introduction, Definition & Classification	
	3.4	Manufacturing process & properties of potassic fertilizers	
4.0		**Complex & Mixed Fertilizers**	**08**
	4.1	Complex fertilizers: Introduction, Advantages, Examples	
	4.2	Fertilizer mixture: Advantages, Disadvantages, Types	
	4.3	Secondary and Micronutrient fertilizers	
	4.4	Nano fertilizers	
		Total	**30**

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, I Year (Semester - I)

Major Practical Course

Course Code – SAGFCP1201

Title of the Course: Practical based on SAGFCT1201

[Credits: 2 (Marks: 50)] **(Total Periods: 60 Hours)**

CURRICULUM DETAILS: SAGFCP1201: Practical based on SAGFCT1201

Sr. No.	Practical Exercises	Hrs.
1.	Identification of different manures and fertilizers	4
2.	Determination of nitrogen from given fertilizer sample	4
3.	Estimation of total N from plant sample by Micro Kjeldahl's method	4
4.	Handling and storage of fertilizers	4
5.	Detection of adulteration in fertilizers (Rapid test)	4
6.	Determination of nitrate nitrogen content of potassium nitrate	4
7.	Determination of water-soluble phosphorus in superphosphate (Pumberton method)	4
8.	Determination of acid soluble phosphorus from rock phosphate	4
9.	Determination of total potassium content of muriate of potash (flame photometer)	4
10.	Determination of zinc content from micronutrient fertilizer (EDTA Method)	4
11.	Determination of acidity (in terms of H_2SO_4) of ammonium sulphate	4
12.	Estimation of copper from micro nutrient carrier	4
13.	Determination of sulphate from super phosphate	4
14.	Determination of water-soluble calcium from super phosphate	4
15.	Visit to fertilizer industry and study of their activities	4
	Total	**60**

Text Books and Reference Books:

1. Manures and Fertilizers By. K.S. Yawalkar, J.P. Agarwal, S. Bokde
2. Commercial Fertilizers by Collings.
3. Hand Book of Fertilizer Technology by Fertilizer Association of India.
4. Chemistry of Manures and Fertilizers by Mannickam and Mariakulandai
5. Das D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana.
6. Handbook of manures and fertilizers – ICAR publication
7. Text Book of fertilizers – Ranjankumar Basak
8. Fertilizer Guide – Tondon HLS (1994)
9. Handbook on fertilizer usage- Seetharam S, Priswas BC, Yadav DS, Matneswaru S. (1996)
10. Fertilizer control order (1985) The fertilizer Association of India
11. Krishna and Murthy (1978): Manual on compost and other organic manures, 214
12. Rakshit A. 2015.Manures Fertilizers and Pesticides Paperback – Import. CBS Publishing; 1ST edition, pp. 266.
13. Havlin, John L. 2004. Soil Fertility and Fertilizers: An Introduction to Nutrient Management Published July 23rd 2004 by Prentice Hall. pp. 528.
14. ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi-110 012. pp. 728.
15. Somawanshi, et al. 2012. Laboratory Methods for Analysis of Soil, Irrigation Water and Plants., Department of Soil Science and Agricultural Chemistry, MPKV., Rahuri. revised Ed. pp. 307.
16. Tisdale, S. L. and Nelson, W. L. and Beaqton, J. D. 2010. Soil Fertility and fertilizers. 7th Ed. Macmillan Publishing Company, 445 Hutchinson Avenue, Columbus.
17. Hand book of fertilizers use (1980): FAI publication.

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)
Major Core Theory Course
Course Code – SAGFCT1202
Title of the Course: Insecticides and Herbicides

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFCT1202: Insecticides and Herbicides

Module No.	Unit No.	Topic	Hrs.
1.0		**Agricultural Entomology**	**07**
	1.1	Agricultural Entomology: Introduction, Definition	
	1.2	General characters, description and morphology of insects	
	1.3	Economic importance of insects: Harmful, beneficial and productive insects	
	1.4	IPM: Introduction, Importance and Methods of insect control	
2.0		**Insecticides**	**08**
	2.1	Introduction, Definition & Classification of insecticides	
	2.2	Inorganic and organic insecticides	
	2.3	Insecticidal act and rules, insecticides banned	
	2.4	Insect pests of important crops and stored grains	
3.0		**Weed management**	**07**
	3.1	Introduction, Definition and Characteristics of weeds	
	3.2	Harmful and beneficial effects of weeds	
	3.3	Classification of weeds	
	3.4	Integrated weed management	
4.0		**Herbicides**	**08**
	4.1	Definition and Classification of herbicides	
	4.2	Some important herbicides (Structure, Chemical names, common names and uses): 2, 4-D, 2,4,5-D, Simazine, Atrazine	
	4.3	TCA, Monuron, Dalapon, Glyphosate	
	4.4	Precautions in storage and handling of herbicides	
		Total	**30**

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)

Major Practical Course

Course Code – SAGFCP1202

Title of the Course: Practical based on SAGFCT1202

[Credits: 2 (Marks: 50)] **(Total Periods: 60 Hours)**

CURRICULUM DETAILS: SAGFCP1202: Practical based on SAGFCT1202

Sr. No.	Practical Exercises	Hrs.
1.	Identification of insects	4
2.	Chemical control – Insecticides and their formulations	4
3.	Calculation of doses/concentrations of insecticides	4
4.	Study of plant protection appliances and equipments	4
5.	Determination of purity percentage of phosphomidon from commercial sample	4
6.	Estimation of phosphorous from given sample of organophosphorus insecticide	4
7.	Surveillance study of pests by using light traps, pheromone traps and field incidence	4
8.	Identification of weeds	4
9.	Study of losses caused by weeds	4
10.	Study of herbicide in relation to agrochemicals	4
11.	Estimation of simazine by colorimetric method	4
12.	Methods of herbicide application	4
13.	Calculation of herbicide dose	4
14.	Visit to agrochemicals industry	4
15.	Study and market survey of different insecticides and herbicides	4
	Total	**60**

Text Books and Reference Books:

1. Chapman, R. F. – The Insects: Structure and Functions
2. David, B. V. and T. Kumarswami – Elements of Economic Entomology
3. Marc J. Klowden- Physiological Systems in Insects
4. Pant N.C. and Swaraj Ghai – Insect Physiology and Anatomy
5. Nayar, K. K.; Anathkrishanan T.N. and B.V. David – General and Applied Entomology
6. Richards O.W. and R.G. Davies – Imms' General Text Book of Entomology –Vol. I & II
7. Metcalf and Flint – Destructive and Useful Insects; their habits and control.
8. G.S. Dhaliwal and Ramesh Arora 2001. Integrated Pest Management. Concepts and Approaches. Kalyani publishers, New Delhi.
9. Aldrich, R.J. and Kramer R.J. (1997), Principles in Weed Management.
10. Gupta O.P. (2007), Weed management Principles and Practices.
11. Gupta, O.P. (2008), Modern Weed Management
12. Jayakumar, R. and Jagannathan, R. (2007). Weed Science Principles.
13. Mandal R.C. (1999), Weed, Weedicides and Weed control Principles and Practices.
14. Rao V.S. (2006), Principles of Weed Science.
15. Gupta, O.P. 1984. Scientific Weed Management Today and Tomorrows.
16. Chemistry of Insecticides and Fungicides-U.S. Sree Ramula.
17. Methods of Pesticide analysis-U.S. Sree Ramulu.
18. Analytical Agricultural chemistry- Chopra and Kanwar.
19. Chemistry of Herbicides- Homer.
20. Hand book of Agrochemicals- Royal Society (UK)
21. Text book of Applied Entomology- K.P. Shrivastava
22. Modern Entomology by Dr. DB. Tambhare.
23. General and Applied Entomology- Anant Krishnan Nayar.

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)

Minor Course (Theory)

Course Code – SAGFMT1201

Title of the Course: Plant Nutrient Management

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFMT1201: Plant Nutrient Management

Module No.	Unit No.	Topic	Hrs.
1.0		**Plant Nutrition**	**07**
	1.1	Soil as a source of plant nutrients	
	1.2	Essential plant nutrients and their role	
	1.3	Deficiency symptoms of plant nutrients	
	1.4	Forms of nutrients in soil	
2.0		**Organic Manures**	**08**
	2.1	Introduction and importance of organic manures	
	2.2	Sources of organic matter, recycling, composition and C:N ratio	
	2.3	Bulky and Concentrated organic manures: Definition, properties and classification	
	2.4	Integrated nutrient management (INM)	
3.0		**Fertilizers**	**07**
	3.1	Introduction, Definition & Classification of fertilizers	
	3.2	Nitrogenous fertilizers: Introduction, Definition& Classification	
	3.3	Phosphatic Fertilizers: Introduction, Definition & Classification	
	3.4	Potassic Fertilizers: Introduction, Definition & Classification	
4.0		**Micronutrients and Biofertilizers**	**08**
	4.1	Secondary and Micronutrient Fertilizers	
	4.2	Water soluble fertilizers	
	4.3	Biofertilizers	
	4.4	Nano fertilizers	
		Total	**30**

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)

Minor Practical Course

Course Code – SAGFMP1201

Title of the Course: Practical based on SAGFMT1201

[Credits: 2 (Marks: 50)] **(Total Periods: 60 Hours)**

CURRICULUM DETAILS: SAGFMP1201: Practical based on SAGFMT1201

Sr. No.	Practical Exercises	Hrs.
1.	Identification of different manures and fertilizers	4
2.	Determination of nitrogen from given fertilizer sample	4
3.	Estimation of total N from plant sample by Micro Kjeldahl's method.	4
4.	Estimation of organic carbon from FYM or Compost (Walkley and Black method)	4
5.	Detection of adulteration in fertilizers (Rapid test)	4
6.	Study of different types of biofertilizers	4
7.	Study of preparation methods for enriched compost	4
8.	Study of quality analysis of compost and vermicompost	4
9.	Determination of total potassium content of muriate of potash (flame photometer).	4
10.	Determination of zinc content from micronutrient fertilizer (EDTA Method).	4
11.	Determination of acidity (in terms of H_2SO_4) of ammonium sulphate	4
12.	Estimation of copper from micro nutrient Carrier	4
13.	Determination of sulphate from superphosphate	4
14.	Visit to manure pit and biogas plant	4
15.	Visit to fertilizer industry and study of their activities	4
	Total	**60**

Text Books and Reference Books:

1. Manures and Fertilizers by K.S. Yawalkar, J.P. Agarwal and 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. Das D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.
7. Handbook of manures and fertilizers – ICAR publication
8. Text Book of fertilizers – Ranjankumar Basak
9. Fertilizer Guide – Tondon HLS (1994)
10. Handbook on fertilizer usage- Seetharam S, Priswas BC, Yadav DS, Matneswaru S. (1996)
11. Fertilizer control order (1985) The fertilizer Association of India
12. Krishna and Murthy (1978): Manual on compost and other organic manures, 214
13. Rakshit A. 2015.Manures, Fertilizers and Pesticides Paperback – Import. CBS Publishing; 1ST edition, pp. 266.
14. Havlin, John L. 2004. Soil Fertility and Fertilizers: An Introduction to Nutrient Management Published July 23rd 2004 by Prentice Hall. pp. 528.
15. ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi-110 012. pp. 728.
16. Somawanshi, et al. 2012. Laboratory Methods for Analysis of Soil, Irrigation Water and Plants., Department of Soil Science and Agricultural Chemistry, MPKV., Rahuri. revised Ed. pp. 307.
17. Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
18. Page et. al. 1982. Methods of Soil Analysis, Part 1 and 2. Chemical and Microbiological Properties. 2nd Ed. Soil Science Soc. of America Am. Soc. Agron., Madison, Wisconsin, USA.
19. Hand book of fertilizers use (1980): FAI publication

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)
Generic Elective Course
Course Code – SAGFGE1201
Title of the Course: Crop Production Technology-I (*Kharif* crops)
[No. of Credits: 2 Credit] **[Total: 30 Hours]**

Curriculum Details: SAGFGE 1201: Crop Production Technology-I (*Kharif* crops)

Module No.	Unit No.	Topic *(Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices Intercropping, pest and disease management and yield of Kharif crops)*	Hrs.
1.0		**Cereals**	**08**
	1.1	Rice	
	1.2	Maize	
	1.3	*Kharif* Sorghum	
	1.4	Pearl millet and Minor millet	
2.0		**Pulses**	**07**
	2.1	Pigeon pea	
	2.2	Mungbean, Uradbean	
	2.3	Cowpea, Kidney bean	
	2.4	Horse gram	
3.0		**Oilseeds**	**07**
	3.1	Groundnut	
	3.2	Sesame	
	3.3	Soybean	
	3.4	Niger	
4.0		**Fiber, Forage crops and Grasses**	**08**
	4.1	Cotton	
	4.2	Jute	
	4.3	Forage crops –Sorghum, Cowpea, Pearl millet and Maize	
	4.4	Grasses: Napier and Marvel	

Text Books and Reference Books:

1. Modern technique of raising field crops by Chidda Singh
2. Agronomy of field crop by S.R. Reddy
3. Hand book of Agriculture, ICAR New Delhi
4. Introduction to Agronomy and Soil and Water Management- Dr. V. G. Vidya, K. R. Shasrabuddhe, Continental Prakashan, Pune - 411 030.
5. Crop Production and Field Experimentation - Dr. V. G. Vaidya, K. R. Sahasrabuddhe, Dr. V. S. Khuspe. Continental Prakashan, Pune - 411 030.
6. Agronomy - S. C. Panda - 2008, Agrobios (India) Jodhpur - 342 002.
7. Principles of Agronomy - J. Yellamanda Reddy, G. H. Sankara Reddy - Kalyani Publishers, Revised Edition 2002.
8. Principles of Crop Production - 2000 S. R. Reddy, Kalyani Publishers, Ludhiyana.
9. Hand Book of Agriculture - Fifth edition (2006) I. C. A. R., New Delhi.
10. Principles of Agriculture - 2009, Ashok S. Jadhav, Sandip K. Raskar, Raj laxmi Prakashan.
11. Plant Breeding - Principles and Methods - 2005, B. D. Singh, Kalyani Publishers.
12. Agronomy of Field Crops - 2006. S. R. Reddy, Kalyani Publishers, Ludhiyana.

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - III)

Skill Enhancement Course

Course Code – SAGFSC1201

Title of the Course: Biofertilizer and Biopesticide Technology

[No. of Credits: 2 Credit] **[Total: 60 Hours]**

CURRICULUM DETAILS: SAGFSC1101: Biofertilizer and Biopesticide Technology

a) Theory: 20 Hrs.

i. Biofertilizers: Introduction, types and importance of biofertilizers

ii. Classification of biofertilizers, Microorganisms used in biofertilizers production

iii. Role of biofertilizers in soil fertility and agriculture.

iv. Biopesticides: Introduction, advantages and types of biopesticides

v. Importance of biopesticides in agriculture and organic farming

vi. Different methods of application of biofertilizers and biopesticides

b) Practical:

Sr. No.	Practical Exercises	Hrs.
1.	Equipment, machinery and tools used for biofertilizers and biopesticides production.	4
2.	Media used for biofertilizers and biopesticides production.	4
3.	Study of *Rhizobium* and its isolation of from root nodules of leguminous plants	4
4.	Demonstration of biofertilizer production through photographs/videos.	4
5.	Isolation of potent biopesticide producer (*Trichogramma/Cryptolaemus/ Chrysoperla/ NPV/ Entomofungal* pathogens)	4
6.	Formulation and preparation of biopesticide using suitable carrier	4
7.	Methods of application of biofertilizers and biopesticide	4
8.	Quality control tests for the biofertilizers and biopesticides	4
9.	Visit to agriculture university/KVK/biofertilizer/biopesticide production unit	4
10.	Visit to the agriculture field and interaction with the farmers to get their views on biopesticides	4
	Total	**40**

Text Books and Reference Books:

1. Alexander M. 1977. Soil Microbiology. John Wiley.
2. Bergerson FJ. 1980. Methods for Evaluating Biological Nitrogen Fixation. John Wiley and Sons.
3. Motsara, I.M.R., Bhattacharyya, P. and Srivastava, B. 1995. Biofertilizer Technology, Marketing and Usage- A Source Book-cum-glossary. FDCO, New Delhi.
4. Subba Rao, N.S. Biofertilizers in Agriculture and Forestry. 1993. Oxford and IBH. Publ. Co., New Delhi.
5. Burges, H.D. and Hussey, N.W. (1971). Microbial Control of Insects and mites. Academic Press, New York.
6. Burges, H.D. Formulation of microbial pesticides – Kluversep, ACB, Dordrecht-ISBN. 0412 625 202.
7. Coppel H.C. and J.W. Martin. (1977). Biological control of insect pest suppression. Springail.
8. De Bach P. 1964. Biological control of Insect Pest and Weeds Chapman and Hall, New York.
9. Gautam, R.D. (2006). Biological suppression of insect pests. Kalyani Publisher, New Delhi.
10. Huffaker, C.B. and Messenger, P.S. (1976). Theory and Practice of Biological control. Academic Press, New York.
11. Ignacimuthu, S.S. and Jayaraj, S. (2003). Biological Control of Insect Pests. Phoenix Publ. New Delhi.
12. Saxena, A.B. (2003). Biological Control of Insect Pests. Anmol Publ. New Delhi.
13. Huffaker, C.B. and Messenger, P.S. (1976). Theory and Practice of Biological control. Academic Press, New York.
14. Pepper HJ and Perlman D. 1979. Microbial Technology. 2nd Ed. Academic Press.

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606 (MS)

Faculty of Science and Technology

B. Sc. Second Year

Semester – IV

Subject: Agrochemicals and Fertilizers

Syllabus

(*As Per NEP- 2020*)

To be Implemented from

Academic Year 2025-2026

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Major Core Theory Course

Course Code – SAGFCT1251

Title of the Course: Manures and Organic Farming

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFCT1251: Manures and Organic Farming

Module No.	Unit No.	Topic	Hrs.
1.0		**Organic Manures**	**07**
	1.1	Manures: Introduction, Importance, Sources and composition	
	1.2	Bulky organic manures: Definition, Properties, Classification	
	1.3	Concentrated organic manure: Definition, Properties, Classification	
	1.4	C:N ratio	
2.0		**Compost & Green manuring**	**08**
	2.1	Compost: Definition, Composition, Classification, Preparation Methods	
	2.2	Decomposition process and nutrient losses during handling and storage	
	2.3	Green Manuring: Introduction, Types, Advantages, Disadvantages	
	2.4	Vermicompost: Introduction, Materials, Production methodology, Advantages	
3.0		**Organic Farming & Sustainable Agriculture**	**08**
	3.1	Organic Farming: Definition, need, principles and steps to successful organic farming	
	3.2	Sustainable Agriculture: Definition, principles and its importance in agriculture	
	3.3	Sewage and sludge, Biogas plant slurry	
	3.4	Integrated nutrient management; concept, components and importance	
4.0		**Biofertilizers, Biocontrol agents and Biopesticides**	**07**
	4.1	Biofertilizers: Introduction and types and importance	
	4.2	Biocontrol agents: Introduction and types and importance	
	4.3	Biopesticides: Introduction and types and importance	
	4.4	Nitrogen cycle in nature and its importance	
		Total	**30**

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester -IV)

Major Practical Course

Course Code – SAGFCP1251

Title of the Course: Practical based on SAGFCP 1251

[No. of Credits: 2 Credit] **[Total: 60 Hours]**

CURRICULUM DETAILS: SAGFCP1251: Practical based on SAGFCT1151

Sr. No.	Practical Exercises	Hrs.
1.	Identification of different manures	4
2.	Estimation of moisture and mineral matter from organic Manures (FYM/Compost/Oil Cake).	4
3.	Estimation of organic carbon from FYM or compost (Walkley and Black Method)	4
4.	Estimation of total nitrogen from FYM/compost by Micro Kjeldhal's Method)	4
5.	Study of different types of biofertilizers	4
6.	Visit to manure pit and biogas Plant.	4
7.	Study of preparation methods for enriched compost.	4
8.	Compost making- aerobic and anaerobic methods	4
9.	Study of quality analysis of compost and vermicompost.	4
10.	Preparation of enriched farm yard manure	4
11.	Study the method of preparation of *Dashparni, Neem Seed extract*	4
12.	Study the method of preparation of *Panchagavya, Beejamrut* and *Jeevamrut*	4
13.	Study of crop residue management and green manuring	4
14.	Visit to biocontrol laboratory/ biofertilizer/vermicompost unit	4
15.	Visit to organic farms to study the various components and their utilization	4
	Total	**60**

Text Books and 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) Chemistry of Manures and Fertilizers by Mannickam and Mariakulandai
4) Biofertilizers by Soani L. L., Bhandari S.C. Saxena S.N.
5) Biofertilizers by Subba Rao.
6) Hand Book of Agriculture ICAR New Delhi.
7) Manures and Fertilizers by – FAI
8) Analytical Agril. Chemistry by Chopra and Kanwar.
9) Hand Book of Manures and Fertilizers by ICAR New Delhi.
10) Organic Farming for Sustainable Agriculture by Dahama A. K. Agrobios Publication
11) Organic Farming: Theory and Practices by Palanippan, S. P. and Anaadurai, K.
12) Organic Farming in India, Problems and Prospects by Thapa, U. and Tripathi, P.
13) Trends in Organic Farming in India by Agrobios Publication
14) Handbook of Organic Farming
15) Recent Developments in Organic farming by Gulati and Barik

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Major Core Theory Course

Course Code – SAGFCT1252

Title of the Course: Plant Diseases and Fungicides

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFCT1252: Plant Diseases and Fungicides

Module No.	Unit No.	Topic	Hrs.
1.0		**Plant Pathology**	**07**
	1.1	Plant Pathology: Introduction, Definition, Scope and Objectives	
	1.2	Plant diseases: Definition and Classification	
	1.3	Causes of plant diseases with examples	
	1.4	Symptoms of plant diseases	
2.0		**Plant Disease Management**	**08**
	2.1	Principles and methods of plant disease management	
	2.2	Economic importance of plant diseases	
	2.3	IPM: Introduction, Importance, Scope, Concepts	
	2.4	Principles, Tools and Limitations of IPM	
3.0		**Fungicides**	**07**
	3.1	Fungicides: Introduction, Definition, Classification	
	3.2	Fungicidal formulations, Mode of action	
	3.3	Methods of applications of fungicides	
	3.4	Antibiotics	
4.0		**Diseases of Important Crops and Management**	**08**
	4.1	Rice, Wheat, Sorghum, Bajra, Soybean, Gram	
	4.2	Cotton, Tobacco, Groundnut, Sunflower, Safflower	
	4.3	Tomato, Okra, Brinjal, Potato, Cucumber	
	4.4	Mango, Citrus, Grape, Banana, Pomegranate, Apple	
		Total	**30**

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)
Major Practical Course
Course Code – SAGFCP1252
Title of the Course: Practical based on SAGFCT1252
[Credits: 2 (Marks: 50)] **(Total Periods: 60 Hours)**

CURRICULUM DETAILS: SAGFCP1252: Practical based on SAGFCT1252

Sr. No.	Practical Exercises	Hrs.
1.	Collection and identification of plant diseases	4
2.	Study of symptoms of various plant diseases	4
3.	Study of fungicides and their formulations	4
4.	Methods of pesticide application and their safe use	4
5.	Calculation of fungicide sprays concentrations	4
6.	Extraction of pesticide/fungicide from plant material	4
7.	Determination of pH/acidity/alkalinity of the formulation	4
8.	Preparation and use of Bordeaux mixture	4
9.	Estimation of copper pesticides by iodometric methods	4
10.	Estimation of zinc from zinc containing fungicides by EDTA method	4
11.	Estimation of sulphur from sulphur containing Fungicide	4
12.	Determination of moisture content from pesticides/fungicide	4
13.	Estimation of mercury from mercury containing fungicide	4
14.	Determination of percentage purity of zinc fungicide in commercial sample	4
15.	Visit to Agroclinic centre	4
	Total	**60**

Text Books and Reference Books:

1) Pathak, V. N. Essentials of Plant Pathology. Prakash Pub., Jaipur
2) Agrios, GN. 2010. Plant Pathology. Acad. Press.
3) Kamat, M. N. Introductory Plant Pathology. Prakash Pub, Jaipur
4) Singh RS. 2008. Plant Diseases.8th Ed. Oxford & IBH. Pub. Co.
5) Singh RS. 2013. Introduction to Principles of Plant Pathology. Oxford and IBH Pub. Co.
6) Alexopoulos, Mims and Blackwel. Introductory Mycology
7) Mehrotra RS & Aggarwal A. 2007.Plant Pathology.7th Ed. Tata Mc Graw Hill Publ. Co. Ltd.
8) Dhingra OD & Sinclair JB. 1986. Basic Plant Pathology Methods. CRC Press, London, Tokyo.
9) Nene YL & Thapliyal PN. 1993. Fungicides in Plant Disease Control. 3rd Ed. Oxford & IBH, New Delhi.
10) Vyas SC. 1993. Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw Hill, New Delhi.
11) Rajeev K & Mukherjee RC. 1996. Role of Plant Quarantine in IPM. Aditya Books.
12) Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management in Agriculture. 2nd Ed. Vol. II. (Ed. David Pimental). CRC Press.
13) Singh RS & Sitaramaiah K. 1994. Plant Pathogens – Nematodes. Oxford & IBH, New Delhi.
14) Vyas SC. 1993 Handbook of Systemic Fungicides. Vols. I-III. Tata McGraw
15) Rhower GG. 1991. Regulatory Plant Pest Management. In: Handbook of Pest Management.

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Minor Course (Theory)

Course Code – SAGFMT1251

Title of the Course: Agrochemicals in Crop Protection

[Credits: 2 (Marks: 50)] **(Total Periods: 30 Hours)**

CURRICULUM DETAILS: SAGFMT1251: Agrochemicals in Crop Protection

Module No.	Unit No.	Topic	Hrs.
1.0		**Agrochemicals**	**07**
	1.1	Introduction to agrochemicals, their type and role in agriculture	
	1.2	Effect of agrochemicals on environment, soil, human and animal health	
	1.3	Merits and demerits of their uses in agriculture	
	1.4	Management of agrochemicals for sustainable agriculture	
2.0		**Insecticides**	**08**
	2.1	Introduction, Definition & Classification of insecticides	
	2.2	Inorganic and organic insecticides	
	2.3	Organochlorine, Organophosphates, Carbamates, Synthetic Pyrethroids, Neonicotinoids	
	2.4	Insecticidal act and rules, insecticides banned	
3.0		**Fungicides**	**07**
	3.1	Plant diseases: Introduction, Classification and Causes	
	3.2	Fungicides: Introduction, Definition, Classification	
	3.3	Fungicidal formulations	
	3.4	Antibiotics	
4.0		**Herbicides**	**08**
	4.1	Weed: Introduction, Definition and Classification of Weed	
	4.2	Herbicides: Introduction, Definition and Classification	
	4.3	Biopesticides: Introduction, Definition and Classification	
	4.4	Biocontrol agents	
		Total	**30**

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Minor Course (Practical)

Course Code – SAGFMP1251

Title of the Course: Practical based on SAGFMT1251

[Credits: 2 (Marks: 50)] **(Total Periods: 60 Hours)**

CURRICULUM DETAILS: SAGFMP1251: Practical based on SAGFMT1251

Sr. No.	Practical Exercises	Hrs.
1.	Collection and identification of insects/pests	4
2.	Study of plant protection appliances	4
3.	Calculation of doses of insecticides	4
4.	Collection and identification of weeds	4
5.	Study of losses caused by weeds	4
6.	Herbicide label information and computation of herbicide doses	4
7.	Study of phytotoxicity symptoms of herbicides in different crops	4
8.	Study of formulations of pesticides	4
9.	Study of pesticide application techniques	4
10.	Collection and identification of plant diseases	4
11.	Preparation of Bordeaux mixture and its use	4
12.	Methods of application of fungicides	4
13.	Handling and storage of agrochemicals	4
14.	Study and market survey of different agricultural chemicals	4
15.	Visit to the agrochemicals Industry	4
	Total	**60**

Text Books and Reference Books:

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.
18) The Pesticide manual A world compendium (1995) – British crop production council, UK
19) Outline of organic chemistry: Bahl and Tuli
20) Chemistry of insecticide: SreeRamulu US (1991)
21) Fungicide in plant disease control: Nene YL and Thapliyal
22) Principles of weed science: Rao VS (1992)

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Generic Elective Course

Course Code – SAGFGE 1251

Title of the Course: Crop Production Technology-II (*Rabi* crops)

[No. of Credits: 2 Credit] **[Total: 30 Hours]**

CURRICULUM DETAILS: SAGFGE 1251: Crop Production Technology-II (*Rabi* crops)

Module No.	Unit No.	Topic *(Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices Intercropping, pest and disease management and yield of Rabi crops)*	Hrs.
1.0		**Cereals**	**08**
	1.1	Wheat	
	1.2	Barley	
	1.3	Rabi Sorghum	
	1.4	Maize (grain corn, sweet corn and baby corn)	
2.0		**Pulses**	**07**
	2.1	Chickpea	
	2.2	Lentil	
	2.3	Peas	
	2.4	French bean	
3.0		**Oilseeds**	**07**
	3.1	Sunflower	
	3.2	Safflower	
	3.3	Mustard	
	3.4	Linseed	
4.0		**Sugar, Medicinal and Forage crops**	**08**
	4.1	Sugar crop –Sugarcane and sugar beet	
	4.2	Medicinal and aromatic crops- Mentha, Lemon grass and Citronella	
	4.3	Forage crops –Lucerne, Berseem, Maize, Oat and Sorghum	
	4.4	Other crops –Potato, tobacco and sweet potato	

Text Books and Reference Books:

1. Modern technique of raising field crops by Chidda Singh
2. Agronomy of field crop by S.R. Reddy
3. Hand book of Agriculture, ICAR New Delhi
4. Introduction to Agronomy and Soil and Water Management- Dr. V. G. Vidya, K. R. Shasrabuddhe, Continental Prakashan, Pune - 411 030.
5. Crop Production and Field Experimentation - Dr. V. G. Vaidya, K. R. Sahasrabuddhe, Dr. V. S. Khuspe. Continental Prakashan, Pune - 411 030.
6. Agronomy - S. C. Panda - 2008, Agrobios (India) Jodhpur - 342 002.
7. Principles of Agronomy - J. Yellamanda Reddy, G. H. Sankara Reddy - Kalyani Publishers, Revised Edition 2002.
8. Principles of Crop Production - 2000 S. R. Reddy, Kalyani Publishers, Ludhiyana.
9. Hand Book of Agriculture - Fifth edition (2006) I. C. A. R., New Delhi.
10. Principles of Agriculture - 2009, Ashok S. Jadhav, Sandip K. Raskar, Raj laxmi Prakashan.
11. Plant Breeding - Principles and Methods - 2005, B. D. Singh, Kalyani Publishers.
12. Agronomy of Field Crops - 2006. S. R. Reddy, Kalyani Publishers, Ludhiyana.

National Education Policy 2020

B.Sc. Agrochemicals and Fertilizers, II Year (Semester - IV)

Vocational Skill Course

Course Code – SAGFSC1251

Title of the Course: Organic Farming Production Technology

[No. of Credits: 2 Credit] **[Total: 60 Hours]**

CURRICULUM DETAILS: SAGFVC1101:Organic Farming Production Technology

a) Theory: **20 Hrs.**

i. Organic farming, principles and its scope in India
ii. Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture
iii. Organic ecosystem and their concepts
iv. Organic nutrient resources and its fortification
v. Restrictions to nutrient use in organic farming;
vi. Choice of crops and varieties in organic farming;
vii. Fundamentals of insect, pest, disease and weed management under organic mode of production
viii. Certification process and standards of organic farming; Processing, labeling, economic considerations and viability, marketing and export potential of organic products.

b) Practical:

Sr. No.	Practical Exercises	Hrs.
1.	Study of indigenous technology knowledge (ITK) for nutrient, insect, disease and weed management.	4
2.	Study of preparation methods for enriched compost.	4
3.	Study of preparation methods for vermicompost and vermiwash	4
4.	Study of biofertilizers and bio-inoculants	4
5.	Study of preparation of biodynamic compost and cow pat pit	4
6.	Study of quality analysis of compost and vermicompost.	4
7.	Study of crop residue management and green manuring	4
8.	Study the method of preparation of *Panchagavya*, *Beejamrut* and *Jeevamrut*	4
9.	Study the method of preparation of *Dashparni ark and Neem Seed extract*	4
10.	Visit to Organic Farm to study the various components and their utilization	4
	Total	**40**

Text Books and Reference Books:

1. Organic Farming for Sustainable Agriculture by Dahama A. K. Agrobios Publication.
2. Organic Farming: Theory and Practices by Palanippan, S.P. and Anaadurai, K.
3. Organic Farming in India, Problems and Prospects by Thapa, U. and Tripathi, P.
4. Trends in Organic Farming in India by Agrobios Publication
5. Recent Developments in Organic farming by Gulati and Barik
6. Arun K. Sharma. 2002. A Hand book of organic farming. Agrobios, India. 627p.
7. Palaniappan, S.P and Annadurai, K.1999. Organic farming-Theory and Practice. Scientific publishers, Jodhpur,India. 257p.
8. Mukund Joshi and Prabhakarasetty, T.K. 2006. Sustainability through organic farming. Kalyani publishers, New Delhi. 349p.
9. Balasubramanian, R., Balakishnan, K and Siva Subramanian, K. 2013. Principles and practices of organic farming. Satish Serial Publishing House. 453p
10. Tarafdar, J.C., Tripathi, K.P and Mahesh Kumar, 2009. Organic agriculture. Scientific Publishers, India. 369p.
11. Tiwari, V.N., Gupta, D.K., Maloo, S.R and Somani, L.L. 2010. Natural, organic, biological, ecological and biodynamic farming. Agrotech Publishing Academy, Udaipur. 420p.
12. Dushyent Gehlot. 2005. Organic farming- standards, accreditation, certification and inspection. Agrobios, India. 357p