



स्वामी रामानंद तीर्थ
मराठवाडा विद्यापीठ, नांदेड

॥ मा 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 विद्याशाखे अंतर्गत राष्ट्रीय
शैक्षणिक धोरण २०२० नुसार पदवी प्रथम
वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक
वर्ष २०२४-२५ पासून लागू करण्याबाबत.

परिपत्रक

या परिपत्रकांमध्ये सर्व संबंधितांना कळविण्यात येते की, या विद्यापीठा अंतर्गत येणा-या सर्व संलग्नित महाविद्यालयांमध्ये शैक्षणिक वर्ष २०२४-२५ पासून पदवीस्तरावर राष्ट्रीय शैक्षणिक धोरण -२०२० लागू करण्याच्या दृष्टीकोनातून विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत येणा-या अभ्यासमंडळांनी तयार केलेल्या पदवी प्रथम वर्षाचे अभ्यासक्रमांना मा. विद्यापरिषदेने दिनांक १५ मे २०२४ रोजी संपन्न झालेल्या बैठकीतील विषय क्रमांक १५/५९-२०२४ च्या ठरावाअन्वये मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील खालील बी. एस्सी प्रथम वर्षाचे अभ्यासक्रम (Syllabus) लागू करण्यात येत आहेत.

- 01 B. Sc. I year - Biotechnology
- 02 B. Sc. I year - Bio-informatics
- 03 B. Sc. I year - Biotechnology (Vocational)
- 04 B. Sc. I year- Dyes and Drugs
- 05 B. Sc. I year - Industrial Chemistry
- 06 B. Sc. I year - Agrochemical and Fertilizers
- 07 B. Sc. I year - Chemistry (General)
- 08 B. Sc. I year - Analytical Chemistry
- 09 B. Sc. I year - Biochemistry
- 10 B. Sc. I year - Statistics
- 11 B. Sc. I year - Zoology
- 12 B. Sc. I year - Biotechnology (NMD College Hingoli)

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/विवत्रविपदवी/२०२४-२५/123
दिनांक २०.०६.२०२४

डॉ. सरिता लोसरवार
सहा.कुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग

- प्रत : १) मा. आधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
२) मा. संचालक, परीक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
३) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
४) मा. प्राचार्य, न्यू मॉडल डिग्री कॉलेज हिंगोली.
५) सिस्टीम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ. याना देवून कळविण्यात येते की, सदर परिपत्रक संकेतस्थळावर प्रसिध्द करण्यात यावे.

COURSE STRUCTURE

As Per National Education Policy- 2020

B. Sc. First Year

Subject: Agrochemicals and Fertilizers

- ❖ Teaching scheme
- ❖ Examination Scheme
- ❖ Syllabus

To be Implemented from
Academic Year 2024-2025



B. Sc. First Year Semester I (Level 4.5)

Sub. Code: AGF

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SAGFCT1101	Fundamentals of Soil Science	02	--	04	02	--
	SAGFCP1102	Practical Based on SAGFCT1101	-	02			04
Optional 2	SAGFMT1101		02	--	04	02	--
	SAGFMP1102		-	02			04
Optional 3	SAGFMT1101		02	--	04	02	--
	SAGFMP1102		-	02			04
Generic Electives <i>(from other Faculty)</i>	SAGFGE1101	Agriculture Science and Technology-I	02	--	02	02	--
Skill Based Course <i>(related to Major)</i>	SAGFSC1101	Problematic Soils and their Management	--	02	02	--	04
Ability Enhancement Course	AECENG1101	L1 – Compulsory English	02	--	02	02	--
Indian Knowledge System (IKS)	IKSXXX1101	Select from Basket 5	02	--	02	02	--
Community Engagement Services (CES)	CCCXXX1101	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness (Basket 6)	-	02	02	--	04
Total Credits			14	08	22	12	20



B. Sc. First Year Semester I (Level 4.5) Sub. Code: AGF

Examination Scheme

[20% Continuous Assessment (CA) and 80% End Semester Assessment (ESA)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	CourseName (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA	CA (8)	ESA (9)	
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)			
Optional 1	SAGFCT1101	Fundamentals of Soil Science	10	10	10	40	--	--	50
	SAGFCP1102	Practical Based on SAGFCT1101	--	--	--	--	10	40	50
Optional 2	SAGFMT1101		10	10	10	40	--	--	50
	SAGFMP1102		--	--	--	--	10	40	50
Optional 3	SAGFMT1101		10	10	10	40	--	--	50
	SAGFMP1102		--	--	--	--	10	40	50
Generic Elective	SAGFGE1101	Agriculture Science and Technology-I	10	10	10	40	--	--	50
Skill Based Course	SAGFSC1101	Problematic Soils and their Management	--	--	--	--	10	40	50
Ability Enhancement Course	AECENG1101	L1 – Compulsory English	10	10	10	40	--	--	50
Indian Knowledge System	IKSXXX1101	Select from Basket 5	10	10	10	40	--	--	50
Community Engagement Services (CC)	CCCXXX1101	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness (Basket 6)	--	--	--	--	10	40	50



B. Sc. First Year Semester II (Level 4.5)

Sub. Code: AGF

Teaching Scheme

	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Optional 1	SAGFCT1151	Agricultural Biochemistry	02	--	04	02	--
	SAGFCP1152	Practical Based on SAGFCT 1151	-	02		04	04
Optional 2	SAGFMT1151		02	--	04	02	--
	SAGFMP1152		-	02		04	04
Optional 3	SAGFMT1151		02	--	04	02	--
	SAGFMP1152		-	02		04	04
Generic Electives <i>(from other Faculty)</i>	SAGFGE1151	Agriculture Science and Technology-II	02	--	02	02	--
Skill Based Course <i>(related to Major)</i>	SAGFSC1151	Soil, water and Fertilizer Analysis-I	--	02	02	--	04
Ability Enhancement Course	AECENG1151	L1 – Compulsory English	02	--	02	02	--
Indian Knowledge System (IKS)	IKSXXX1151	Select from Basket 5	02	--	02	02	--
Community Engagement Services (CES)	CCCXXX1151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness (Basket 6)	-	02	02	--	04
Total Credits			14	08	22	12	20



B. Sc. First Year Semester II (Level 4.5) Sub. Code: AGF

Examination Scheme

[20% Continuous Assessment (CA) and 80% End Semester Assessment (ESA)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	CourseName (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA	CA (8)	ESA (9)	
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)			
Optional 1	SAGFCT1151	Agricultural Biochemistry	10	10	10	40	--	--	50
	SAGFCP1152	Practical Based on SAGFCT 1151	--	--	--	--	10	40	50
Optional 2	SAGFMT1151		10	10	10	40	--	--	50
	SAGFMP1152		--	--	--	--	10	40	50
Optional 3	SAGFMT1151		10	10	10	40	--	--	50
	SAGFMP1152		--	--	--	--	10	40	50
Generic Elective	SAGFGE1151	Agriculture Science and Technology-II	10	10	10	40	--	--	50
Skill Based Course	SAGFSC1151	Soil, water and Fertilizer Analysis-I	--	--	--	--	10	40	50
Ability Enhancement Course	AECENG1151	L1 – Compulsory English	10	10	10	40	--	--	50
Indian Knowledge System	IKSXXX1151	Select from Basket 5	10	10	10	40	--	--	50
Community Engagement Services (CC)	CCCXXX1151	Any one of NCC/ NSS /Sports/ Culture /Health Wellness /Yoga Education / Fitness (Basket 6)	--	--	--	--	10	40	50

Syllabus for B. Sc. First Year
Subject: Agrochemicals and Fertilizers
Semester – I
As Per National Education Policy- 2020

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - I)
Major Core Theory Course
Course Code – SAGFCT1101
Title of the Course: FUNDAMENTALS OF SOIL SCIENCE

[Credits: 2 (Marks: 50)]

(Total Periods: 30 Hours)

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. First year has been designed with well-defined objectives.

Course objectives:

1. To know well the soils of our region in their physical, chemical and biological aspects.
2. To understand the basic components of soil, their origin and various physicochemical properties
3. To manage the soil in various ways so as to improve their fertility and productivity
4. To understand the proper methods of soil testing to select proper fertilizers and suitable crops aiming for higher production.

Course outcomes:

1. Creation of skilled and trained manpower for agriculture sector
2. Application of latest technology to understand the physicochemical properties of soils
3. To access the soil health parameters and help in government programs of soil health card distribution.
4. To carry out soil fertility and productivity mapping for better management of soil resources
5. To correlate the soil properties with the choice of proper fertilizer doses.
6. The ultimate outcome should be the increased productivity of soils with better management so as to improve crop yield.

CURRICULUM DETAILS: SAGFC1101: FUNDAMENTALS OF SOIL SCIENCE

Module No.	Unit No.	Topic	Hrs.
1.0		Introduction of Soil	
	1.1	Definition of Soil, Scope of Soil Science, Functions of Soil, Soil Components	07
	1.2	Rocks and Minerals: Classification and Properties	
	1.3	Weathering: Definition, Types and Factors responsible for weathering	
	1.4	Soil Profile: Definition, Soil Horizons and Typical Diagram of Soil Profile	
2.0		Physical Properties of Soil	
	2.1	Soil Texture and Structure	08
	2.2	Soil Air and Soil Temperature	
	2.3	Density and Porosity of Soil	
	2.4	Soil color and Soil Consistence	
3.0		Soil Colloids and Ion Exchange	
	3.1	Definition of Soil Colloids, Types and Properties	07
	3.2	Importance of Ion Exchange, Cation Exchange Capacity (CEC), Anion Exchange Capacity	
	3.3	Soil Reaction: Relation of Soil pH and Nutrient Availability	
	3.4	Buffer Capacity of Soil	
4.0		Soil Water and Organic Matter	
	4.1	Soil Water: Importance, Retention and movement of water in soil, Classification of Soil Water, Soil Moisture Constants	08
	4.2	Sources, Factors affecting, composition and decomposition of soil organic matter, Role of organic matter	
	4.3	Soil Microorganisms: Important microbial processes in soil, Biological Nitrogen Fixation	
	4.4	Soil Fertility and Soil Productivity: Definition and Comparison	
		Total	30

Text Books and Reference Books:

1. Fundamentals of Soil Science: Dr. V. D. Patil and Dr. C. V. Mali
2. Principles of Soil Science: M. M. Rai.
3. Nature and properties of soil: Boolanann and Brady.
4. A textbook of soil science: Dr. J. A. Daji.
5. Introduction to Agronomy: Vaidya and Sahastrabuddhe.
6. Soil fertility and fertilizer: Tisdle and Nelson.
7. Soil science: P. S. Varma and V. K. Agarwal.
8. Soil Fertility: Theory and Practice by J. S. Kanwai
9. Dictionary of soil and water management by J. R. Kadam, B. P. Ghildyal.
10. Handbook of Agriculture: I. C. A. R. Publication
11. Introductory Soil Science by D. K. Das

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - I)
Major Practical Course
Course Code – SAGFCP1102
Title of the Course: Practical based on SAGFCT1101

[Credits: 2 (Marks: 50)]

(Total Periods: 60 Hours)

CURRICULUM DETAILS: SAGFCP1102: Practical based on SAGFCT1101

Sr. No	Practical Exercises	Hrs.
1.	Collection and preparation of soil sample	4
2.	Determination of bulk density of soil	4
3.	Determination of particle density of soil	4
4.	To determine organic carbon from soil samples	4
5.	To determine moisture percentage from soil	4
6.	Determination of soil colour by Munsell soil colour chart in field.	4
7.	Preparation of HCl extract of soil.	4
8.	Determination of Ferrous from HCl extract	4
9.	Determination of Calcium from HCl extract	4
10.	Determination of Phosphorous from HCl extract	4
11.	Determination of soil texture by Feel method	4
12.	Estimation of Cation exchange capacity of Soil	4
13.	Determination of soil pH	4
14.	Determination of Electrical Conductivity of Soil	4
15.	Determination of soil temperature by using soil thermometer	4
	Total	60

Text Books and Reference Books:

1. ISSS. 2009. Fundamentals of Soil Science. 2nd Ed. Indian Society of Soil Science, New Delhi- 110012. pp. 728
2. Das D. K. 2011. Introductory Soil Science, 3rd revised and Enlarged Ed, Kalyani Publisher, Ludhiana. pp. 645.
3. Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: Pearson Education, ISBN: 978-0133254488
4. Daji J A; Daji J A; Kadam J R; Patil N D.1996. Textbook of Soil Science Bombay Media Promoters and publishers Pvt. Ltd.
5. Biswas, T.D.; Mukherjee, S.K. 1995. Text Book of Soil Science 2nd sEd. Tata McGraw Hill Publisher, Delhi pp 433.
6. Somawanshi, et al. 2012. Laboratory Methods for Analysis of Soil, Irrigation Water and Plants., Department of Soil Science and Agriculturasl Chemistry, MPKV., Rahuri. revised Ed. pp. 307.
7. Jakson, M.L. 1973. Soil Chemical Analysis. Printice Hall, India, Pvt. Ltd. New Delhi. pp 498.
8. 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.
9. Klute, A. 1986. Methods of Chemical Analysis, 2nd Ed. American Soc. Agron.,Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
10. Piper, C. S. 1966. Soil and Plant Analysis. Inters Science. Hans Publisher, Mumbai
11. Black, C. A. 1965. Soil Chemical Analysis, Part I and part II. American Soc. Agron.,Inc. and Soil Science Society of America. Madison, Wisconsin, USA.
12. Hesse, P. R. 1971. a Text Book of Soil Chemical Analysis. John Murray, London
13. Chora, S. L. and Kanwar, J. S. 1991. Analytical Agricultural Chemistry, Kalyani Publisher New Delhi
14. Chapman, H.D., and P.F. Pratt. 1961. Methods of analysis for soils, plants and waters. Division of Agricultural Sciences, University of California
15. Patil, V. D. and Mali C. V. 2007. Fundamentals of Soil Science, Aman Publication, Meerut.

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - I)
 Generic Elective Course
 Course Code – **SAGFGE 1101**
 Title of the Course: **Agriculture Science and Technology-I**

[No. of Credits: **2 Credit**]

[Total: **30 Hours**]

CURRICULUM DETAILS: SAGFGE 1101: Agriculture Science and Technology-I

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0			
	1.1	Introduction to Agriculture	08
	1.2	Rock and Soil	
	1.3	Weather and Climate	
	1.4	Agriculture- A Modern Approach	
2.0			
	2.1	Seeds and Sowing	07
	2.2	<i>Plant Nutrition</i>	
	2.3	Irrigation Management	
	2.4	Cropping System	
3.0			
	3.1	Tillage	07
	3.2	Weed Management	
	3.3	Pest and Disease Control	
	3.4	Protection From Wild Animals	
4.0			
	4.1	Waste Management	08
	4.2	Horticultural Practices	
	4.3	Special Crops	
	4.4	Agro-tourism	

Text Books and Reference Books:

1. Introduction to Agronomy and Soil and Water Management- Dr. V. G. Vidya, K. R. Shasrabuddhe, Continental Prakashan, Pune - 411 030.
2. Crop Production and Field Experimentation - Dr. V. G. Vaidya, K. R. Sahasrabuddhe, Dr. V. S. Khuspe. Continental Prakashan, Pune - 411 030.
3. Agronomy - S. C. Panda - 2008, Agrobios (India) Jodhpur - 342 002.
4. Principles of Agronomy - J. Yellamanda Reddy, G. H. Sankara Reddy - Kalyani Publishers, Revised Edition 2002.
5. Principles of Crop Production - 2000 S. R. Reddy, Kalyani Publishers, Ludhiana.
6. Hand Book of Agriculture - Fifth edition (2006) I. C. A. R., New Delhi.
7. Principles of Agriculture - 2009, Ashok S. Jadhav, Sandip K. Raskar, Raj laxmi Prakashan.
8. Plant Breeding - Principles and Methods - 2005, B. D. Singh, Kalyani Publishers.
9. Agronomy of Field Crops - 2006. S. R. Reddy, Kalyani Publishers, Ludhiana.
10. Seed Technology, 2002, Ratan Lal Agrawal, Oxford and IBH Publishing Co-op. Pvt. Ltd., Kolkata.
11. Seed Technology - Dr. Harpal Singh, Tomar, Aman Publishing House, Meerut.
12. Plant Tissue Culture - M. K. Rajdan.
13. Plant Tissue Culture - M. K. Singh, Oxford and IBH Publishing Co. Pvt. Ltd. 2004.
14. Seed Science and Technology - A. K. Joshi, B. D. Singh, Kalyani Publishers.
15. Principles of Agronomy, 2011, - S. R. Reddy, Kalyani Publishers.
16. Fundamentals of of Agronomy, 2008, - Dr. Gopal Chandra De, Oxford and IBH Publishing Company Pvt. Ltd.
17. Seed Science and Technology, 2001 - Subir Sen, Nabinananda Ghosh, Kalyani Publishers.
18. Text Book of Soil Science - A Textbook - V. D. Patil, C. V. Mali, Phoneix Publications Parbhani.
19. Fundamentals of Soil Science, 1996 - Dr. J. A. Daji, Revised by Dr. J. R. Kadam, N. D. Patil, Media Promoters and Publisher Pvt. Ltd., Mumbai.
20. Handbook of Horticulture -, 2002, I. C. A. R., New Delhi.
21. Munures and Fertilizers - K. S. Yawalar, J. P. Agarwal, S. Bokde, Agri-Horticultural Publishing House, Nagpur.
22. Commercial Production of Horticultural Crops - H. N. Samaddar, Naya Udyog, Kokata.
23. Basic Horticulture - Jitendra Singh, Kalyani Publishers, Ludhiana.
24. Vegetable Crops - T. K. Bose, K. Kabir et. al., Naya Prokash, Kolkata.
25. Introductory Ornamental Horticulture - J. S. Arora, Kalyani Publishers.
26. A Class Book of Botany - A. C. Datta, Oxford Publication.
27. Waste Management and Environment V. PDPO, H. Ltob, U. Mander.
28. Environment Waste Management, Ramchandra, Oxford Publication
29. Advances in Waste Management, - Ajay S. Kalasdhad, Jawan Singh, Kondusamy Dhamodharan, Springer, WIF Press.
30. Handbook on Waste Management, Thomas C., Kinnaman and Kenji Takeychi

National Education Policy 2020

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

Skill Enhancement Course

Course Code – SAGFSC1101

Title of the Course: Problematic Soils and their Management

[No. of Credits: 2 Credit]

[Total: 60 Hours]

CURRICULUM DETAILS: SAGFSC 1101: Problematic Soils and their Management

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1 & 2	Preparation of saturation paste extract.	8
3	Determination of pH and EC from irrigation water.	4
4 & 5	Determination of cations (Ca, Mg, Na and K) and computation of SAR	8
6	Determination of ESP of soils	4
7	Determination of gypsum requirement of sodic soil	4
8	Determination of calcium carbonate from soil	4
9	Determination of lime requirement of acidic soil	4
10	Collection of irrigation water and sewage water	4
11	Determination pH and EC from irrigation water	4
12 & 13	Determination of cations (Ca, Mg, Na and K) from irrigation water	8
14 & 15	Determination of anions (CO ₃ , HCO ₃ , Cl and SO ₄) from irrigation water and RSC and SAR	8
	Total	60

Text Books and Reference Books:

- 1) Richards L. A..1954. Diagnosis and Improvement of Saline and Alkali Soils. UnitedState Department of Agriculture.
- 2) Maliwal, G. La. and Somanil, L. 2010. Nature Properties and Management of Sine andAlkali Soils. Agrotech Publishing Academy, Udaipur 313 002. pp. 335.
- 3) Mahendran, et al. Soil Resource Inventory and Management of Problematic [i.e.Problematic] Soils. Published by Agrotech Publishing Academy (2012) ISBN 10: 818321097X / ISBN 13: 9788183210973
- 4) Abrol, I. P., Yadav, J. S. P and Massoud, F. I. 1988. Salt-Affected Soils and their Management. FAO SOILS BULLETIN
- 5) Tyagi, N.K. and P.S. Minhas. 1998. Agricultural Salinity Management in IndiaPublished by CSRI., Kernel. (Price Rs. 500/-).
- 6) Yaduvanshi, N. P. S. 2008. Chemical Changes and Nutrient Transformation in Sodic/Poor Quality water Irrigated Soils. Published by CSRI Kernel.
- 7) Dey, P., Gupta, S. K. 2012. Diagnostics, Remediation and Management of Poor Quality Waters: Lectures for Summer School by R. L. Meena, S. K. Gupta, R. K. Yadav and D. K. Sharma, 2011. Salinity Management for Sustainable Agriculture in Canal Commands.Published by CSRIKernel.
- 8) Twenty-five years of research on management of salt affected soils & use of saline waterin agriculture, 1998 (Price Rs. 75/-). Published by CSRI., Kernel.
- 9) Patil, V. D. and Mali C. V. 2007. Fundamentals of Soil Science, Aman Publication, Meerut. 10)Das, D. K. Introductory Soil Science
- 11) Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: PearsonEducation, ISBN: 978-0133254488.
- 12) The chemistry of Soil – Firman Bear
- 13) Text Book of Pedology Concepts and Applications – J. Sehgal
- 14) FAO United Nations Soils Portal- FAO

Syllabus for B. Sc. Agrochemicals and Fertilizers,
First Year
Semester – II
As Per National Education Policy- 2020

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - II)
Major Core Theory Course
Course Code – SAGFCT 1151
Title of the Course: AGRICULTURAL BIOCHEMISTRY

[Credits: 2 (Marks: 50)]

(Total Periods: 30 Hours)

Course objectives:

1. The nutritional aspects of the various food components are considered for balanced nutrition.
2. To gain knowledge about the principles that govern complex biological systems.
3. To analyze and understand the biochemical processes and metabolic pathways involved in crop growth, development, metabolism and stress responses.
4. To enhance understanding of students about fundamental biological processes critical for sustainable and productive agriculture.

Course outcomes:

1. To gain and spread the knowledge about nutritional components of food, their sources, balanced nutrition and their role in human health.
2. Designing sustainable farming practices and maximizing crop yields.
3. Providing insights into how biochemical reactions influence crop yield, nutritional content, and overall agricultural productivity.
4. This course will contribute to the advancement of efficient and environmentally conscious farming practices, ultimately addressing global issues related to food security and the optimization of agricultural systems.

CURRICULUM DETAILS: SAGFCT 1151: AGRICULTURAL BIOCHEMISTRY

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Introduction to Biochemistry	
	1.1	Definition, Scope and Importance of Biochemistry in Agriculture	07
	1.2	Food: Definition, Functions of food, Balanced Nutrition and malnutrition	
	1.3	Biomolecules - Definition, types, structure, properties and its applications	
	1.4	Carbohydrate: Introduction and Classification, Structure and properties of Glucose, biological significance of carbohydrates	
2.0		Amino acids, Proteins, Lipids and Enzymes	
	2.1	Amino acids: Definition, structure, classification and properties of amino acids	08
	2.2	Proteins: Introduction, definition, classification, properties and structure of proteins	
	2.3	Lipid: Introduction and classification, Structures and properties of fatty acids, biological significance of lipids.	
	2.4	Enzymes: Definition, Classification, Chemical nature of enzymes, Factors affecting enzyme activity, Role of enzymes as biological catalysts.	
3.0		Vitamins	
	3.1	Introduction, Classification, Properties, Functions and Deficiency Symptoms of Vitamins	08
	3.2	Vitamin A, Vitamin D	
	3.3	Vitamin E, Vitamin K	
	3.4	Vitamin B and Vitamin C	
4.0		Plant Hormones	
	4.1	Introduction, Occurrence, Structure, Physiological role of following plant hormones	07
	4.2	Auxins, Gibberellins	
	4.3	Cytokinin	
	4.4	Absciscic acid and Ethylene	
		Total	30

Text Books and Reference Books:

1. Foods: Facts and principle by N. Shakuntala
2. Handbook of agriculture: I.C. A. R. Publications.
3. Plant physiology by Sunderam.
4. Plant biochemistry by Bonner.
5. Textbook of biochemistry by West and Todd.
6. Elementary biochemistry by J. L. Jain, Sanjay Jain and Nitin Jain.
7. Elements of biochemistry by Srivastava.
8. Fundamentals of food and nutrition by S. R. Mudambi and M. V. Rajgopal.
9. Fundamentals of biochemistry by B. P.; Pandey.
10. Introduction to modern biochemistry by P. Caifon.
11. Plant physiology and biochemistry by Agarwal.
12. A Text book of plant physiology by N. Datta
13. Food and nutrition by Swaminathan

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester -II)
Major Practical Course
Course Code – SAGFCP 1152
Title of the Course: Practical based on SAGFCT 1151

[No. of Credits: 2 Credit]

[Total: 60 Hours]

CURRICULUM DETAILS: SAGFCP 1152: Practical based on SAGFCT 1151

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1	Preparation of solution, pH & buffers	4
2	Estimation of reducing sugar	4
3	Estimation of non-reducing sugar	4
4	Determination of acid value from oil sample	4
5	Estimation of free amino acids by Ninhydrin method	4
6	Determination of saponification value from oil sample	4
7	Estimation of Vitamin C	4
8	Estimation of Starch	4
9	Qualitative tests for Oil	4
10	TLC for separation of sugars	4
11	Qualitative tests for Carbohydrates	4
12	Qualitative tests for Proteins	4
13	Qualitative tests for Lipids	4
14	Estimation of Iodine value of oil/fat	4
15	Visit to Food Industry	4
	Total	60

Text Books and Reference Books:

1. Bhatia S. C., 1984, Biochemistry in Agricultural Sciences, Shree Publication House, New Delhi. 246
2. Purohit S.S. 2009, Biochemistry - Fundamentals and Applications, Agrobios, Jodhpur
3. Singh M. 2011, A Textbook of Biochemistry, Dominant Publishers & Distributors, New Delhi
4. Veerkumari L. 2007, Biochemistry, MIP Publishers, Chennai
5. Jain J. L. *et.al.* 2005, Fundamentals of Biochemistry, S. Chand & Company Ltd., New Delhi
6. Rastogi S. C. 2003 - Biochemistry Tata McGraw-Hill Education, New Delhi.
7. Rama Rao A. V. S. S., 2002 A Textbook of Biochemistry. Edition, 9, illustrated. Publisher, Sangam Books Limited, New Delhi.
8. Com EE & Stumpf PK. 2010. Outlines of Biochemistry, 5th Ed. John Wiley Publications.
9. Donald Voet and Judith G. Voet. 2011. Biochemistry, 4th Ed. John Wiley and Sons, Inc., NY, USA.
- 10.10) Goodwin, TW & Mercer EI. 1983. Introduction to Plant Biochemistry. 2nd Ed. Oxford, New York. Pergamon Press.

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - II)
 Generic Elective Course
 Course Code – **SAGFGE 1151**
 Title of the Course: **Agriculture Science and Technology-II**

[No. of Credits: 2 Credit]

[Total: 30 Hours]

CURRICULUM DETAILS: SAGFGE 1151: Agriculture Science and Technology-II

Module No.	Unit No.	Topic	Hrs.
1.0			
	1.1	Traditional Crops	08
	1.2	Commercial Crops	
	1.3	Modes of Reproduction	
2.0			
	2.1	Seed Production Technology	07
	2.2	Farm Management	
	2.3	Nursery Management	
3.0			
	3.1	Green House Technology	08
	3.2	Seed Processing and Testing	
	3.3	Organic Farming	
4.0			
	4.1	Agro-informatics	07
	4.2	Agricultural Marketing	
	4.3	Preservation	
		Total	30

Text Books and Reference Books:

- 1) ICAR Handbook of manures and fertilizers (1971) publication.
- 2) Yawalkar K.S. Manures & fertilizer: (1992).
- 3) Somwanshi, 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.
- 4) Jackson, M.L. 1973. Soil Chemical Analysis. Prentice Hall, India, Pvt. Ltd. New Delhi. pp 498.
- 5) 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.
- 6) *Chapman, H.D., and P.F. Pratt. 1961. Methods of analysis for soils, plants and waters. Division of Agricultural Sciences, University of California.*
- 7) Introduction to Soil Science by D. K. Das
- 8) A text book of Soil Science by J.A. Daji
- 9) Soils and soil fertility, Troch, F.R. And Thompson, L.M. Oxford University Press Inc.
- 10) Fundamentals of soil science, V. D. Patil and C.V. Mali
- 11) Soil Sampling, Preparation and analysis, Marcell Dekker, Inc, New York
- 12) Methods of soil analysis, American society of Agronomy Inc., Kuete, A. et.al., 1986
- 13) Introduction to soil laboratory manual - J. J. Harsett Stipes Publishing
- 14) Tandon HLS. 1993. Methods of Analysis of Soils, Fertilizers and Waters. FDCO, New Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: Pearson Education, ISBN: 978-01332544

National Education Policy 2020
B.Sc. Agrochemicals and Fertilizers, I Year (Semester - II)
Skill Enhancement Course
Course Code – SAGFSC 1151

Title of the Course: Soil, water and Fertilizer Analysis-I

[No. of Credits: 2 Credit]

[Total: 30 Hours]

CURRICULUM DETAILS: SAGFSC 1151: Soil, water and Fertilizer Analysis-I

Sr. No	Practical Exercises	Hrs. Required to cover the contents
1.	Principle and application of Spectro-photometry / Colorimetry	4
2.	Principle and application of flame photometry and atomic absorption spectrophotometer (AAS)	4
3.	Determination of moisture from organic manures and its preparation for nutrient analysis	4
4.	Determination of organic carbon from organic manures by ignition method	4
5.	Estimation of available nitrogen in soil (Alkaline permanganate method)	4
6.	Estimation of available phosphorus in soil	4
7.	Determination of available potassium in soil using flame photometer	4
8.	Determination of exchangeable Ca & Mg in soil by EDTA method	4
9.	Estimation of available sulphur in soil (Turbidity method)	4
10.	Determination of zinc content from micronutrient fertilizer (EDTA Method)	4
11.	Estimation of total N from plant sample by Micro Kjeldahl's method	4
12.	Plant analysis for P, K, secondary and micronutrients	4
13.	Fertilizer adulteration test / identification of adulteration in fertilizer / Detection of adulteration in fertilizers (Rapid test)	4
14.	Determination of nitrate nitrogen content of potassium nitrate	4
15.	Determination of water-soluble phosphorus in superphosphate (Pemberton method)	4
	Total	60

Text Books and Reference Books:

- 15) ICAR Handbook of manures and fertilizers (1971) publication.
- 16) Yawalkar K.S. Manures & fertilizer: (1992).
- 17) Somwanshi, 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.
- 18) Jakson, M.L. 1973. Soil Chemical Analysis. Prentice Hall, India, Pvt. Ltd. New Delhi. pp 498.
- 19) 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.
- 20) *Chapman, H.D., and P.F. Pratt. 1961. Methods of analysis for soils, plants and waters. Division of Agricultural Sciences, University of California.*
- 21) Introduction to Soil Science by D. K. Das
- 22) A text book of Soil Science by J.A. Daji
- 23) Soils and soil fertility, Troch, F.R. And Thompson, L.M. Oxford University Press Inc.
- 24) Fundamentals of soil science, V. D. Patil and C.V. Mali
- 25) Soil Sampling, Preparation and analysis, Marcell Dekker, Inc, New York
- 26) Methods of soil analysis, American society of Agronomy Inc., Kuete, A. et.al., 1986
- 27) Introduction to soil laboratory manual - J. J. Harsett Stipes Publishing
- 28) Tandon HLS. 1993. Methods of Analysis of Soils, Fertilizers and Waters. FDCO, New
- 29) Brady, N. C. 2016. The Nature and Properties of Soils. 15th edition Publisher: Pearson Education, ISBN: 978-01332544