Swami Ramanand Teerth Marathwada University, Nanded

B. O. S. IN CHEMISTRY
B. SC. THIRD YEAR (CHEMISTRY)
SEMESTER- V & VI
CBCS Course
Effective from JUNE – 2018

Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Credit System (CBCS) Course Structure

Subject: Agrochemicals and Fertilizers

B. Sc. Third Year (Semester-V & VI)

Semester Pattern effective from June -2018

B.Sc.Third Year Structure Subject : AGROCHEMICALS AND FERTILIZERS

Semester	Course No.	Name of the Course	Instructions Hrs/week	Total Period	Internal Evaluation	Marks of Semester	Total Marks	Credits
V	DSEAGF I SECTION A	Agronomy and seed technology (P-XII)	03	45	10	40	50	02
	DSEAGF I SECTION B / ELECTIVE	Horticulture (P-XIII) OR Vegetable Production	03 03	45 45	10 10	40 40	50 50	02
	DSECAGF P-I (DECAGF I-II	Practical based on P-XII & P-XIV (P-XVI)	04	Practicals 08 08	05 05	20 20	25 25	01 01
	DSEAGF P-II (DECAGF)	SEC III (1 Skill/Project)			15x3=45			(02)*
	OR DECAGF-P I	Practical based on P-XIII Elective	04	08 Practical	05	20	25	
VI	DSEAGF II SECTION A	Preservation of fruits and vegetables P-XIV	03	45	10	40	50	02
	DSEAGF II SECTION B / ELECTIVE	Agricultural Technology OR Hydroponics Technology P-XV	03 03	45 45	10 10	40 40	50 50	02
	DSEAGF P II DECAGF I & II	Practical based on P-XIII & P-XV P-XVII	04	Practicals 08 08	05 05	20 20	25 25	01 01
	DSEAGFP-III SECTION B	SEC IV			50		50	(02)*
	OR DSEAGF P-II	Practical based on P-XV Elective	04	08	05	20	25	
				Total Credit		: 12 (04)* = 16		

Objectives:

India being a chiefly agrarian economy and focus of future development, the subject Agrochemicals and fertilizers is catering to the needs of the agricultural manpower in the region.

The revised syllabus at B.Sc. IIIrd year has been designed with well defined objectives.

a. Agronomy and seed technology: aims to import the knowledge of latest methods in agronomy to increase farm production. Seed technology will ensure the high quality of seeds to the farmers and its legal angles.
b. Horticulture: production of fruits, vegetables and ornamental plants is the focus of the syllabus and aims at providing needs of population for better health.
c. Vegetable production (Elective-I) aims at familiarizing students with importance and cultivation of vegetable to augment farmers income.
d. Preservation of fruits and vegetables: The post harvest technology aims at storing and preserving the fruits and vegetables for avoiding losses and improve profitability of farming.
e. Agricultural technology: it helps the students in knowing and using the improved form technologies like micro irrigation, green houses, soil and water conservation techniques.
f. Hydroponics technology (Elective-II): It aim at providing knowledge about the advanced techniques of soilless culture and its significance for future of agriculture.

Course outcome:

1. Creation of skilled and trained manpower for agricultural sector.
2. Application of technology for higher production and profitability of farming.
3. Saving valuable natural produce like fruits and vegetables from spoilage and improving farm income.
4. Development of skills needed for future agriculture like hydroponics which will boost the intensive agriculture and production efficiencies.
5. Supplementing farm income by promoting vegetable production, storage and marketing and also helping in preserving the health of people by providing sufficient healthy foods like vegetables.
6. Knowledge resource persons for seed production industry.

Paper – XII Agronomy and Seed Technology

(CH-AG-301)

Periods : 45

Unit –I

1. Introduction to Agronomy 06
   - Definition, Scope
   - Relationship with other sciences
   - Factors governing Crop Production
   - Agro- climatic Zones of Maharashtra
2. Tillage and tillage implements : 05
   - Introduction
   - Objects of tillage
   - Type of tillage operations
   - Tillage implements
   - Modern concepts of tillage

Unit -II

3. Dry Land Management 06
   - Introduction
   - Importance
   - Problems of dry land farming
   - Management of dry land farming
   - Water shed management - definition and objectives
4. Package of practices for important field crops 08
   - Cotton
   - Jowar (Sorghum)
   - Sugarcane
   - Soya bean

Unit –III

5. Introduction to seed Technology 06
   - Definition of seed and seed technology
   - Characteristics of good quality seeds
   - Types of seeds
   - Seed dormancy
   - Seed treatment
6. General Principles of seed production 04
   - Genetic Principles
   - Agronomic Principles

Unit -IV

7. Seed certification and seed legislation 10
   - Seed certification- objectives, fundamental concepts
   - Organization of Seed certification
   - Seed certification agency
   - General seed certification Standards
   - Seed testing
   - Seed legislation in India.

Paper XIII Horticulture

(CH-AG-302)

Periods : 45

Unit -I

1. Introduction to Horticulture 04
   - Definition
   - Branches of horticulture
   - Importance and scope of horticulture in India
2. Propagation of horticulture crops 08
   - Definition,
   - Principles and methods of propagation of fruit crops
   - Propagation by seeds
   - Propagation by cuttings, grafting, budding, and layerage

Unit -II

3. Package of practices for important fruit crops of Maharashatra 08
   - Mango Grapes
   - Banana Guava

Unit-III

4. Olericulture 07
   - Definition
   - Scope and importance of vegetable growing
   - Classification of vegetable
   - Types of vegetable gardens
5. Package of Practices for important vegetable crops 10
   - Chillies Onion
   - Tomato Brinjal
   - Bhendi(okra)

   (Package of practices include area and production, varieties, climatic requirements cultivation practices, manuring, irrigation, plant protection and economic importance.)

Unit –IV

6. Floriculture 08
   - Introduction
   - Methods of cultivation
   - Important flower crops of Maharashtra state
   - Handling, transportation and storage of floriculture products
   - Export potential in floriculture

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Choice Based Credit System (CBCS) Course Structure
B. Sc. Third Year (Semester-VI) Semester Pattern
effective from June -2018

Subject: Agrochemicals and Fertilizers

Elective Paper I
Paper No. XIII
Title : Vegetable production

Credits: 02 (Marks-50) Periods: 45

Unit - I

1.	Importance of vegetables Introduction, Definition of vegetables Classification of vegetables Scope and importance of vegetable growing	06
2.	Types of vegetable farming Home or kitchen gardening Commercial vegetable gardening Vegetable gardening for seed production Floating vegetable garden	08

Unit - II

3.	Vegetable seed production Qualities of good seed, Definition of terms How to get good seed, Seed organization and its drawback Seed raising technique	08

Unit - III

4.	Storage of vegetables Principles of storage, Types of storage Physiological processes during storage Losses during storage, Storage of some vegetables	08
5.	Harvesting and packing of vegetables Introduction, Definition Post harvest deterioration of vegetables Packing of vegetables Kinds of packing, containers for vegetables	07

Unit - IV

6.	Vegetable Marketing in India Essentials of vegetable marketing Transportation of vegetables Methods of marketing in India Processing and Assembling Defects of present system of marketing	08

Paper XIV Preservation of Fruits and Vegetables

(CH-AG-303)

Period 45

Unit-I

1. Post harvest technology for fruits and vegetables 05 Harvesting, storage and marketing of fruits

   Harvesting, grading, packaging, marketing and storage of vegetables

2. Preservation of fruits and vegetables 08
   - Spoilage of fruits and vegetables
   - Importance and Principles of Preservation
   - Methods of Preservation
   - Chemical preservatives – types and uses

Unit-II

3. Canning and bottling of fruits and vegetables 02
   - Canned mango and canned vegetables

4. Fruit beverages 04
   - Preparation of fruit juices ,squashes, cordials
   - Preparation of orange and lemon squash

5. Preparation of jams, jellies, 06
   - Preparation of guava jelly, apple jam .mango jam, Amla jam

Unit-III

6. Drying and dehydration of fruits and vegetables 06
   - Methods –sun drying, mechanical dehydration, drum drying
   - Preparation of raisins from grapes. Banana products like chips and powders

7. Preparation and preservation of pickles 04
   - Preparation of mango, lime ,chillies and vegetable pickles,

Unit-IV

8. Preparation of crystallized fruits 04
   - Preparation of Amala Candy
9. Preparation of Tomato products 02
   - Tomato Ketchup and puree

10. Preparation of fermented vegetables 02

11. Irradiation to reduce post harvest losses of fruits and vegetables 02

Paper –XV Agricultural Technology
(CH-AG-304)

Periods :45

Unit -I

1. Problematic soils 10
   - Introduction to saline and alkali soils
   - Classification
   - Diagnostic criteria and causes of their formation
   - Adverse effects
   - Reclamation and management of saline and alkali soils
   - Introduction to acidic Soils, Sources of soil acidity
   - Reclamation of acidic soils

Unit -II

2. Hydroponics 04
   - Methods of soil-less cultivation
   - Nutrient film technique (NFT)
   - Advantages and disadvantages of hydroponics
   - Applications of hydroponics in agriculture
3. Micro- propagation techniques 06
   - Introduction , Types of micro- propagation
   - Techniques of tissue culture and its applications in agriculture

Unit – III

4. Green house technology 06
   - Introduction,
   - Components and design of green houses
   - Advantages , Applications in agriculture
5. Micro- irrigation 08
   - Introduction
   - Drip and sprinkler irrigation systems, their components
   - Advantages
   - Their importance in water management

Unit –IV

6. Soil and water conservation 08
   - Soil erosion- definition and types
   - Importance , Methods of soil and water management
   - Waste land reclamation
   - Watershed management- definition and objectives
   - Water harvesting- definition , methods of water harvesting
7. Biopesticides 03
   - Introduction ,
   - Types ,
   - Applications and importance

Swami Ramanand Teerth Marathwada University, Nanded

Choice Based Credit System (CBCS) Course Structure
B. Sc. Third Year (Semester-VI)
Semester Pattern effective from June -2018

Subject: Agrochemicals and Fertilizers

Elective Course II

Title: Hydroponics Technology

Periods

Chapter 1. What Is Hydroponics?... 5

A Brief History Of Hydroponics..
Current Research..
What All Gardeners Can Learn From NASA.
It's All About The Roots..

Chapter 2.Hydroponic Mediums... 6

Coconut Coir Perlite. LECA.
Perfect Starts. Rockwool.

Chapter 3.Hydroponic Technology. 14

Sand And Gravel Culture. The Dutch Bucket Method.
The Rockwool Slab Drip System. The Nutrient Film Technique (NFT).
The Raft System. Ein Gedi System.
Aeroponics. The Autopot.
Vertical Gardening.

Chapter 4.Plant Nutrition. 7

The Organic Composition Of Plants. Macro Nutrients .
Micro Nutrients. Selecting A Hydroponic Nutrient.
Making Your Own Nutrients. Maintaining Nutrient Concentration And pH.
Nutrient Solution Microbiology. Supercharge Your Garden With CO2.
CO2 And You. Do-It-Yourself CO2.

Chapter 5.Light Requirements 5

High Intensity Discharge (HID) Lighting. Intensity.
Duration (Photoperiod): Color (Photosynthetic spectrum) .
Choosing A Grow Light.

Chapter 6.Hydroponics As A Commercial activity 8

Making A Market For Your Garden. Investigate Your Local Market.
Product Quality Considerations. Approaching Prospective Customers.
Hydroponics -applications and customisation under Indian conditions

Laboratory Course –IV

Paper –XVI

(CH-AG-305)

Duration of practical –Four periods

(At least sixteen practicals are essential)

1. Study of tillage implements
2. Visit to the field to observe the package of practices for any field crop
3. Preparation of various types of nursery beds
4. study and practice of grafting technique
5. study and practice of budding technique
6. study and Practice of Layering Technique
7. Study and practice of propagation through cuttings
8. Study of garden tools and implements
9. Determination of seed moisture
10. Determination of germination percentage of seeds
11. Delinting of cotton seeds
12. Application of Azotobacter / Rhizobium culture on seed and observe their effect on crops
13. Use of growth regulators in plant propagation
14. Visit to the fruit orchards /vegetable garden to study the package of practices
15. Visit to seed production plot
16. Visit to seed testing laboratory
17. Study of physical purity analysis of seeds
18. To study the seed germination methods. (C& P, B.P., Sand)
19. Filling of application form for seed certification
20. To study seed quality testing

Laboratory Course –V

Paper XVII

CH-AG-306

Duration of practicals -4 periods

(At least sixteen practials are essential)

1. Preparation and use of soil testing kit for determination of available N,P, K
2. Estimation of total soluble salts in 1:2.5 soil water extracts.
3. Preparation and preservation of fruit juice
4. Preparation and preservation of squash
5. Preparation of fruit jam
6. Preparation of fruit jelly
7. Determination of gypsum requirement of soil
8. Determination of carbonates and bicarbonates from irrigation water
9. Determination of chlorides from irrigation water
10. Determination of sulphates from irrigation water
11. Determination of electrical conductivity of irrigation water /soil
12. Dehydration of Banana /Grapes
13. Preparation and preservation of pickles
14. Visit to the fruit preservation industry
15. Visit to the farm and diagnosis of field problems
16. Drying /dehydration of vegetables cabbage /potato /beans
17. Study of drip irrigation components /field visit
18. Study of sprinkler irrigation components /field visit
19. Determination of lime requirement of soil
20. Visit to green house to observe its design and working

Reference books for B.Sc. IIIrd year

1. Introduction to Agronomy –soil and water management.— Vaidhya and Sahasrabuddhe
2. Principles of Agronomy- Reddy and Reddi
3. Crop production and field experimentation – Vaidya and Saharabudhe and Khuspe
4. Seed Technology – Ratanlal Agrawal
5.Text book of Horticulture –K. Manibhushanrao
6.Basic Horticulture –Jitendrasingh
7. Fruit Growing - J.S. Bal
8. Fruit Physiology and Production- Amarsingh
9. Basic concept of fruit science –N.P.Singh
10. Fruits – Ranjeet Singh and Saxena
11. Floriculture in India –Randhwa and Mukhopadhya
12. Vegetable Growing –Chauhan
13. Vegetable science –Hazara and Som
14. Green house Technology –Arupratan Ghosh
15.Handbook of Saline and alkali soils -USDA
16. Vegetable Production in India- D.V.S.Chauhan
17.Vegetable growing in India – P.S. Arya and Santprakash
18.vegetable growing – Choudhary
19. Horticulture at glance- Amarsingh
20. Plant Propagation – Hertman et al
21. Preservation of fruits and Vegetables -Girdharilal and Tondon
22. Principles of fruit growing – Yawalkar and Kunte
23. Horticulture for competitive and college Exam- Suhas Diwase
24. Horticulture main book for Competitive Exam - R. N. Sable
25. Agriculture M.P.S.C. Main Exam- R. N. Sable
26. Foods and Nutrition – Sumati Mudambi
27. Plant Physiology- Pandey and Sinha
28. Plant physiology –Jain
29. Hand book of Agriculture –ICAR Publications

31. Drip Irrigation – WALMI Publication
32.How to Hydroponics-by Keith Roberto

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Choice Based Credit System (CBCS) Course Structure

B. Sc. Third Year (Semester-V)

Semester Pattern effective from June -2018

Subject: Agrochemicals and Fertilizers

SKILL ENHANCEMENT COURSE SECAGF-III

Title :Plant propagation techniques and their applications in Horticulture

Objective : To learn various propagation techniques for multiplication of commercially important fruit and flower plants.

Skill component: Learning and practising various propagation techniques like

a. Budding
b. Grafting
c. Layerage
d. Cutting

In various economically significant fruit and ornamental plants.

SKILL ENHANCEMENT COURSE SECAGF-III

Title : Preservation techniques for various fruits and vegetables.

Objective: To learn various preservation techniques for improving and increasing the storage life of various fruit and vegetables and converting them in to the products with longer shelf life.

Skill component : Learning and practising the various preservation techniques like

a. Preparation and Preservation of fruit juices.
b. Drying and dehydration of fruits and vegetables.
c. Preparation of Jams
d. Preparation of Jellies
e. Preparation of Pickles.

Laboratory Course – IV

Paper – XVI

(CH-AG-305)

Duration of Practical – Four Periods

(At least Sixteen Practical are Essential)

1	Identification of seeds of different vegetable crops
2	Calculation of fertilizer requirement for vegetable crops
3	Identification of common tools and Implements used for land preparation
4	Calculation of Seed rate required for vegetable crops
5-6	Study of Package of practices for Tomato
7-8	Study of Package of Practices for Brinjal
9-10	Study of Package of Practices for Bhendi
11-12	Study of Package of Practices for Chilli
13-14	Study of Package of Practices for Onion
15	Visit to Polyhouse Culture
16	Visit to Floriculture Garden
17	Visit to Vegetable seed production plot
18	Study of Package of Practices for Leafy Vegetable (Methi)
19	Study of Package of Practices for Leafy Vegetable (Palak)
20	Study of Seed Production Technology for Vegetable Crops.

Laboratory Course – V

Paper – XVII

(CH-AG-306)

Duration of Practical – Four Periods

(At least Sixteen Practical are Essential)

1	Study of Design and Components of Hydroponic System
2	Study of Working of Hydroponic unit
3	Study of Media Required for Hydroponic s
4-5	Study of Hydroponic techonology for Tomato
6-7	Study of Hydroponic techonology for Chilli
8-9	Study of Hydroponic techonology for Cucurbits
10-11	Study of Hydroponic techonology for Green Fodder Crop
12	Visit to Hydroponics Farming unit.
13-14	Study of Hydroponic techonology for Flower Cultivation
15	Preparation of Different Hydroponic Media
16	Study of Plant Tissue Culture and its application in agriculture
17 -18	Study of Different types of Plant Propagation techniques
19	Preparation of different Media for Tissue Culture
20	Visit to Tissue Culture Laboratory