

Swami Ramanand Teerth Marathwada University, Nanded



B. O. S. In Chemistry

**B. Sc. First Year Semester-I & II
Agrochemicals & Fertilizers
Syllabus**

In force from June -2009

B. Sc. First Year (Semester-I)
Agrochemicals & Fertilizers

Paper	Course No.	Course	Periods/ week	Total Periods	Marks
I	CHAG-101	Soil Chemistry-I	3	45	60
II	CHAG-102	Agricultural Biochemistry-I	3	45	60

B. Sc. First Year (Semester-II)
Agrochemicals & Fertilizers

Paper	Course No.	Course	Periods/ week	Total Periods	Marks
III	CHAG-103	Soil Chemistry-II	3	45	60
IV	CHAG-104	Agricultural Biochemistry-II	3	45	60
V	CHAG-105	Laboratory Course-I	4	120	60

Theory Papers 60 Marks (External-50 + Internal-10)

B. Sc. First Year, Semester-I
Paper-I, Soil Chemistry-I (CHAG-101)

Marks: 60

Periods: 45

UNIT-I

1.1 Soil forming Rocks and Minerals: 12P

Definition of soil, definition, classification and properties of rocks and minerals.

Weathering: Definition and types, factors responsible for weathering.

Unit-II

2.1 Soil profile: 08P

Definition, soil horizons and typical diagram of soil profile. Soil components.

UNIT-III

3.1 Soil physical properties and their importance in soil fertility: 12P

1. Soil texture and mechanical analysis of soil.

2. Soil structure.

3. Soil density and porosity.

4. Soil color.

5. Soil temperature

6. Soil aeration.

Unit-IV

4.1 Soil Colloids: 13P

Definition, types, nature, constitution, classification of collides, properties of soil colloids and their role in soil fertility.

B. Sc. First Year, Semester-II
Paper-III, Soil Chemistry-II (CHAG-103)

Marks: 60

Periods: 45

UNIT-I

- 1.1 Soil fertility and productivity: 12P**
Definition, comparison between fertility and productivity and factors affecting them.

Unit-II

- 2.1 Soil water: 08P**
Importance, retention and movement of water in soil. Loss of water in soil and plants.

UNIT-III

- 3.1 Soil organic matter: 10P**
Sources, composition and decomposition of soil organic matter. Influence of soil organic matter. Factors affecting decomposition of organic matter.

- 3.2 Ion exchange properties of soil: 04P**
Introduction, cation exchange process in soil. Anion exchange.

Unit-IV

- 4.1 Soil reaction and buffering of soil: 06P**
Definition, factors controlling soil pH. Relation of soil pH and nutrient availability. Buffer capacity of soil.

- 4.2 Soil micro-organism: 05P**
Important microbial process in soil.
Biological nitrogen fixation, Nitrification, ammonification, denitrification.

Reference Books:

1. Fundamental of soil science: Forth and Turk.
2. Principles of soil science: M. M. Rai.
3. Nature and properties of soil: Bookmann 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. Kanwar.
9. Dictionary of soil and water management by J. R. Kadam, B. P. Ghildyal.
10. Handbook of agriculture: I. C. A. R. Publication.

B. Sc. First Year Semester-I
Paper-II [CHAG-102]
Agricultural Biochemistry-I

Marks: 60

Periods: 45

UNIT-I

1.1 Scope and Importance of biochemistry in Agriculture **02P**

1.2 Carbohydrates: **09**

Definition, classification, structure and properties of Glucose, biological significance of carbohydrates,

Unit-II

2.1 Proteins and amino acids: **10**

Proteins: Introduction, definition, classification, properties and structure of proteins. Qualitative tests for identification of proteins.

Amino acids: Definition, structure, classification and properties of amino acids.

UNIT-III

3.1 Lipids: **12**

Introduction, Definition, components of fats-alcohols and fatty acids, classification of lipids, properties of fats and oils, biological significance of lipids.

Unit-IV

4.1 Enzymes: **12**

Definition, classification, chemical nature of enzymes, factors affecting enzyme activity, role of enzyme as biological catalysts.

B. Sc. First Year Semester-II
Paper-IV [CHAG-104]
Agricultural Biochemistry-II

Marks: 60

Periods: 45

UNIT-I

1.1 Vitamins: 10

Introduction, classification, properties, functions and deficiency symptoms of vitamins. A, D, E, K, Vit. B complex (B1 & B12) and vitamin C (Ascorbic acid).

Unit-II

2.1 Plant Hormones: 10P

Introduction, Structure, Physiological role of following plant hormones.

- a) Auxins
- b) Gibberellins
- c) Cytokinins.
- d) Abscisic acid.

Applications of plant hormones in agriculture.

UNIT-III

3.1 Nutrition: 12P

Definition, nutritional components of food, energy requirements and its importance. Nutritional importance of following food constituents.

- 1) Carbohydrates.
- 2) Proteins.
- 3) Fats and fatty acids.
- 4) Minerals and water.
- 5) Fibers

Unit-IV

4.1 A] Biochemical changes during seed germination 13P
B] Biochemical changes during fruit ripening.
C] Commercial use of hormones in fruit ripening.

Reference Books:

1. Foods: Facts and principle by N. Snakuntala Many and M. Shadaksharaswany.
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. Mudamhi and M. V. Rajgopal.
9. Fundamentals of biochemistry by B. P.; Pandey.
10. Introduction to modern biochemistry by P. Carlon.
11. Plant physiology and biochemistry by Agarwal.
12. A Text book of plant physiology by N. Datta.
13. Food and nutrition by Swaminathan.

B. Sc. First Year; Semester-I & II
Paper-V [CHAG-105]
Laboratory Course-I

Marks: 60

Periods: 120

Note: At least 16 experiments are essential.

1. Collection of soil sample and preparation.
2. Determination of bulk density of soil.
3. Determination of practical density of soil.
4. To determine organic carbon from soil sample.
5. To determine moisture percentage from soil.
6. Preparation of HCl extract of soil.
7. Determination of Ferrous from HCl extract.
8. Determination of Calcium from HCl extract.
9. Determination of phosphorus from HCl extract.
10. Color test of carbohydrate and protein.
11. Estimation of reducing sugar from cane juice.
12. Estimation of non-reducing sugar from Jaggary.
13. Determination of acid value from oil sample.
14. Determination of saponification value from oil sample.
15. Estimation of Vitamin C from fruit juice.
16. Visit to soil testing laboratory.
17. Visit to vermiculture industry.
18. Visit to sericulture industry.
19. Use and applications of soil thermometer.
20. Determination of water holding capacity of soil.

Reference Books:

1. Analytical agricultural chemistry by Kanwar and Chopra.
2. Soil analysis by Ravi.
3. Chemical analysis by Jackson.
4. Handbook of agriculture by I. C. A. R. Publication.
5. Textbook of agricultural biochemistry by Jain.

QUESTION PAPER FORMAT

FACULTY OF SCIENCE
B. Sc. First Year EXAMINATION
Semester Pattern

Agrochemicals and fertilizers

Time: 2 Hrs.

Maximum Marks: 50

N. B.:

- (i) *Attempt all questions.*
- (ii) *Use of logarithmic table and calculator is allowed.*
- (iii) *Figures to the right hand side indicates full marks.*
- (iv) *Questions No.1 should be attempt only once on page number three of answer book with complete answer.*

Q. 1	Answer any <i>three</i> of the following	15
	a)	
	b)	
	c)	
	d)	
	e)	
Q. 2	A	08
	OR	
	A	
	B	07
	OR	
	B	
Q. 3	Objective type-(MCQ, fill in the blanks, match of the following, true or false)	10
	10 bits	
Q. 4	Write short notes on any two of the following	10
	i)	
	ii)	
	iii)	