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**B. O. S. In Chemistry**  
**B. Sc. First Year Semester-I & II**  
**Sub : Agrochemicals & Fertilizers**

**Syllabus**  
**In force from June -2013**

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

<b>Paper</b>	<b>Course</b>	<b>Periods/week</b>	<b>Total Periods</b>	<b>Marks</b>
I	Introductory Soil Science	3	45	50
II	Agricultural Biochemistry	3	45	50

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

<b>Paper</b>	<b>Course</b>	<b>Periods/week</b>	<b>Total Periods</b>	<b>Marks</b>
III	Soil Chemistry	3	45	50
IV	Food and Nutrition	3	45	50
V	Laboratory Course-I	4	120	100

Theory Papers 50 Marks (External-40 + Internal-10)

**B. Sc. First Year, Semester-I**  
**Paper-I Introductory Soil Science (CHAG-101)**

**Periods: 45**

**Marks: 50**

**Unit-I**

**1. Soil forming Rocks and Minerals:**

**12**

Definition of soil,

Definition, classification and properties of rocks and minerals.

Weathering: Definition and types, factors responsible for weathering.

**Unit-II**

**2. Soil profile:**

**08**

Definition, soil horizons and typical diagram of soil profile.

Soil components.

Soil forming processes

**Unit-III**

**3. Soil physical properties and their importance in soil fertility:**

**12**

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. Soil fertility and productivity:**

**12**

Definition,

comparison between soil fertility and productivity and factors affecting them.

Management of soil productivity

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

Periods: 45

Marks: 50

**Unit-I**

**1. Scope and Importance of biochemistry in Agriculture** **02**

**2. Carbohydrates:** **09**

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

**Unit-II**

**3. Amino acids and Proteins:** **10**

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

Proteins: Introduction, definition, classification, properties and structure of proteins.

Qualitative tests for identification of proteins.

**Unit-III**

**4. 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**

**5. 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-III Soil Chemistry (CHAG-103)**

Periods: 45

Marks: 50

**Unit-I**

**1. Soil Colloids:** **13**  
Definition, types, nature, constitution, classification of collides, properties of soil colloids and their role in soil fertility.

**Unit-II**

**2. Soil water:** **08**  
Importance, retention and movement of water in soil. Soil moisture constants ,Loss of water in soil and plants.

**Unit-III**

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

**4. Ion exchange properties of soil:** **04**  
Introduction, Importance ,cation exchange process in soil. Anion exchange.

**Unit-IV**

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

**6. Soil micro-organisms:** **05**  
Important microbial process in soil.  
Biological nitrogen fixation, Nitrification, ammonification, denitrification.

**Reference Books: soils**

1. Fundamental of soil science: Forth and Turk.
2. Principles of soil science: M. M. Rai.
3. Nature and properties of soil: Buckmann and Brady.
4. A textbook of soil science: Dr. J. A. Daji.
5. Introduction to agronomy- soil and water management : 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.
11. Text book of soil science : C.S.Patil
12. Text book of soil science : Biswas and Mukherji

**B. Sc. First Year Semester-II**  
**Paper-IV Food and Nutrition [CHAG-104]**

Periods: 45

Marks: 50

**Unit-I**

**1. Nutrition:** **16**

Food –Definition ,functions of food -Physiological, social and psychological,  
Balanced Nutrition and malnutrition

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-II**

**2. Vitamins:** **10**

Introduction,

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

**Unit-III**

**3. Plant Hormones:** **10**

Introduction, occurrence, Structure, Physiological role of following plant hormones.

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

Applications of plant hormones in agriculture.

**Unit-IV**

**4. a] Biochemical changes during seed germination** **9**

- b] Biochemical changes during fruit ripening.
- c] Commercial use of hormones in fruit ripening.

**Reference Books: Biochemistry**

1. Foods: Facts and principle by N. Shakuntala 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. Mudambi 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.
14. Dietetics by S. Srilaxmi

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

Periods: 120

Marks: 100

Note: At least 16 experiments are essential.

1. Collection of soil sample and preparation.
2. Determination of bulk density of soil.
3. Determination of particle 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. Qualitative test of carbohydrates and proteins.
11. Estimation of reducing sugar from cane juice.
12. Estimation of non-reducing sugar from Jaggery.
13. Determination of acid value of oil sample.
14. Determination of saponification value of oil sample.
15. Estimation of Vitamin C from fruit juice.
16. Visit to soil testing laboratory.
17. Visit to vermiculture Unit
18. Visit to sericulture industry.
19. Use and applications of soil thermometer.
20. Determination of water holding capacity of soil.
21. Determination of percentage expansion of soil by weight and volume
22. Determination of cation exchange 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.
6. Soil ,plant and water analysis by P.C. Jaiswal
7. Laboratory handbook of soil and plant analysis by Iswaran