

Syllabus for Bachelor of Agriculture

BIOCHEMISTRY

Subject code: 16AS0206

Subject Name: **Fundamentals of Plant Biochemistry**

B. Sc. (Hons.) Agri., **First Year (Sem.-II)**

Objective:

To create the awareness among the students about carbohydrate, protein, lipids and enzymes in the plant systems and their importance

Credit Earned: 2+1= 3 Credit

Course Outcomes:

After completion of this course, student will be able to:-

- 1 Know the role of carbohydrates in the plant
- 2 Know the role of protein, lipids and enzymes in the plant and its metabolism

Teaching and Evaluation Scheme

| Teaching Scheme (hours) | | Credits | Theory Marks | | | Practical Marks | | Total Marks |
|-------------------------|-----------|---------|--------------|----|-----|-----------------|----------------|-------------|
| Theory | Practical | | ESE (E) | IA | CSE | Viva (V) | Term Work (TW) | |
| 2 | 2 | 3 | 50 | 30 | 20 | 25 | 25 | 150 |

Syllabus for Bachelor of Agriculture

BIOCHEMISTRY

Contents:

| Unit | Topics | Contact Hours |
|---------------|---|---------------|
| Theory | | |
| 1. | Importance of Biochemistry | |
| 2. | Properties of Water, pH and Buffer | |
| 3. | Carbohydrate: importance and classification. Structures of Monosaccharides, reducing and oxidizing properties of Monosaccharides, Mutarotation, structure of Disaccharides and polysaccharides | |
| 4. | Lipid: importance and classification. Structures and properties of fatty acids, storage lipids and membrane lipids | |
| 5. | Proteins: importance of proteins and classification. Structures, titration and zwitterions nature of amino acids, structural organization of proteins. Introduction to secondary metabolites | |
| 6. | Enzymes: General properties, classification Introduction to allosteric enzymes. Applications of enzymes | |
| 7. | Vitamins and mineral nutrition for human health | |
| 8. | Nucleic acids: Importance and classification, Chemical and physical properties of nucleic acids. Structures of nucleotides, A, B and Z | |
| 9. | DNA ; RNA: Types and secondary and tertiary structure | |
| 10. | Metabolism of carbohydrates: Glycolysis, TCA cycle, pentose phosphate pathway, Glyoxylates cycle, Electron transport chain | |
| 11. | Substrate level and photo phosphorylation reaction, metabolism of lipids : Beta oxidation, Transamination reaction | |

| Unit | Topics | Contact Hours |
|------------------|---|---------------|
| Practical | | |
| 1. | Preparation of solution | |
| 2. | pH and Buffers | |
| 3. | Qualitative tests of carbohydrates and amino acids | |
| 4. | Quantitative estimation of glucose/proteins | |
| 5. | Titration methods for estimation of amino acids/lipids | |
| 6. | Effect of pH, temperature and substrate concentration on enzyme action | |
| 7. | Quantitative analysis of DNA and RNA | |
| 8. | Estimation of ascorbic acid and calcium by titration method total phenols/plant pigments/ total alkaloids | |
| 9 | Estimation of total phenols/plant pigments/ total alkaloids | |

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board may also use any of tools such as demonstration, role play, quiz, brainstorming, MOOCs *etc.*
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the class-room.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.