

Programme	BS Biochemistry	Course Code	BC. 308	Credit Hours	2+1
Course Title	Plant Biochemistry				
Course Introduction					
<p>This course provides an introduction to the key concepts of plant biochemistry, designed for undergraduate students majoring in Biochemistry and Biotechnology. The curriculum covers the structure and function of plant cells, photosynthetic systems and pathways, phytohormones, and naturally occurring compounds. Students will learn about the metabolic pathways relevant to plants and gain a comprehensive understanding of plant biochemistry.</p>					
Learning Outcomes					
<p>On the completion of the course, the students will:</p> <ul style="list-style-type: none"> • Acquire basic knowledge of plant biochemistry. • Understand the major metabolic pathways in plants and their regulation. • Apply biochemical knowledge to understand plant physiology and development. 					
Course Content					
<p>Theory Unit-</p> <ul style="list-style-type: none"> • Structure and Functions of Plant Cell: Overview of Plant Cell Structure, Functions of Plant Cell Organelles • Photosynthesis; Structure of Chlorophyll, Absorption of Light Energy, Photosynthetic Pigments • Photosynthetic Reaction Center, Photosystem-I, Photosystem-II • Hill's Reaction, Electron Transport Chain, ATP Synthesis • C3 and C4 Pathways, Mechanisms and Differences, Importance in Plant Physiology • CAM Photosynthetic Pathways, Mechanisms and Significance, Adaptations in CAM Plants • CO2 Fixation (Calvin Benson Cycle), Steps of the Calvin Cycle, Regulation and Efficiency • Respiration, Mechanisms and Significance, Impact on Plant Metabolism • Nitrogen Metabolism, Conversion of Nitrogen into Ammonia, Other Nitrogenous Compounds • Biosynthesis of Alkaloids, Functions and Applications, Examples of Alkaloids • Biosynthesis of Flavonoids, Functions and Applications, Examples of Flavonoids • Biosynthesis of Terpenes and Terpenoids, Functions and Applications, Examples of Terpenes and Terpenoids • Biosynthesis of Phenolics, Functions and Applications, Examples of Phenolic Compounds • Other Secondary Plant Metabolites (Polyketides, Glucosinolates), Biosynthesis and Functions, Biological Significance • Phytohormones and Related Compounds, Types of Phytohormones, Functions and Mechanisms • Signal Transduction in Plant Cells, Mechanisms of Signal Transduction, Examples and Applications <p>Practical Unit -I</p> <ul style="list-style-type: none"> • Extraction and Qualitative analysis of Starch • Extraction and Qualitative analysis of Chlorophyll • Extraction and Qualitative analysis of Chlorophyll • Estimation of Superoxide dismutase • Estimation of Peroxidase 					

- Estimation of Catalase
- Extraction and estimation of Total Protein content
- Qualitative analysis of different plant secondary metabolites
- Extraction and Estimation of Alkaloids
- Extraction and Estimation of Flavonoids
- Extraction and Estimation of Phenolics
- Extraction and Qualitative analysis of Auxins
- Extraction and Qualitative analysis of Lipids
- Antioxidant activity of plant secondary metabolites

Textbooks and Reading Material

Textbooks.

- Caroline Bowsher and Alyson Tobin (2021). *Plant Biochemistry 2nd Edition*, CRC Press
- S. L. Kochhar and Sukhbir kaur Gujral. (2020). *Plant physiology: Theory and applications 2nd Edition*. Cambridge University Press.
- Hans-Welter Heldt., and Birgit Piechulla. (2021). *Plant biochemistry 5th Edition*. Academic Press.
- Satish C Bhatla, and Manju A. Lal. (2023). *Plant physiology, development and metabolism*. Springer Nature.

Teaching Learning Strategies

- Class Lecture
- Class Discussions
- Class Tutorials
- Lab Demonstration

Assignments: Types and Number with Calendar

- 1st Quiz in 4th Week of 5 marks
- 2nd Quiz in 10th Week of 5 marks
- 3rd Quiz in 14th Week of 5 marks
- 1st Assignment in 8th Week of 10 marks

Assessment

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.