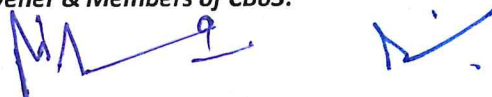


FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Degree/Honors)		Semester - VI	Session: 2024-2025
1	Course Code	BCSE-04 T	
2	Course Title	Plant Biochemistry	
3	Course Type	Discipline Specific Elective (Theory)	
4	Pre-requisite (if, any)	As Per The Program	
5	Course Learning Outcomes (CLO)	<p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> ➤ Learning outcomes for this course include detailed understanding of metabolic processes specific for plants such as nitrate assimilation, photosynthesis, respiration, nitrogen fixation. ➤ Understand the role of different metabolic pathways in plant growth and development. ➤ Understand insight to various stressful conditions of the environment that affect plant growth and productivity ➤ Understand the defense mechanisms in plants due to which plants survive under stresses. 	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning & Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
PART -B: Content of the Course			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	<p>Nitrogen metabolism: assimilation of nitrate, structural features of nitrate reductase and nitrite reductase, incorporation of ammonia into organic compounds, regulation of nitrate assimilation. Biological nitrogen fixation by free living and in symbiotic association; structure and function of the enzyme nitrogenase.</p> <p>Electron transport system in plants: Chemiosmotic theory, ATP synthase and mechanism of ATP synthesis.</p>		12
II	<p>Photosynthesis – Photosynthetic apparatus, pigments of photosynthesis, role of carotenoids, photosystems I and II, their location; Hill reaction, photosynthetic electron transport and generation of NADPH & ATP, cyclic and non-cyclic photophosphorylations, complexes associated with thylakoid membranes; light harvesting complexes, path of carbon in photosynthesis – C₃ and C₄ pathway of carbon reduction and its regulation, Photorespiration.</p>		11
III	<p>Special features of secondary plant metabolism, terpenes (classification, biosynthesis), lignin, tannins, pigments, phytochrome, waxes, alkaloids, biosynthesis of nicotine, functions of alkaloids, cell wall components.</p> <p>Toxins of plant origin – mycotoxins, phytohemagglutinins, lathrogens, nitriles, protease inhibitors, protein toxins.</p>		11
IV	<p>Stress metabolism in plants – Environmental stresses, salinity, water stress, heat, chilling, anaerobiosis, pathogenesis, heavy metals, radiations and their impact on plant growth and metabolism, criteria of stress tolerance.</p> <p>Antioxidative defense system in plants – reactive oxygen species and their generation, enzymic and non-enzymic components of antioxidative defense mechanism.</p>		11
Keywords	Electron transport, Nitrogen assimilation, secondary metabolites, Reactive oxygen species.		

Name and Signature of Convener & Members of CBoS:



PART-C: Learning Resources**Text Books, Reference Books and Others****Text Books Recommended –**

- Buchann (2015), Biochemistry and Molecular Biology of Plants, 2nded. Publisher: I KInternational. ISBN-10: 8188237116, ISBN- 978047 0714218
- Taiz and Zeiger, Plant Physiology, 5thedition, Sinauer Associates Inc.ISBN-13:978- 0878938667, ISBN-10:0878938664
- Caroline Bowsher, Martin steer, Alyson Tobin (2008), Plant Biochemistry, Garland science ISBN978-0-8153-4121-5.
- P.M Dey and J.B. Harborne (Editors) (1997), Plant Biochemistry, Publisher:Academic Press ISBN-10:0122146743, ISBN-13:978-0122146749

PART -D: Assessment and Evaluation**Suggested Continuous Evaluation Methods:****Maximum Marks: 100 Marks****Continuous Internal Assessment (CIA): 30 Marks****End Semester Exam (ESE): 70 Marks**

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
Total Marks - 30		
End Semester Exam (ESE):	Two section – A & B	
	Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks	
	Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	




Name and Signature of Convener & Members of CBoS:

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
Department of Biochemistry
Course Curriculum

PART- A: Introduction			
Program: Bachelor in Science (Degree/Honors)		Semester - VI	Session: 2024-2025
1	Course Code	BCSE-04P	
2	Course Title	Plant Biochemistry	
3	Course Type	Discipline Specific Elective (Practical)	
4	Pre-requisite (if, any)	As Per the Program	
5	Course Learning Outcomes (CLO)	<i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> ➤ Determine the contents of photosynthetic pigments, ascorbic acid, phenols, tannins, hydrogen peroxide in plant samples. ➤ Understand the spectral patterns of photosynthetic pigments. ➤ Perform extraction and assay enzymes like urease from Jack bean. 	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
PART -B: Content of the Course			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<ul style="list-style-type: none"> ➤ Estimation of chlorophylls and carotenoids from grass/spinach leaves ➤ Estimation of ascorbic acid, phenols, tannins in fruits and vegetables ➤ Determination of radical scavenging activity of plant extracts ➤ Estimation of hydrogen peroxide in tissue extracts ➤ Extraction and assay of urease from Jackbean. ➤ Separation of photosynthetic pigments by TLC and determination of absorption Spectra. 		30
Keywords	Photosynthetic pigments, ascorbic acid, phenols, tannins,		



 Name and Signature of Convener & Members of CBoS:

PART-C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended –		
<ul style="list-style-type: none"> ➤ Buchann (2015), Biochemistry and Molecular Biology of Plants, 2nded. Publisher: I KInternational. ISBN-10: 8188237116, ISBN- 978047 0714218 ➤ Taiz and Zeiger, Plant Physiology, 5thedition, Sinauer Associates Inc. ISBN-13: 978- 0878938667, ISBN-10:0878938664 ➤ Caroline Bowsher, Martin steer, Alyson Tobin (2008), Plant Biochemistry, Garland science ISBN978-0-8153-4121-5. ➤ P.M Dey and J.B. Harborne (Editors) (1997), Plant Biochemistry, Publisher: Academic Press ISBN-10:0122146743, ISBN-13:978-0122146749 		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		50 Marks
Continuous Internal Assessment (CIA):		15 Marks
End Semester Exam (ESE):		35 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment A. Performed the Task based on lab. work - 20 Marks B. Spotting based on tools & technology (written) – 10 Marks C. Viva-voce (based on principle/technology) - 05 Marks	Managed by Course teacher as per lab. status

Name and Signature of Convener & Members of CBoS: