

PLANT BIOCHEMISTRY AND DEVELOPMENTAL BIOLOGY

Sem	Sub. Code	Category	Lecture		Theory		Practical		Credits
			Hrs/week	Hrs/sem.	Hrs/week	Hrs/sem.	Hrs/week	Hrs/sem.	
II	21CPBC2D	Elective	3	45	3	45	-	-	3

COURSE OBJECTIVE:

The course aims to give exposure to learn the concepts involved in photosynthesis, nitrogen fixation, hormonal mechanism, transport mechanism, developmental biology such as gametogenesis, fertilization and development of organs.

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to,

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Helps to understand about photosystem in plants	K2
CO2	Gives a clear understanding about the process of nitrogen fixation and plant hormones.	K3
CO3	A Clear Knowledge about transport process involved in plants.	K2
CO4	Describes the process involved in fertilization.	K4
CO5	Describe development and differentiation of organs in plants.	K3

(*CO – Course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze).

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	S	M
CO2	S	S	M	M	S	S
CO3	M	M	M	S	M	S
CO4	S	M	S	S	M	M
CO5	M	S	S	M	S	S

(S- Strong; M-Medium; L- Low)

UNIT I

Introduction to plant biochemistry

10 Hours

Photosynthesis- Photosynthetic pigments, light harvesting complexes, Light reaction, CO₂ fixation – C₃(Dark reaction), C₄ and CAM metabolism. Mode of action of DCMU, Rubisco, Bacterio rhodopsin, photorespiration, Glyoxalate cycle. Respiration – citric acid cycle, plant mitochondrial electron transport and ATP synthesis

UNIT II

Nitrogen metabolism and plant Hormones

10 Hours

Nitrogen cycle, diazotrophs, Biochemistry of symbiotic and non-symbiotic nitrogen fixation and genetics of N₂ fixation, Genetic manipulation of Nif genes. Biosynthesis, mode of action, transport, distribution & physiologic effects of auxins, gibberellins, cytokinins, ABA and ethylene.

UNIT III

Transport mechanism in plants

10 Hours

Uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem; transpiration; mechanisms of loading and unloading of photo assimilates.

UNIT IV

Gametogenesis, fertilization and early development

10 Hours

Production of gametes, embryo sac development and double fertilization in plants; zygote formation, embryogenesis, establishment of symmetry in plants; seed formation and germination.

UNIT V

Morphogenesis and organogenesis in plants

5 Hours

Organization of shoot and root apical meristem; shoot and root development; leaf development and phyllotaxy; transition to flowering, floral meristems and floral development in Arabidopsis and Antirrhinum.

DISTRIBUTION OF MARKS: Theory - 100% and Problems – Nil

TEACHING METHODOLOGY:

- Black Board
- Power Point Presentations
- Assignments
- Models
- Demonstrations

TEXT BOOK

S.No	Author Name	Title of the Book	Publisher	Year
1.	Berrill N.J	Developmental Biology	TMH Edition	1974
2.	V.K Jain	Fundamental of plant physiology	S. Chand & company Ltd	2000

REFERENCE BOOKS:

S.No	Author Name	Title of the Book	Publisher	Year
1.	William G. Harpkins	Introduction to plant physiology	John Wiley and sons, INC, 2 nd edition	1999
2.	Browder L.W., Erickson C.A., And Jeffery W.R	Developmental Biology	Saunders College Publishing House, Philadelphia	1991
3.	Lea and Leagood	Plant biochemistry and molecular biology	John Eiley and Sons	1999

WEB SOURCES:

- http://www.biology.arizona.edu/cell_bio/cell_bio.html
- https://ecok.libguides.com/biology/web_sources
- <https://www.nicholls.edu/biol-ds/biol155/Lectures/Cell%20Biology.pdf>
- <http://www.bio-nica.info/Biblioteca/Bolsover2004CellBiology.pdf>

SYLLABUS DESIGNER:

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