DEPARTMENT OF BOTANY				*CLASS: II B.Sc. Zoology*				
Sem	**Course type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
IV	Allied- II	20U4BAC2	Allied Botany – II	4	4	25	75	100

Course Objectives

1. Study the various types of tissues in plants and their internal structure.
2. Identify the symptoms, causative agent and control measures of plant diseases.
3. Acquire knowledge on the functional aspects of plants.

Unit-I (12 Hours)

Plant Anatomy: Tissues - meristem and their types - Histogen theory, Tunica-Corpus theory and Korper-Kappe theory; permanent tissues - parenchyma, collenchyma, sclerenchyma, xylem and phloem.

Unit-II (10 Hours)

Internal structure of dicot Stem, monocot stem, dicot root and monocot root - Anatomy of dorsiventral and Isobilateral leaves - secondary growth in dicot stem.

Unit-III (8 Hours)

Plant Diseases: symptoms, etiology, dissemination and control measures of Tikka Disease of groundnut, Red rot of sugarcane and Citrus canker.

Unit-IV (15 Hours)

Plant Physiology: Diffusion, imbibition, osmosis, plasmolysis; absorption of water - active and passive mechanisms; ascent of sap - cohesion theory; Transpiration - types - mechanism of stomatal opening and closing - Starch-sugar hypothesis; Role of macro and micronutrients in plant growth.

Unit-V (15 Hours)

Photosynthesis: Light reaction - cyclic and non-cyclic photophosphorylation - dark reaction - C_3 and C_4 cycle; respiration: glycolysis, Kreb's cycle and electron transport system.

Books for Study

1 Pandey BP (1989). Plant Anatomy, S. Chand Publishing Company, New Delhi.
2 Singh V, Pandey PC & Jain DK (1987). Anatomy of Seed Plants, Rastogi Publications, Meerut.
3 Sharma PD (2008). Plant Pathology, Rastogi Publications, Meerut, India.

Book for References

1. Jain VK (2007). Fundamentals of Plant Physiology, S. Chand Publishing Company, New Delhi.
2. Pandey SN & Sinha BK) 2001). Plant Physiology, Third Revised Edition, Vikas Publishing House Pvt. Ltd, New Delhi.
3. Pandey, B.P. (1978). Plant Anatomy, S.Chand & Co., New Delhi,
4. Vasishta, P.C. (1982). A Text Book of Plant Anatomy, Pradeep Publications, Jullunder.
5. Alexopolous, C.J. & C.W. Misra (1972). Introductory mycology. John Wiley and Sons, New York.

Web Resources

1. https://www.easybiologyclass.com/plant-anatomy-online-tutorials-lecture-notes-study-materials/
2. https://www.britannica.com/science/photosynthesis/Basic-products-of-photosynthesis
3. https://www.britannica.com/science/plant-disease

Course Learning Outcomes:

	CLO Statement	Knowledge level
CLO-1	Able to understand the various cell and tissue types and the scientific basis behind it	**K3**
CLO-2	Report/Identify the various cell and tissue types and different group of plant species	**K3**
CLO-3	Apply the learned information to identify and control plant diseases and efficient management.	**K2**
CLO-4	Able to examine the various functions of plants to clarify the role of nutrients in plant growth and development	**K2**
CLO-5	Analyze the value of photosynthetic and the role of respiration as the sustaining life processes	**K4**

Mapping Programme Specific Outcome with Course Learning Outcome:

	PSO-1	PSO-2	PSO-3	PSO-4	PSO-5	PSO-6	PSO-7	PSO-8	PSO-9
CLO-1	-	-	2	1	-	-	-	-	-
CLO-2	-	-	1	1	-	-	-	-	-
CLO-3	-	-	1	2	-	-	-	-	-
CLO-4	-	-	1	2	-	-	-	-	-
CLO-5	-	-	1	1	-	-	-	-	-

3-Advance application; 2- Intermediate level; 1- Basic level

Mapping Programme Outcomes with Course Learning Outcome:

	PO-1	PO-2	PO-3	PO-4	PO-5
CLO-1	3	3	3	2	3
CLO-2	3	1	1	3	3
CLO-3	2	2	1	1	2
CLO-4	1	-	2	2	2
CLO-5	1	-	1	-	1

3-Advance application; 2- Intermediate level; 1- Basic level

Lesson Plan:

Unit	Description	Staff Name	Hours	Mode
I	a) Types of Meristem	-	3	Black Board
	b) Theory of Histogen, Tunica-Corpus & Korper-Kappe	-	3	Power Point
	c) Permanent tissues - Parenchyma, Collenchyma, Sclerenchyma, Xylem and Phloem.	-	6	Virtual Lab
II	a) Internal Structure of Dicot & Monocot Stem	-	4	Discussion
	b) Internal Structure of Dicot & Monocot Root	-	2	Black Board
	c) Anatomy of Dorsiventral and Isobilateral	-	2	LMS
	d) Secondary growth in dicot stem.	-	2	LMS
III	a) Symptoms, Etiology, Dissemination and Control Measures of Tikka Disease of Groundnut	-	3	Seminar
	b) Red Rot of Sugarcane and Citrus canker.	-	5	Power Point
IV	a) Diffusion, Imbibition & Osmosis	-	4	Virtual Lab
	b) Absorption of Water - Active and Passive mechanisms	-	3	LMS
	c) Ascent of Sap - Cohesion Theory	-	3	Discussion
	d) Types - Mechanism of Stomatal Opening and Closing - Starch-Sugar Hypothesis	-	4	Power Point
	e) Role of macro and micronutrients in plant growth	-	1	Black Board
V	a) Light Reaction - Cyclic and non-cyclic	-	4	Black Board
	b) Photophosphorylation	-	2	Black Board
	c) Dark reaction - C_3 Cycle	-	2	Power Point
	d) C_4 cycle and Respiration	-	3	Power Point
	e) Glycolysis, Kreb's cycle and ETS	-	4	LMS
Total			**60**	

Course Designer: Dr. N. Janakiraman, Assistant Professor

Blue Print – Model for External Examination
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

Sl. No	CLOs	K – Level	Section – A		Section – B		Section C (Either/ Choice)	Section D (Open Choice)
			MCQs		Short Answer			
			No. of Questions	K – Level	No. of Questions	K – Level		
1	CLO 1	Up to K 2	2	K1 or K2	1	K1	2(K1&K1)	1 (K2)
2	CLO 2	Up to K 3	2	K1 or K2	1	K1	2(K2&K2)	1 (K3)
3	CLO 3	Up to K 3	2	K1 or K2	1	K2	2(K3&K3)	1 (K3)
4	CLO 4	Up to K 4	2	K1 or K2	1	K2	2(K4&K4)	1 (K4)
5	CLO 5	Up to K 3	2	K1 or K2	1	K2	2(K3&K3)	1 (K3)
No. of Question to be asked			10		5		10	5
No. of Question to be answered			10		5		5	3
Mark for each question			1		2		5	10
Total Marks for each section			10		10		25	30

K1 - Remembering and recalling facts with specific answers
K2- Basic understanding of fact and stating main ideas with general answers
K3- Application oriented – Solving Problems
K4- Examining, analyzing, presentation and make inferences with evidences

Distribution of Section- wise marks with K Levels

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	**Total Marks**	% of Marks without choice	**Consolidated**
K1	5	4	10	-	**19**	15.83	**42%**
K2	5	6	10	10	**31**	25.83	
K3	-	-	20	30	**50**	41.67	**42%**
K4	-	-	10	10	**20**	16.67	**16%**
Total Marks	10	10	50	50	**120**	100.00	**100%**

Blue Print – Model for Internal Examination
Articulation Mapping – K Levels with Courses Learning Outcomes (CLOs)

Sl. No	CLOs	K – Level	Section – A		Section – B		Section C (Either/ Choice)	Section D (Open Choice)	Total
			MCQs		Short Answer				
			No. of Questions	K – Level	No. of Questions	K - Level			
1	CLO 1	Up to K 2	2	K1&K2	1	K1	2(K2&K2)	2 (K2/K3)	
2	CLO 2	Up to K 3	2	K1&K2	2	K2	2(K3&K3)	1 (K4)	
No. of Question to be asked			4		3		4	3	14
No. of Question to be answered			4		2		2	2	10
Mark for each question			1		2		5	10	
Total Marks for each section			4		6		10	20	40

K1 - Remembering and recalling facts with specific answers
K2- Basic understanding of fact and stating main ideas with general answers
K3- Application oriented – Solving Problems
K4- Examining, analyzing, presentation and make inferences with evidences

Distribution of Section- wise Marks with K Levels *

K Levels	Section A (No Choice)	Section B (No Choice)	Section C (Either/or)	Section D (Open Choice)	**Total Marks**	% of Marks without choice	**Consolidated**
K1	2	2		-	**4**	6.67	**50**
K2	2	4	10	10	**26**	43.33	
K3	-	-	10	10	**20**	33.33	**33**
K4	-	-		10	**10**	16.67	**17**
Total Marks	4	6	20	30	**60**	100.00	**100%**