DEPARTMENT OF BOTANY				*CLASS: II B.Sc. Botany*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
III	Major Core 5	20U3BMC5	**Morphology and Taxonomy of Angiosperms**	5	5	25	75	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	✓
Skill oriented	✓		Entrepreneurship oriented	

Course Objectives: This course will enable the students

1. To understand the morphology of plants and various systems of classification.
2. To recognize the members of angiosperm families by identifying their diagnostic features and learn their economic importance.
3. To study the phylogenetic aspects of plant taxonomy for understanding the inter-relationship among plants.

UNIT	CONTENT	CLO	K LEVEL	HOURS
I	**Plant Morphology:** Types of root and its modifications - Stem: Types and their modifications - Leaves: Phyllotaxy, Types and its modifications - Inflorescence: Racemose, Cymose and Special types - Flower: Technical Description of Floral Parts, Floral Diagram and Floral Formula - Fruits: Simple (Fleshy and Dry), Aggregate and Composite.	**1**	**Up to K4**	**15**
II	**Plant Taxonomy:** Objectives and Goals - Various Hierarchical Categories - Contribution to Indian Botany by J.D. Hooker and J.S. Gamble - Systems of Classification with their Merits and Demerits: Artificial - Linnaeus; Natural - Bentham and Hooker; Modern - Cronquist; Outline of APG IV (2016).	**2**	**Up to K4**	**15**
III	**Nomenclature:** Key Preparation - Nomenclature: Binomial system, ICN - Principles and Rules, Typification and Various nyms - Herbarium: Preparation, Maintenance and Significance, Important Indian and World herbaria - Botanical Survey of India - Brief Outline on Modern Methods of Plant Identification: Chemotaxonomy, Numerical Taxonomy, Serotaxonomy and Molecular Techniques.	**3**	**Up to K4**	**15**
IV	**Selected Families:** Detailed studies on the vegetative, reproductive characters and economic importance of the following families: Nymphaeaceae, Brassicaceae, Malvaceae, Rutaceae, Meliaceae, Myrtaceae, Cucurbitaceae, Rubiaceae and Asteraceae.	**4**	**Up to K4**	**15**

V	**Selected Families:** Detailed studies on the vegetative, reproductive characters and economic importance of the following families: Sapotaceae, Acanthaceae, Lamiaceae, Amaranthaceae, Aristolochiaceae, Euphorbiaceae, Orchidaceae, Commelinaceae and Poaceae.	**5**	**Up to K4**	**15**

Books for Study

1. Sharma, O.P., Plant Taxonomy, 2009, Tata McGraw Hill Education Private Limited, New Delhi.
2. Pullaiah, T. and Karuppusamy, S., Taxonomy of Angiosperms, 4th Ed, 2018, Regency Publication, New Delhi.
3. Lawrence, G.H.M., Taxonomy of Vascular Plants, 2012, Scientific Publishers. India.

Books for References

1. Naik, V.K., Principles of Plant Taxonomy, IBH Oxford.
2. Verma, B.K., Introduction to Taxonomy of Angiosperms, 2011, PHI Learning Pvt. Ltd., New Delhi.
3. Rendle, R.B., The Classification of Flowering Plants, Vols. I, II & III, Oxford-Clarendon.
4. Gamble, J.S., Flora of Presidency of Madras, Vols. I, II & III, 1986, Bishen Singh Mahendra Pal Singh, Dehra Dun.
5. Subrahmanyam, N.S., Modern Plant Taxonomy, 2011, Vikash Publishing House, New Delhi.
6. Singh, G, Plant Systematics - Theory and Practice, 2005, Oxford & IBH, New Delhi.
7. Pandey, B.P., Taxonomy of Angiosperms, 2017, S. Chand Publication, New Delhi.
8. Naik, V.N., Taxonomy of Angiosperms, 2000, Tata McGraw Hill Publishing Company Limited, New Delhi.
9. Singh, V. and Jain, D.K., Taxonomy of Angiosperms, 1981, Rastogi Publications.
10. Gurcharan Singh, Plant Systematics, 2nd Ed., 2005, Scientific Publications, Jodhpur.

Web Resources

1. http://www.theplantlist.org/
2. https://www.biologydiscussion.com/
3. https://www.britannica.com/search?query=taxonomy+of+angiosperms
4. https://www.easybiologyclass.com/topic-botany/

Rationale for Nature of the Course

The course will enable the students to acquire knowledge on morphology of plants, various systems of classification, plant identification, economically useful plant parts and their uses.

Activities having direct bearing on Skill development / Employability / Entrepreneurship

The knowledge acquired by the students will be used to identify plants based on morphological observations. It will help them to attain a position after higher studies in reputed institutions like Botanical survey of India and its related organizations.

Pedagogy

Chalk and Talk, Power Point, Group Discussion, Seminar, Interaction, Problem Solving, Quiz, Virtual Images, You Tube Videos, Google classroom & LMS (CANVAS).

Course Designer: Dr. N. Janakiraman, Assistant Professor

Course Learning Outcomes:

On successful completion of the course, the students will be able to know, understand, apply and analyse

CLOs	CLO Statement	Knowledge Level
CLO 1	The vegetative and reproductive morphology of angiosperms	**Up to K4**
CLO 2	The artificial, natural and modern systems of classifications	**Up to K4**
CLO 3	The ICN principles and modern methods of plant identification	**Up to K4**
CLO 4	The morphological description and illustration of selected dicotyledonous families	**Up to K4**
CLO 5	The morphological description and illustration of selected dicotyledonous and monocotyledonous families	**Up to K4**

Mapping Programme Specific Outcomes with Course Learning Outcomes:

#	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CLO1	2	3	2	3	-	2	-	3	2
CLO2	3	1	2	1	2	-	1	1	2
CLO3	3	2	3	2	3	-	2	2	1
CLO4	3	3	1	-	1	2	-	2	3
CLO5	3	3	1	-	2	2	1	2	3

3 - Advance Application; 2 - Intermediate Level; 1 - Basic Level

Mapping Programme Outcomes with Course Learning Outcomes:

#	PO1	PO2	PO3	PO4	PO5
CLO1	3	3	2	1	1
CLO2	3	1	3	2	2
CLO3	2	2	2	3	3
CLO4	3	3	3	2	2
CLO5	1	2	1	2	2

3 - Advance Application; 2 - Intermediate Level; 1 - Basic Level

Lecture Schedule

Unit	Description	Hours	Mode
I	Plant Morphology – Introduction	1	Chalk and Talk, Power Point, Group Discussion, Seminar, Quiz, Virtual Images, You Tube Videos, Google classroom & LMS (CANVAS).
	Types of root and its modifications	2	
	Stem: Types and their modifications	2	
	Leaves: Phyllotaxy, Types and its modifications	2	
	Inflorescence: Racemose, Cymose and Special types	2	
	Flower: Technical Description of Floral Parts	2	
	Floral Diagram and Floral Formula	2	
	Fruits: Simple (Fleshy and Dry), Aggregate and Composite	2	
II	Plant Taxonomy - Objectives and Goals	1	Chalk and Talk, Power Point, Group Discussion, Seminar, Quiz, Virtual Images, You Tube Videos, Google classroom & LMS (CANVAS).
	Various Hierarchical Categories in Taxonomy	1	
	Contribution to Indian Botany by J.D. Hooker	1	
	Contribution to Indian Botany by J.S. Gamble	1	
	Artificial Classification – Linnaeus	2	
	Natural Classification - Bentham and Hooker	4	
	Modern Classification – Cronquist	2	
	Outline of APG IV Classification (2016)	3	
III	TaxonomicKey Preparation	2	Chalk and Talk, Power Point, Group Discussion, Seminar, Quiz, Virtual Images, You Tube Videos, Google classroom & LMS (CANVAS).
	Nomenclature: Binomial system	1	
	ICN - Principles and Rules, Typification and Various nyms	3	
	Herbarium: Preparation, Maintenance and Significance	2	
	Important Indian and World herbaria	1	
	Botanical Survey of India	1	
	Brief Outline on Modern Methods of Plant Identification	1	
	Chemotaxonomy and Numerical Taxonomy	2	
	Serotaxonomy and Molecular Techniques	2	
IV	Nymphaeaceae, Brassicaceae and Malvaceae	5	Chalk and Talk, Power Point, Virtual images.
	Rutaceae, Meliaceae and Myrtaceae	5	
	Cucurbitaceae, Rubiaceae and Asteraceae	5	
V	Sapotaceae, Acanthaceae and Lamiaceae	5	Chalk and Talk, Power Point, Virtual images.
	Amaranthaceae, Aristolochiaceae and Euphorbiaceae	5	
	Orchidaceae, Commelinaceae and Poaceae	5	

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 4	2	K1 & K2	1	K1	2(K1&K1)	1 (K2)
2	CLO 2	Up to K 4	2	K1 & K2	1	K1	2(K2&K2)	1 (K3)
3	CLO 3	Up to K 4	2	K1 & K2	1	K2	2(K3&K3)	1 (K3)
4	CLO 4	Up to K 4	2	K1 & K2	1	K2	2(K4&K4)	1 (K4)
5	CLO 5	Up to K 4	2	K1 & 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 Leaning 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 x	Up to K 4	2	K1&K2	2	K1& K2	2(K2&K2)	1 (K2/K3)	
2	CLO y	Up to K 4	2	K1&K2	1	K2	2(K3&K3)	2 (K3& 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%**