University of Kerala

Discipline	**BOTANY**				
Course Code	**UK5DSCBOT301**				
Course Title	**MORPHOLOGY AND PLANT SYSTEMATICS**				
Type of Course	**DSC**				
Semester	**V**				
Academic Level	**300 - 399**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	04	03 Hours	-	02 Hours	05 Hours
Pre-requisites	**UK1DSCBOT101, UK2DSCBOT101**				
Course Summary	The course emphasizes the identification and classification of plants based on morphological traits. Understand various angiosperm families their morphology, distinctive features, and biology.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**Morphology of Flowering Plants**	**08**
	1	A brief account of vegetative parts of a plant - Plant habit, stem, root, leaf- morphotypes, phyllotaxy, venation.	
	2	Flower as a modified shoot: Detailed structure of floral parts- arrangements, relative position, cohesion, and adhesion of floral parts; Flower- symmetry- aestivation and placentation; Floral diagram and floral formula.	
	3	Types of inflorescence with examples- Racemose (simple raceme, spike, catkin, spadix, umbel, corymb, capitulum and panicle), Cymose (simple cyme, monochasial - helicoid and scorpioid, dichasial, polychasial) & special types - Cyathium, Verticillaster, Hypanthodium, Coenanthium and Thyrsus)	
	4	Types of fruits – Simple fruits-Fleshy& Dry – Dehiscent, Indehiscent, and Schizocarpic fruits)-Aggregate-and Multiple fruits with examples.;Seeds – Albuminous and exalbuminous-Dispersal of fruits and seeds.	
II		**Nomenclature and Systems of angiosperm classification**	**06**
	5	Basic rules of Binomial Nomenclature - International Code of Nomenclature for algae, fungi, and plants (ICN): Outline- Rule of priority and its limitations, Author citation -typification (Holotype, Isotype, Syntype, Paratype, and Lectotype), Effective and valid publication, Nomina rejected, Nomina conservenda.	
	6	Major systems of classification: Artificial (Linnaeus), Natural: (Bentham and Hooker (detailed account)), Phylogenetic- (Engler and Prantl)-APG-IV system (outline and its significance).	

III	**Taxonomic aids**		**04**
	7	Herbarium, techniques, preparation, International (Kew, K) – National (Central National Herbarium, CAL), BSI-Coimbatore(MH),JNTBGRI(TBGT), Virtual herbarium (concept and example only)- Botanical gardens and its role- important Botanic gardens: RBG, Kew; Acharya Jagadeesh Chandrabose Indian Botanic Garden-Culcutta, JNTBGRI, Thiruvananthapuram- Botanical Survey of India- Structure and organization.	
	8	Taxonomic Literature: Floras, Monographs, Revisions and Journals- Taxonomic keys: Bracketed and Indented keys (Brief account).	
IV	**Systematic study of Angiosperm families**		**12**
	9	A detailed study (Systematic position, distribution, common members, diagnostic features, vegetative, floral characters, and economic importance of the following families: 1. *Annonaceae,* 2. *Malvaceae* 3. *Rutaceae,* 4. *Leguminosae with sub-families* 5. *Rubiaceae* 6. *Asteraceae* 7. *Sapotaceae* 8. *Asclepiadaceae* 9. *Solanaceae* 10. *Acanthaceae* 11. *Lamiaceae* 12. *Euphorbiaceae* 13. *Orchidaceae* 14. *Liliaceae* 15. *Poaceae*	
V	**Modern techniques in plant systematics**		**15**
	10	Numerical Taxonomy, Chemotaxonomy, Cytotaxonomy, Molecular taxonomy – concepts and brief account.	
	11	Biosystematics-Principles and methodology(Brief account)- Phylogenetic systematics: principle, Methodology, and applications- brief account	

Practicals		
	1. Prepare a photo album of leaves and Inflorescences. 2. Identify evidence from nature for considering the flower as a modified shoot and submit the same in the form of geo-tagged photographs or herbarium sheets. 3. Conduct regular field visits to familiarise with the local flora and submit e-reports with photographs. 4. Conduct a field trip outside the Kerala -Herbarium of samples should be made from the trip, along with photographic evidence and a report should also be submitted during practical examination.	**30**

	5. Visit to a recognized Herbarium- Report of the same with photographic evidence should be submitted for the practical examination. 6. Students should work with at least two members from each family mentioned in the syllabus and record- description of the same in technical terms should be done in the practical record. 7. Submission of not less than 15 properly identified Herbarium sheets with author citation, should be done during the practical examination. 8. Online resources and websites: Index Herbarium, IPNI, The Tree Of Life Web Project (To), Plants of The World (POWO), The world flora online (WFO), RBGE Living collections should be accessed and familiarised. E-Flora Kerala.	

Suggested Reading

1. Simpson, Michael G.(2019) Plant systematics. Academic press.
2. Singh, Gurcharan.(2019) Plant systematics: an integrated approach. CRC Press.
3. Bell, Adrian D., and Alan Bryan.(2008) Plant form: an illustrated guide to flowering plant morphology. Timber Press.
4. Eames, A.J. (1961). Morphology of Angiosperms. McGraw Hill, New York
5. Harris, J.G & M.W. Harris (1994). Plant Identification Terminology -An illustrated Glossary, Spring Lake Publishing, Spring Lake, Utah.
6. Sinha R K (2010) Practical Taxonomy of Angiosperms. IK International Publishing Pvt Ltd.
7. Naik, V.N. Taxonomy of Angiosperms. TATA McGraw Hill, New Delhi.

Web link

1. https://www.botanicalartandartists.com/plant-evolution-and-taxonomy.html
2. https://open.lib.umn.edu/horticulture/chapter/2-1-plant-taxonomy/
3. https://botanicalsociety.org.za/the-science-of-names-an-introduction-to-plant-taxonomy/
4. https://www.employees.csbsju.edu/ssaupe/biol308/Lecture/introduction.htm
5. https://botany.org/home/resources/plant-talking-points/what-is-economic-botany.html

Course Outcomes

No.	Upon completion of the course, the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Students possess the capability to recognize and distinguish different categories of foliage, flowers, inflorescence, and fruits.	R, U	PSO-1,2
CO-2	Compare the morphological characters of plants belonging to different families. Construct the floral diagram and floral formula subsequent to the observation of a studied plant.	R, U	
CO-3	Execute field collections of plant specimens, scientific	An, C	

	herbarium preparations, and maintenance.		
CO-4	Learn about various modern taxonomies, software and tools and their application in plant systematics and the techniques for the preparation of virtual herbaria and macrophotography.	Ap, An, C	PSO-8,9
CO-5	Utilize the knowledge of plant systematics for the benefit of science and society.	Ap, E, C	PSO-1,6

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Angiosperm Morphology and Plant Systematics

Credits: 3:0:1 (Lecture:Tutorial:Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
CO-1	1	1.2	R, U	F, C	L.T	
CO-2	2		R, U	F, C	L.T	P
CO-3	3		An, C	F, C	L.T	P
CO-4	4	8,9	U, An, C	P	L.T	P
CO-5	5	1,6	Ap, E, C	P	L.T	

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics :

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓			✓
CO 2	✓			✓
CO 3	✓			✓
CO 4		✓		✓
CO 5		✓	✓	✓