University of Kerala

Discipline	**BOTANY**				
Course Code	**UK1DSCBOT103**				
Course Title	**FUNDAMENTALS AND SCOPE OF BOTANY**				
Type of Course	**DSC**				
Semester	**I**				
Academic Level	**100-199**				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	04	03 Hours	-	02 Hours	05 Hours
Pre-requisites	Basic understanding of plant biology at the higher secondary level.				
Course Summary	Students can study plants and their biology, including how they grow and adapt to their environment. The history of Botany and also different branches within botany focus on specific areas of plant biology.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**Botany: An Introduction**	**06**
	1	History of botany, the basic concept of botany, Evolutionary history of plants on geological time scale; Fossil evidence for plant evolution.	
	2	The Lush Green Domain: A Brief description of various branches in Botany (Phycology, Lichenology, Mycology, Bryology, Pteridology, Taxonomy, Ethnobotany, Horticulture, Molecular Biology, Physiology, cytology, Genetics, Pharmacognosy, Plant Pathology, Palynology)	
II		**Predecessors in Plant Science**	**04**
	3	International: Theophrastus (Father of Botany), Charles Darwin, G.J. Mendel, Carl Linnaeus, Louis Pasteur, Rosalind Franklin, Watson and Crick. N.I.Vavilov, Norman Borlaug, George Bentham & Joseph Dalton Hooker.	
	4	Indian Botanists: M. O. P. Iyengar, S.R. Kashyap, P. K. K. Nair, Birbal Sahni, P. Maheswari, M.S. Swaminathan, Janaki Ammal, Jagadish Chandra Bose.	
III		**Plant Morphology**	**11**
		Roots- types (Tap root, fibrous and adventitious). Stem – types (aerial and underground). Leaf – parts of the leaf; phyllotaxy –	

	5	Alternate, Opposite, Whorled; Leaf types-simple, compound, Leaf venation-Parallel, and Reticulate. Inflorescence types – Cymose (Monochasial and Dichasial), Racemose (Raceme, Spike, Spadix, Catkin, Capitulum), and Special (Cyathium and Hypanthodium).	
	6	Flower – Parts, Symmetries, Aestivation Types. Fruit – Simple (Fleshy, Dry) Aggregate, Multiple (Syconous, Sorosis) with two examples. Seed and its Structure (Brief study).	
IV	**Botanical Skills and Techniques**		**09**
	7	Familiarization with Microscopes (Simple and Compound Microscope), and photomicrography; Plant Collection and Preservation: Dry Preservation – Herbarium; Killing and Fixing agents – Carnoy's formula, FAA. Whole mounts and sections – Free Hand Sectioning. Staining plant tissues: purpose; stains – Safranine, Acetocarmine. ***Learning Activity:*** *1. Identify and collect any five flowering plants and Prepare herbarium.* 2. *Prepare semi-permanent slide /whole mount.*	
V	**Prospects and Scope of Botany**		**15**
	9	Importance and scope: Mushroom cultivation. Agriculture and its branches (Horticulture and Floriculture). Integrated Farming. Micro and macro propagation. Fertilizers and bio-pesticides industry. Dye industry. Perfumery industry. Cloth industry. Pharmaceutical industry. Cosmetic industry. Garden and Nursery Management, Microgreens.	
	10	Teaching and Research, Technical and field level openings, pharmaceutical sector, Agriculture sector, NGOs, BSI, and Entrepreneurship. ***Learning Activity:*** *Invited talk by Eminent Botanists to make awareness among students about Career and Entrepreneurial Prospects and Opportunities in Botany*.	

Practicals		
	Field Activities (Mandatory) 1. Conduct a laboratory Visit and submit reports with the support of Geo-tagged photographs. 2. Prepare a report and presentation on Botanists who made significant contributions to plant science. 3. Collection/ photograph of different shoots with respect to phyllotaxy, shapes, types, Leaf margins, leaf apex, leaf venation. 4. Collection/photographs of different types of inflorescences 5. Collection/photographs of different types of Fruits.	**30**

Suggested Readings

1. Arnold, C. A. 1947. Introduction to Paleobotany. Tata McGraw Hill, New Delhi.
2. 2.Beck, W. S., Karel, F. L., & George, G. S. 1991. LIFE: An Introduction to Biology (IIIEdn). Harper Collins Publishers.
3. Pallabhi, V.& Gautham, N. 2005. Biophysics. Narosa Publishing House, New Delhi.
4. Sewart, W. N. 1983. Paleobotany and the Evolution of Plants. Cambridge Uni. Press, London.
5. Simpson, M. G. 2010. Plant Systematics (II Edn). Academic press.

References

1. Davis, P. H., & Heywood, V. H., 1963. *Principles of Angiosperm Taxonomy*. Oliver & Boyd, London.
2. Eames A. J., 1961. *Morphology of Angiosperms*. McGraw Hill, New York.
3. Gangulee, S. C., Das, K. S., Dutta, C. D., & Kar, A. K., 1968. *College Botany Vol. I, II, and III*. Central Education Enterprises.
4. Pandey, R. K., & Ghosh, S. K., 1996. *A Handbook on Mushroom Cultivation*. Emkey Publications
5. Prasad, M. K., & Krishna, P. M., 1986. *Outlines of microtechnique*. Emkay Publishers, New Delhi.
6. Sharma, V. K., 1991. *Techniques in microscopy and cell biology*. Tata McGraw-Hill, New Delhi.
7. Singh, G., 2012. *Plant Systematics. Theory and Practice. 3rd edition*. Oxford & IBH Pvt. Ltd., New Delhi.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand the basic concepts of Botany and its origin	U	PSO-1,2
CO-2	Help the learner gain an understanding of the cardinal branches in Botany hence paving the way towards the conception of an elemental awareness of the areas.	R, U	PSO-1
CO-3	Identify and acknowledge the Eminent Botanical Contributors, and recognize the importance of their contributions.	R, U	
CO-4	Analyze the morphological features of plants. Develop basic skills required to study Botany in detail and gain a foundational understanding of the basic instruments and techniques used in Botanical studies.	R, U, An	PSO-1, 4

CO-5	The learner will develop evolving abilities and opportunities in diverse themes in botany and gain insights into the potential of personal prosperity and career opportunities in plant science.	U, Ap	PSO- 3,4,6

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

Name of the Course: Fundamentals and Scope of Botany

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

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

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		✓		✓