University of Kerala

Discipline	**BOTANY**				
Course Code	**UK1DSCBOT102**				
Course Title	**INTRODUCTORY 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.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I		**An Introduction to the Science of Botany**	**07**
	1	What is Botany? Characteristics of Plants, Levels of biological organization from atom-Molecules - Macromolecule- Organelle - Cell-Tissue- Tissue Systems – Organ - Organism - Population- Community- Ecosystem- Biosphere (Brief account).	
	2	Characteristic features of plant Kingdom - Eukaryotic cell- the important character of the plant cell (Cellulose -cell wall & plastids)- single to multicellular structure - sexual & asexual reproduction- Autotrophic synthesize food by Photosynthesis; Plant kingdom- Classification- Cryptogamae and Phanerogamae.	
II		**Why Study Plants?**	**08**
	3	Plants are the foundation of ecosystem-primary producers - Supplying Food and Energy)- Maintains Climatic Conditions - (production of oxygen-removing the carbon dioxide from the surroundings). Biogeochemical Cycles- Aesthetics for Humans- Natural habitat for most organisms.	
	4	Plants around us- Crops (Wheat, Mango) Poisonous (Cerebera, Datura), Weeds (*Ageratum sp., Alternanthera sp*) Carnivorous Plants (Dionaea, Nepenthus), Ornamental plants (Orchids, Rose), Wild ornamental plants (*Osbeckia Sp.* Memecylon), Invasive plants (*Sphagneticola trilobata, Mimosa diplotricha),* Misteleto (*Loranthus*), Parasitic plants (*Cuscuta*).	
	5	Plants Defense– **(**against herbivorous and animals)- Structural defense – Barrios-cuticle, wax, bark; Adaptations- thorns, prickles, shrinkage (Mimosa), latex, trichomes, crystalliferous cells, and silica cells.)-Biochemical defense (alkaloids, phenolics, terpenes, and flavonoids) (Brief study)	

III	**Plant Morphology**		**08**
	6	Roots- types (Tap root, fibrous and adventitious). Stem - types (aerial and underground). Leaf - parts of the leaf; phyllotaxy,types v e n a t i o n . Inflorescence types – Cymose, Racemose, and Special (Cyathium and Hypanthodium). Flower - (Parts, Symmetries, Aestivation Types). Fruit – Simple (Fleshy, Dry) Aggregate, Multiple (Syconous, Sorosis) with two examples. Seed and its Structure (Brief study only).	
IV	**Botanical Skills and Techniques**		**07**
	7	Familiarization with Microscopes (Simple and Compound Microscope), and photomicrography. Plant Collection and Preservation: Dry Preservation – Herbarium). Killing and fixing. Purpose and Importance of FAA. Whole mounts and sections – Hand Sectioning – TS and LS. Staining plant tissues: purpose; stains – Safranine, Crystal violet. ***Learning Activity:*** *Identify and collect any five flowering plants and Prepare herbarium.*	
V	**Scope of Botany**		**15**
	9	**Importance and Scope**: Mushroom cultivation, Agriculture, Horticulture - Garden and Nursery Management, Floriculture- cut flower), Integrated Farming, Micro and macro propagation, Bio-pesticides industry, Dye industry, Perfumery industry, Cloth industry, pharmaceutical industry, Cosmetic industry, and Microgreens.	
	10	Teaching and Research, Technical and field level openings, pharmaceutical sector, Agriculture sector, NGOs, BSI, and Entrepreneurship. *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, and leaf venation. 4. Collection/photographs of different types of inflorescences. 5. Collection/photographs of different types of Fruits.	**30**

Suggested Reading

1. Acquciah, G. (2004). *Horticulture: Principles and Practices (II Edn)*. Prentice Hall. India
2. Brown, W.(2021). *The Forgotten Botanist: Sara Plummer Lemmon's Life of Science and Art*. Bison Books. ISBN: 9781496222817 (ISBN10: 1496222814
3. Davis, P. H., & Heywood, V. H.(1963). *Principles of Angiosperm Taxonomy*. Oliver &

Boyd, London.
4. Eames A. J.(1961). *Morphology of Angiosperms*. McGraw Hill, New York.
5. Gangulee, S. C., Das, K. S., Dutta, C. D., & Kar, A. K.(1968). *College Botany Vol. I, II, and III*. Central Education Enterprises.
6. Gifford, E. M., & Foster, A. S.(1988). *Morphology and Evolution of Vascular Plants*.
7. Pallabhi, V., & Gautham, N.(2005). Biophysics. Narosa Publishing House, New Delhi.

References

1. Mason K. A., Jonathan B. L., & Susan R. S. (2013). *Biology (IX Edn)*. McGraw Hill.
2. Narayana, P. S., & Pullaiah, T.(2010). *Eminent Indian Botanists: Past and Present Biographies and Contributions*. Regency Publications, Ansari Road, New Delhi- 110002
3. Pandey, R. K., & Ghosh, S. K.(1996). *A Handbook on Mushroom Cultivation*. Emkey Publications
4. Prasad, M. K., & Krishna, P. M.(1986). *Outlines of microtechnique*. Emkay Publishers, New Delhi.
5. Purohit, S. S. (2005). *Plant Tissue Culture*. Student Edition.
6. Rema, L. P.(2006). *Applied Biotechnology*. MJP Publishers.
7. Sharma, R. R.(2005). *Propagation of Horticultural Crops*. Kalyani Publishers.
8. Sharma, V. K. (1991). *Techniques in microscopy and cell biology*. Tata McGraw-Hill, New Delhi.
9. Singh, G. (2012). *Plant Systematics. Theory and Practice. 3rd edition*. Oxford & IBH Pvt. Ltd., New Delhi.
10. Taylor, T. N. (1981). *Paleobotany: An Introduction to Fossil Plant Biology*. McGraw Hill, New York.

Course Outcomes

No.	Upon completion of the course, the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand the Level of biological organization of communities and ecosystems and acquire the knowledge of characteristic features of the plant kingdom.	U	PSO-1,2
CO-2	Understand the relevance of the plants in the ecosystem, will develop the ability to identify the diversity of plants around us and the defense mechanism in plants.	R, U	PSO-1,2
CO-3	Understand the morphological features of plants	R, U	PSO-1
CO-4	Develop basic skills required to study Botany in detail and gain a foundational understanding of the basic instruments and techniques used in Botanical studies.	U, Ap	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, Cr	PSO-4, 6

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

Name of the Course: Introductory 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	LT	
2	2	1,2	R, U	F, C	LT	
3	3	1	R, U	F, C	L,T	
4	4	1,4	U, Ap	C, P	P	P
5	5	1,6	U, Cr	P,M	L,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		✓	✓	✓