



University of Kerala

Discipline	BOTANY				
Course Code	UK1DSCBOT101				
Course Title	PLANT WORLD I				
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	The course gives an all-round awareness of plants, their evolution, and how they respond to the environment. Kick-starting the process of scientific inquiry in students by observation of nature and recording its diversity along with problem solving and reporting of scientific data using digital tools and techniques is also envisaged.				

Detailed Syllabus:

Module	Unit	Content	Hrs
I	Origin, Diversity & Evolution of Life		02
	1	Are Plants Alive? Circadian movements, Cyclosis, Tropic movements, Sensing the environment (photo, chemo), respiration, photosynthesis, secretion, allelopathy, and reproduction. (Brief account.)	
	2	Where do they survive? Terrestrial biomes, aquatic biomes, tundra biomes.	
II	Diversity of Plants: Prokaryotic world		08
	3	Geological time scale with special reference to plant evolution.	
	4	Viruses, Fungi and Lichens, Bacteria, Archaea and Eukaryotes. General account, Emphasize distinguishing characters.	
	5	Viruses: Virion types: Helical, Icosahedral, Icosahedral with tail, helical encapsulated, Giant Viruses.	
	6	Bacterial Cell Structure: Fundamental differences between Archaea and bacteria, Shape and size, Plasma membranes, Cell wall, Gram-positive and gram-negative bacteria.	
III	Eukaryotic world		15
	7	Algae: Spirogyra, Pinnularia, Nitella Microscopic study of thallus structure.	
	8	Fungi: Yeast, Pleurotus , Microscopic study of thallus morphology.	
	9	Lichens: Concept of Symbiosis, Various forms of Lichens- Crustose, Foliose and Fruticose.	
	10	Bryophyta: Thallus morphology of <i>Riccia, Bryum</i> .	
IV	Recording Plant Life		05

	11	Process of scientific inquiry: Observation of nature, Identifying a problem, Formulating a hypothesis, Experimentation, Data collection, Analysis and Interpretation of results, Compiling and Reporting the results. (Discuss in light of experiments)	
	12	Basics of Macrophotography: Macro photography of Plants, Time-lapse video recording of plant movements, Microphotography and measurement. Basics of Lighting, f-stop, depth of field, bokeh, ISO values, Photographic equipment.	
	13	Outline of report writing: Introduction, Materials, and Methods, Discussion, References.	
V	Influence of plants on the environment		15
	14	Specialties of the plant specimens/ecosystems are listed below: <ol style="list-style-type: none"> Conservation successes: <i>Judean date palm</i>, <i>Nymphaea thermarum</i>. Botanical novelties: <i>Victoria amazonica</i>, <i>Welwitschia</i>, <i>Podocarpus wallichianus</i>, <i>Cycas annaikalensis</i>, <i>Wollemia nobilis</i>, <i>Wolffia arriza</i>, <i>Rafflesia arnoldii</i>, <i>Amorphophallus titanum</i>. Alluring assassins: <i>Amanita muscaria</i>, <i>Abrus precatorius</i>, <i>Thevetia nerifolia</i>, <i>Cerbera odollum</i>, <i>Strychnos nux-vomica</i>. Foreign exchange earners: <i>Morels of Kashmir</i>, <i>Crocus sativus</i>, Marayoor Sandalwood, <i>Tectona grandis</i>. Invasive alien: <i>Eichornia crassipes</i>, <i>Mikania micrantha</i>. Metal Prospectors: <i>Equisetum arvensis</i>. Pharma factories: <i>Trichopus zeylanicus</i>, <i>Vinca rosea</i>, <i>Ephedra foliata</i>, <i>Artemesia</i>, <i>Rauwolfia serpentina</i>, <i>Atropa belladonna</i>. Adaptation kings: Myristica swamps, Mangrove vegetation, Insectivorous plants, <i>Cephaeleuros</i>, <i>Parmelia</i>, <i>Ficus religiosa</i> var. <i>krishnae</i>, Peat bogs. Early warning systems: Lichens. Kerala's own: Rice cultivation below sea level, Pokkali rice, Sacred Groves, Marayoor jaggery, <i>Cassytha filiformis</i>, Timeless giants: <i>Giant redwoods</i>, <i>Bristlecone pines</i>. 	

Practicals		
	<ol style="list-style-type: none"> Familiarisation with simple and compound microscopes, Identifying the various parts, and measurement of microscopic structures using micrometry. Observing algal filaments using a microscope to detect cyclosis movements. Setting up & Demonstrating experiments to show the Evolution of oxygen (Photosynthesis) and CO₂ during respiration. (Discuss given the Process of Scientific Enquiry). Field visits to familiarise diverse environments, and collection of samples. Documentation of collected samples, and preparation of semi-permanent slides of bacteria and algae. 	30

	6. Differentiating gram-positive and gram-negative bacteria using Gram staining (Demonstration only).	
	7. Collection, recording, and preservation of the various plant groups from nearby ecosystems.	
	8. Photographic records of botanical specimens encountered <i>in vivo</i> .	
	9. Generating a report on nearby ecosystems with a photographic record.	

Suggested Readings

1. The Evolution of Plants, K.J Willis & J C Mc Elwain, Oxford University Press, ISBN 0-19-567604-1.
2. Life. The Science of Biology, Twelfth edition.
3. Biology. Kenneth A. Mason & Jonathan B. Losos, ISBN 978-1-260-16961-4, (bound edition).

Resource materials:

1. Macro Photography, The Universe at our Feet, Don Komarcheka, 2021.
2. A Short Guide to Writing about Biology, *Ninth Edition*, Jan A. Pechenik, ISBN 978-0-321-98425-8 (student edition).
3. College Botany, Volume II, 2011, Hirendra Chandra Gangulee, Asok Kumar Kar.

Course Outcomes:

No.	Upon completion of the course, the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand, explain, evaluate, and effectively interpret basic concepts about plant lineages	R,U	PSO-1,2
CO-2	Apply knowledge to analyze and to distinguish among the major plant lineages.	R, U, E	PSO-1,2
CO-3	Understand basic concepts of photography and apply them to create scientifically useful photographic data.	R, E, Ap,	PSO-7
CO-4	Understand basic needs to effectively initiate, execute and report on the scientific process.	U,Ap,C	PSO-8
CO-5	Work and communicate effectively in a group on enquiry-based tasks and in a practical environment.	Ap, C	PSO-8

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

Name of the Course: Plant World 1

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	U, An	F, C	L,T	
2	2	2	R, U, E	F,C	L,T	
3	3	2	R, U, E	F,C	L,T	
4	4	7,8,9	R,Ap,An	F,P	T	P
5	5	1,2,6	R,U	F	L,T	P

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

Mapping of COs with PSOs and POs :

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO7	PO8	PO9	PO10
CO 1	3	-	-	-	-	-				
CO 2	-	3	-	-	-	-				
CO 3	-	3	-	-	-	-				
CO 4	-	-	-	-	-	-	3	3	3	2
CO 5	1	1	-	-	-	-				

Assessment Rubrics:

- Quiz / Assignment/ 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		✓	✓	✓