



UNIVERSITY OF CALICUT

**BOTANICAL DIVERSITY**

Programme	B. Sc. BOTANY				
Course Title	<b>Plant Ecology, Conservation &amp; Plant Interactions</b>				
Type of Course	<b>Minor</b>				
Semester	<b>I</b>				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	-				
Course Summary	This course offers basic knowledge related to the relationships between plants and their environment, the importance of conservation efforts and the interactions between different plant species.				

**Course Outcomes (CO):** After completing the Course, the student should be able to:

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools
CO1	Explain the ecological relationships between plants and the environment	U	C	Test/Assignments/Field study
CO2	Summarise the significance of conservation practices	U	F	Class Discussions
CO3	Explain various interactions that occur among plant species	U	C	Test/Field study/Group project
CO4	Develop the skills necessary to contribute to the conservation and sustainable management of plant ecosystems	Ap	C	Volunteer Projects/Reflective essays
CO5	Apply conservation strategies suitable for neighbouring ecosystems	Ap	P	Case studies/Presentations/Field reports

\* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)  
 # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

### Detailed Syllabus

Module	Unit	Content	Hrs (45 + 30)
<b>I</b>	<b>Plant Ecology</b>		<b>9</b>
	1	Ecology - Definition, Ecosystem: ecological factors - biotic and abiotic.	2
	2	Ecological adaptations - Morphological and anatomical adaptations of the following types: Hydrophyte ( <i>Vallisneria</i> ), Xerophyte ( <i>Opuntia</i> )	2
	3	Halophyte ( <i>Avicennia</i> ), Epiphytes ( <i>Vanda</i> ) and parasites ( <i>Cuscuta</i> )	2
	4	Ecological succession - Process of succession, types of succession, Hydrosere	3
<b>II</b>	<b>Biodiversity, Loss and its Consequences</b>		<b>18</b>
	5	Biodiversity - Definition, types of biodiversity - habitat diversity, species diversity and genetic diversity	3
	6	Values of Biodiversity - Economic and aesthetic value, Medicinal values	2
	7	Concept of Biodiversity Hotspots, Biodiversity hot spots of India.	2
	8	Concept of endemism and endemic species. ICUN plant categories with special reference to Western Ghats.	2
	9	Estimates of extinction rates worldwide and in India, causes of extinction/changes in biodiversity	2
	10	Habitat fragmentation and destruction	3
	11	Threats to biodiversity: Overexploitation, Invasive species	2
	12	Consequences: loss of gene pool, loss of ecosystem services, livelihood	2
	<b>III</b>	<b>Biodiversity Conservation</b>	
13		Conservation methods - <i>In-situ</i> and <i>ex-situ</i> methods.	2
14		<i>In-situ</i> methods - Biosphere reserves, National parks, Sanctuaries, Sacred grooves	2
15		<i>Ex-situ</i> methods - Botanical gardens, Seed bank, Gene banks, Pollen banks	2
16		Cryopreservation	2
<b>IV</b>	<b>Plant Interactions</b>		<b>10</b>
	17	Plant interactions: overview, Plant - microbe interactions: Mycorrhizae	1
	18	Plant - herbivore interactions, Plant defences against herbivores	2
	19	Plant - pollinator interactions, Pollination syndromes and floral specialisation	2
	20	Ant-plant interactions	1
	21	Plant-animal interactions as ecosystem services	2
	22	Conservation aspect of plant-animal interactions	2

<b>V</b>	<b>Practical (Mandatory Experiments)</b>	<b>30</b>
	<ol style="list-style-type: none"> <li>1. Study the morphological and anatomical adaptations of the hydrophytes, xerophytes, halophytes, epiphytes and parasites mentioned in the syllabus</li> <li>2. Study of a pond/forest ecosystem and recording the different biotic and abiotic components</li> <li>3. Field observations of plant-animal interactions in natural environments around campus</li> <li>4. Field visit: To study different types of local vegetation/ecosystems and the report to be recorded.</li> </ol>	
	<b>Practical (Open Ended-Suggestive list)</b>	
	<ol style="list-style-type: none"> <li>5. Case studies: Contemporary Indian wildlife and biodiversity issues</li> <li>6. Group presentations in an area of conservation biology</li> <li>7. Discussion on biodiversity (Man-animal conflict, human interference, climate change)</li> </ol>	
<b>Suggested Readings</b>		
<ul style="list-style-type: none"> <li>• Rajak, A. 2020. Textbook of Biodiversity. 1st edition, Notion Press, India.</li> <li>• Mahanty, S. and Srivastava, A. 2016. Biodiversity and It's Conservation. Disha International Publishing House, India.</li> <li>• Singh, J.S., Singh, S.P. and Gupta, S.R. 2008. Ecology, Environment and Resource Conservation. Anamaya Publications (New Delhi).</li> <li>• Krishnamurthy, K.V. 2004. An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi.</li> <li>• Gaston, K J. and Spicer, J. I. 1998. Biodiversity: An Introduction. Blackwell Science, London, UK.</li> <li>• Primack, R. B. 2002. Essentials of Conservation Biology (3<sup>rd</sup> edition). Sinauer Associates, Sunderland, USA.</li> <li>• Chittka, L. and Thompson, J. D. (Eds.). 2001. Cognitive Ecology of Pollination- Animal Behaviour and Floral Evolution. Cambridge University Press.</li> <li>• Herrera, C. M. and Pellmyr, O. (Eds.). 2002. Plant-Animal Interactions: An Evolutionary Approach. Blackwell Publishing.</li> <li>• Schaeffer, H.M., and Ruxton, G.D. (Eds). 2011. Plant-Animal Communication. Oxford University Press.</li> </ul>		
<b>Online Sources</b>		
<ul style="list-style-type: none"> <li>• <a href="https://www.igntu.ac.in/eContent/IGNTU-eContent-313628797582-M.Sc-EnvironmentalScience-4-ManojkumarRai-MicrobialEcology-2-3.pdf">https://www.igntu.ac.in/eContent/IGNTU-eContent-313628797582-M.Sc-EnvironmentalScience-4-ManojkumarRai-MicrobialEcology-2-3.pdf</a></li> <li>• <a href="http://www.eagri.org/eagri50/AMBE101/lec29.html">http://www.eagri.org/eagri50/AMBE101/lec29.html</a></li> <li>• <a href="http://eagri.org/eagri50/AMBE101/pdf/lec29.pdf">http://eagri.org/eagri50/AMBE101/pdf/lec29.pdf</a></li> <li>• <a href="http://ales.arizona.edu/classes/ento415/LECTURES/ENTO415_PlantInteractions.pdf">ales.arizona.edu/classes/ento415/LECTURES/ENTO415_PlantInteractions.pdf</a></li> <li>• <a href="https://entnemdept.ufl.edu/baldwin/webbugs/3005_5006/Docs/notes/notes10.pdf">https://entnemdept.ufl.edu/baldwin/webbugs/3005_5006/Docs/notes/notes10.pdf</a></li> </ul>		

**Mapping of COs with POs:**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	2	-	-	-	1	2	-
CO2	2	-	-	-	1	2	-
CO3	2	-	-	-	-	2	-
CO4	2	-	-	-	-	2	-
CO5	2	-	-	-	-	2	-

**Correlation Levels:**

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

**Assessment Rubrics:**

- Quiz / Discussion
- Assignment/ Seminar
- Project/Practical
- Final Exam

**Mapping of COs to Assessment Rubrics**

	Internal Exam	Assignment/Seminar	Practical/Project Evaluation	End Semester Examinations
CO 1	✓	✓	✓	✓
CO 2	✓	✓		✓
CO 3	✓		✓	✓
CO 4	✓		✓	