

## **ENE-251: Ecological Management**

**CREDIT HOURS:**            Theory        = 02  
                                 Practical      = 00  
                                 Total         = 02

**CONTACT HOURS:**        Theory        = 32  
                                 Practical      = 00  
                                 Total         = 32

**PREREQUISITE:**            None

### **MODE OF TEACHING:**

Instruction:	Two hours of lecture per week	100%
Practical/ Laboratory Demonstration:	N/A	0%

### **COURSE DESCRIPTION:**

This course module is focussed on the fundamental principles and concepts of Ecology and Ecosystem Management in the context of human welfare. Understanding of ecosystem with respect to the man and its financial implications remains the focus of this course. It provides an appreciation of the issues and current techniques for sustainability and sustainable development by focussing on society, environment, and economics simultaneously.

The course is divided into three parts mainly. In the first part, students are introduced to the Basic concepts in ecology, Trophic Structure and Energy and material flow within ecosystem. Second part is focussed on various types of ecosystems and their management, Nutrient cycles and Eutrophication, biodiversity and ecological sustainability, and Succession. The final part is related to extinction crises influenced anthropogenically and approaches in environmental management.

### **RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):**

The course is designed so that students will achieve the PLOs:

1	Engineering Knowledge:	<input type="checkbox"/>	7	Environment and Sustainability:	<input checked="" type="checkbox"/>
2	Problem Analysis:	<input type="checkbox"/>	8	Ethics:	<input type="checkbox"/>
3	Design/Development of Solutions:	<input type="checkbox"/>	9	Individual and Teamwork:	<input type="checkbox"/>
4	Investigation:	<input type="checkbox"/>	10	Communication:	<input type="checkbox"/>
5	Modern Tool Usage:	<input type="checkbox"/>	11	Project Management:	<input type="checkbox"/>
6	The Engineer and Society:	<input checked="" type="checkbox"/>	12	Lifelong Learning:	<input type="checkbox"/>

### **COURSE LEARNING OUTCOMES:**

Upon successful completion of the course, the student will demonstrate competency by being able to:

S. No.	CLOs	Domain	Taxonomy Level	PLOs
1	<b>Comprehend</b> the basics concepts of ecology	Cognitive	1	7
2	<b>UNDERSTAND</b> the role of ecological science in sustainable management of the natural systems that underpin human well-being.	Cognitive	2	6
3	<b>Explain</b> the methods & techniques for economic analysis of the natural resources and the environment.	Cognitive	2	6

### **PRACTICAL APPLICATIONS:**

Sustainable development is a famous slogan now a days in the world. However, understanding of interactions between the environment and human beings is poorly understood that is hindering the progress in a sustainable way. Being engineers, it is also important for the students to learn the environmental management aspect of the roles that they need to fulfil in the organizations. This course will enable the students to understand the importance of the ecosystem management and equip them with the basic knowledge of managing projects in ecology effectively.

### **TOPICS COVERED WITH THEIR CONTRIBUTION TO PLOs:**

#### **Theory:**

Week	Topic
1	Basic concepts in ecology
2	Structure of ecosystem
3,4	Trophic structure: Food web complexity, Food web patterns, Problems with food web patterns, Guilds, Keystone species, Human as keystone species, effects of human activities on ecosystem
4,5	Energy and material flow within ecosystem: Measuring production, Limits to primary production, Patterns in primary production, Secondary production, Limits to secondary production
6	OHT1
7	Ecosystem productivity, food webs and food chains
8	Biogeochemical cycles : Nitrogen cycle, Phosphorus cyce, Sulphur cycle, Carbon cycle
<b>Mid Semester Exam</b>	
9	Succession and development of communities: Development of communities, Facilitation, Inhibition, Tolerance and other patterns of succession, Patterns in species richness during succession, Biotic interactions and succession
10	Eutrophication & its ecological significance
11	Biodiversity and ecological sustainability, Sustainable development
12	OHT2
13	Extinction of species: The extinction crisis, Patterns of extinction
14	Extinction of species: Endangered species, Species characteristics and extinction

15	Environmental management approaches
16	Ecosystem Ecology and Environmental management
<b>End Semester Exam</b>	

### TEXT AND MATERIAL:

#### Textbook (s)

1. Ecology: Theories and applications, 4<sup>th</sup> edition by Peter Stiling. 2001. Published by Prentice Hall of India (Pvt) Limited, New Delhi

#### References Material

1. Environmental Management for Sustainable Development, 2<sup>nd</sup> Edition by C.J. Barrow. 2006. Published by Routledge, Taylor & Francis Group, USA.
2. Ecosystem Ecology: A New Synthesis, Edited by David G. Raffaelli, Christopher L. J. Frid. 2010. CAMBRIDGE UNIVERSITY PRESS, UK

### ASSESSMENT SYSTEM:

<b>Theoretical/Instruction</b>	<b>100%</b>
Assignments	10%
Quizzes	15%
Mid Semester Exam	25%
End Semester Exam	50%

<b>Practical Work</b>	<b>0%</b>
Lab Attendance	0%
Lab Report	0%
Lab Quiz	0%
Lab Rubrics	0%