



SECOND SEMESTER 2015-16

Course Handout Part II

Date: 05/01/2016

In addition to part I (general handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No. : **BIO F241**
Course Title : **Ecology and Environmental Sciences / Ecology**
Instructor-In Charge : : **SANDHYA AMOL MARATHE**
Co-instructor : **BhagavatulaVani**

Scope and objectives of the course:

In the past few decades, man has achieved mental development that has translated into scientific and technological innovations to improve/manipulate life and environment. As a consequence the science of ecology, dealing with organism-environment relationships, has become more and more an integrated discipline that links the natural and the social sciences. As an integrated science ecology has a vast potential of application to human welfare, merging natural science with its social, economic and political counterparts. In short, ecology helps us understand our planet – Mother Earth – better and devise sustainable methods to preserve it.

The objective of this course is to make the students aware of the various segments of our environment, interaction between abiotic and biotic components of ecosystems, energy and material utilization strategies, anthropogenic activities leading to ecosystem imbalance, depletion of natural resources and the impact of 'greedy' and polluting technological developments on the ecosystem. The course culminates by suggesting pertinent solutions to some current environmental problems and looking at the Indian scenario on the protection of local environments.

1. **Text Book (TB):** "*Fundamentals of Ecology*", by E. P. Odum & G. W. Barrett, Brooks/Cole Cengage Learning, 5th edition, 2005
2. **Reference Books (RB):**
RB1- "*Concepts of Ecology*" by E. J. Kormondy, Prentice Hall of India Pvt. Ltd., 4thed, 1996.
RB2 – "*Introduction to Biology*", Unit 9 (Ecology), Interactive e-textbook, Nature Publishing Group, 2011.
RB3 – "*Element of Ecology*", by T. M. Smith & R. L. Smith, Pearson Education, Inc., 6th edition, 2012.
3. **Suggested Reading:** "*Down to Earth*", a fortnightly magazine published by the Society for Environmental Communications, India.

Course Plan:

Lect. No.	Learning Objective	Topic	Reference to chapter*
1	Introduction	Introduction to ecology	TB Ch 1
2-3	Beginning the science of ecology: Segments of environment	Soil, nutrients and other factors	TB Ch 5





4	Principles pertaining to limiting factors	Minimum & Tolerance Laws	TB Ch 5
5-8	Principles and concepts of ecosystem	Concept and structure Biodiversity and its function Cybernetic nature and stability of ecosystems	TB Ch 2
9-12	Regional ecology: Major ecosystem types	Marine ecosystems Fresh water ecosystems Terrestrial ecosystems; Desert ecology	TB Ch 10
13	Nutrient budgets	Nutrient budgets corresponding to nutrient cycles	TB Ch 4, RB1 Ch 9
14-19	Energy in ecological systems	Global production and decomposition Radiant energy and photosynthesis; Measuring primary production Early estimates of primary production: Comparison of primary productivity Autotroph based ecosystems Detritus based ecosystems Energy flow models, Food chain and food webs, Food Chain Length (FCL)	TB Chs 2 & 3, RB1 Chs 6 & 7
20-23	Population ecology	Properties of population Age structures, Population fluctuations, Population regulation Intrinsic rate of natural increase, r- and K-selection, Carrying capacity Allee principle, Territoriality, Dispersion	TB Ch 6
24-28	Community ecology	Types of interaction Models describing these interactions Ecological niches, Guilds	TB Ch 7, <i>Class notes</i>
29	Succession in communities: Evolution	Ecosystem development & succession, Stages of succession	TB Ch 8
30-32	Behavioral ecology	Different animal behavior and models describing them.	<i>Class notes</i>
33-35	Pollution ecology	Anthropogenic impact on ecosystems and waste management	RB2, <i>Class notes</i>
36-37	Environmental Biotechnology	A brief introduction to the topic with relevant examples	<i>Class notes</i>
38	The Indian environmental movement	Viewing Indian society from an ecological perspective	<i>Class notes</i>

*As the subject is vast and continuously updated, the lectures may also include material from sources other than those mentioned above.

For Self Study: Insolation, precipitation and climate from RB1 Chapter 4 and nutrient budget from TB Chapter 4, RB1 Chapter 9.





Evaluation scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid-term Test	1 ½ hrs	25	15/3 9:00 - 10:30 AM	CB
Assignments + quizzes (surprise)	-	35	-	-
Comprehensive Exam	3 hrs	40	5/5 FN	CB/OB*

*Xerox of class notes will *not* be allowed for open book examination.

Chamber consultation hour: To be announced.

Notices: Notices will be displayed on Biological Sciences Notice Board.

Assignments and quizzes: Details regarding these will be notified in class. The quizzes will be mostly of surprise nature.

Make up Policy: Make up for test/compre will be granted *only* under extreme circumstances such as hospitalization (with prior permission). No make up for quizzes/assignments.

**Instructor In Charge
(BIO F241)**

