

**SEMESTER V****ZY5B06U CORE COURSE 6****ENVIRONMENTAL BIOLOGY, TOXICOLOGY AND  
DISASTER MANAGEMENT**

54 hrs

Credits 3

**Objectives**

- To impart basic knowledge on ecosystems and their functioning
- To learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures
- To study toxicants, their impacts on human health and environment and remedial measures
- To create awareness about disasters, prevention and mitigation measures

**Pre-requisite:**

- Basic knowledge on ecosystem, food chain, food web and energy flow
- General awareness on pollution and their impacts

**PART I: ENVIRONMENTAL BIOLOGY (44 Hrs)****Module I – Introduction (2 hrs)**

History, development

Scope, branches

**Core Readings**

Bharucha, E. 2005. *Textbook of Environmental Studies for Undergraduate Courses*. University Grants commission

Miller, Tyler. G. (Jr) 2005. *Essentials of Ecology*. Thomson Brooks/cole.

Nambiar, K.R. 2008. *Textbook of Environmental Studies (For Undergraduate Courses as per the UGC Model Syllabus)*. Scitech Publications (India) Pvt. Ltd. Chennai, India.

Odum, E.P. 1971. *Fundamentals of Ecology*. W.B. Saunders College Publishing, Philadelphia.

Rajagopalan,R. 2005.*Environmental Studies from Crisis to Cure*. Oxford University Press, New Delhi.

**Module II – Ecosystems**

**(20 hrs)**

Concept, classification

Terrestrial ecosystem

Abiotic/ biotic components (Brief description only)

Interactions

Classification (Types)

Forest

Desert

Grassland

Causes of land degradation with special reference to Kerala

Freshwater ecosystem

Physico chemical nature (Brief description only)

Types

Lentic

Lotic

Ground water

Threat to freshwater resources of Kerala

Watershed management

Marine ecosystem

Physico chemical nature (Brief description only)

Intertidal zone

Rocky shore

Muddy shore

Sandy shore

Coral reefs

Open sea

Pelagic realm

Benthic realm

Wetland and mangroves

Estuaries

Convention on wetlands (Ramsar, 1971)

Ramsar sites in Kerala –threats and conservation aspects

### **Core Readings**

Bharucha, E. 2005. *Textbook of Environmental Studies for Undergraduate Courses*. University Grants commission

Miller, Tyler. G. (Jr) 2005. *Essentials of Ecology*. Thomson Brooks/cole.

Nambiar, K.R. 2008. *Textbook of Environmental Studies (For Undergraduate Courses as per the UGC Model Syllabus)*. Scitech Publications (India) Pvt. Ltd. Chennai, India.

Odum, E.P. 1971. *Fundamentals of Ecology*. W.B. Saunders College Publishing, Philadelphia.

Rajagopalan, R. 2005. *Environmental Studies from Crisis to Cure*. Oxford University Press, New Delhi.

Zoological Society of Kerala Study material. 2002. *Environmental Biology and Ethology* Published by Zoological Society of Kerala.

### **Module III – Man and Environment (8 hrs)**

Natural resources

Introduction (concept)

Energy resources

Conventional

Non conventional

Inexhaustible

Energy conservation measures

### **Core Readings**

Andrew S. Pullin 2002 *Conservation Biology*. Cambridge University Press, Cambridge, UK

Bharucha, E. 2005. *Textbook of Environmental Studies for Undergraduate Courses*. University Grants commission

Kaufman G.Donald and Cecilia M. Franz. 2000. *Biosphere 2000 Protecting Our Global Environment*. Kendall/Hunt Publishing Company. Iowa, US

#### **Module IV – Global environmental changes (9 hrs)**

Global warming

Green house effect

Ozone depletion

Climate change (Brief description only)

Definition- recent developments

Kyoto protocol

IPCC/UNFCCC

Carbon credit

Carbon sequestration

Carbon trading

#### **Core Readings**

Bharucha, E. 2005. *Textbook of Environmental Studies for Undergraduate Courses*. University Grants commission

Miller, Tyler. G. (Jr) 2005. *Essentials of Ecology*. Thomson Brooks/cole.

Nambiar, K.R. 2008. *Textbook of Environmental Studies (For Undergraduate Courses as per the UGC Model Syllabus)*. Scitech Publications (India) Pvt. Ltd. Chennai, India.

#### **Module V – Municipal Solid Waste (3 hrs)**

Plastic pollution

Types of plastics

Problems of plastics

Management strategies

Biowastes and their management. –aerobic and anaerobic systems.

e-waste

Major types and sources

Toxic ingredients

Effects on environment and human health (Brief description only)

Management strategies

### **Core Readings**

Nambiar, K.R. 2008. *Textbook of Environmental Studies (For Undergraduate Courses as per the UGC Model Syllabus)*. Scitech Publications (India) Pvt. Ltd. Chennai, India.

Odum, E.P. 1971. *Fundamentals of Ecology*. W.B. Saunders College Publishing, Philadelphia.

### **Module V – Local environmental issues (2 hrs)**

Impact of tourism on ecology

Landscape changes

### **Core Readings**

Santra, S.C. 1994. *Ecology Basic and Applied*. M.D. Publications Pvt. Ltd. New Delhi.

## **PART II. DISASTER MANAGEMENT AND TOXICOLOGY (10 Hrs)**

### **Module VI – Disaster Management (5 hrs)**

Definition

Classification

Natural

Anthropogenic

Hybrid

Earthquake

Landslide

Flood

Drought

Cyclone

Tsunami

Mitigation measures

### **Core Readings**

Singh, S.R., 2008 *Disaster Management*. A.P.H Publishers

### **Module VII: Toxicology**

**5 hrs**

Definition

History of toxicology

Classification – occurrence/ source

Role of toxicology

Toxicants of biological origin

Aflatoxin

Botulinum toxin

Heavy metal toxicants

Food additives

### **Core Readings**

Stiling Peter, 2002. *Ecology: Theories and applications*. Prentice Hall of India Pvt. Ltd. New Delhi

Pandey Kamleshwar , J.P.Shukla and S.P.Trivedi.2005. *Fundamentals of Toxicology*. New Central Book Agency (P) Ltd. Kolkata, India

Rajagopalan,R. 2005.*Environmental Studies from Crisis to Cure*. Oxford University Press, New Delhi.

### **Selected Further Readings**

Ahuwalie V.K., Sunita Malhotra, 2009 *Environmental science*, Ane Books Pvt. Ltd.

- Alan Beeby, 2006 Anne – Maria Brennan First Ecology, Ecological principles and Environmental issues . International students edition Sec. edition Oxford University Press.
- Andrew S. Pullin 2002 *Conservation Biology*. Cambridge University Press, Cambridge, UK
- Banerjee, L.K., Sastry, A.R.K. and Nayar, M.P. 1989. Mangroves in India: Identification manual. Botanical Survey of India.
- Bharucha, E. 2005. *Textbook of Environmental Studies for Undergraduate Courses*. University Grants commission
- Erach Bharucha 2008 (UGC).Test Book of Environmental Studies of Undergraduate course. University Press
- Kaufman G.Donald and Cecilia M. Franz. 2000. *Biosphere 2000 Protecting Our Global Environment*. Kendall/Hunt Publishing Company. Iowa, US
- Miller, Tyler. G. (Jr) 2005. Essentials of Ecology. Thomson Brooks/cole.
- Misra S.P., Pandey S.N. 2009 Essential Environmental Students , Ane books Pvt. Ltd.
- Nambiar, K.R. 2008. *Textbook of Environmental Studies (For Undergraduate Courses as per the UGC Model Syllabus)*. Scitech Publications (India) Pvt. Ltd. Chennai, India.
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders College Publishing, Philadelphia.
- Pandey Kamleshwar , J.P. Shukla and S.P. Trivedi. 2005. *Fundamentals of Toxicology*. New Central Book Agency (P) Ltd. Kolkata, India
- Rajagopalan, R. 2005. *Environmental Studies from Crisis to Cure*. Oxford University Press, New Delhi.
- Robert May & Angela Mc Lean 2007 Theoretical Ecology. Principles and Application , Oxford University press (India Ed.)
- Santra ,S.C. 1994. *Ecology Basic and Applied*. M.D. Publications Pvt. Ltd. New Delhi.
- Sharma, P.D. 2007. Ecology and Environment. Rastogi Publishers

- Stern, Nicholas. 2006. *The Economics of Climate Change: The Stern Review*, Cambridge University Press, Cambridge, UK.
- Stiling Peter, 2002. *Ecology: Theories and applications*. Prentice Hall of India pvt. Ltd. New Delhi



**ZY5B06U [P] PRACTICAL 6**  
**ENVIRONMENTAL BIOLOGY, TOXICOLOGY & DISASTER**  
**MANAGEMENT**

36 hrs

Credit 1

1. Estimation of dissolved oxygen
2. Estimation of dissolved carbon dioxide
3. Estimation of Soil Organic Carbon(Demonstration only)
4. Plankton count
5. Identification of freshwater/ marine plankton
6. Extraction of soil organisms(Demonstration only)
7. Identification of minerals and rocks
8. Sechi disc, Plankton Net
9. Compulsory Field Study report on one Terrestrial/Marine/Fresh water ecosystem