

## Academic Course Description

BHARATH UNIVERSITY  
 Faculty of Engineering and Technology  
 Department of Civil Engineering

**BCE406 - ENVIRONMENTAL STUDIES**  
**Fourth Semester, 2016-17 (Even Semester)**

### Course (catalog) description

The goal of the Environmental Science course is to study the nature and facts about environment.

**Compulsory/Elective course** : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Ms.M.Asathy, Assistant Professor

**Instructors** :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Ms.M.Asathy	Second year Civil	Civil Block		aswathym026@gmail.com	9.00 - 9.50 AM
Ms.L.MariaSubashini	Second year Civil	Civil Block			12.45 - 1.15 PM
Mr.M.C.P.Chockalingam	Second year Civil	Civil Block			1.45-3.45pm

### Relationship to other courses:

Pre –requisites : The students will have a physics,chemistry background obtained at a high school (or equivalent) level.

Assumed knowledge : Basic knowledge in physics,chemistry

Following courses : Environmental Engineering, Environmental health Engineering

### Syllabus Contents

#### UNIT I THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

9

Definition, scope and importance, Need for public awareness.

#### Natural Resources : Renewable And Non – Renewable Resources

Natural resources and associated problems

- a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effect on forests and tribal people.
- b) Water resources : Use and over-utilization of surface and ground water, flood, drought conflicts over water, dams-benefits and problems.
- c) Mineral resources : Uses and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources : World food problems, changes caused by agriculture and overgrazing , effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies.

f) Land resources : Land as a resource, Land degradation, man induced landslides, soil erosion and desertification  
Role of an individual in conversation of natural resources, Equitable use of resources for sustainable lifestyles.

## UNIT II ECOSYSTEMS

9

Concepts of an ecosystem. Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the following ecosystem :- Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)-

Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation - Ethics : Issues and possible Solutions, Climate change, global warming, acid rain, ozone layer depletion.

## UNIT III BIODIVERSITY AND ITS CONSERVATION

9

Introduction and Definition - genetic, species and ecosystems diversity, Biogeographical classification of India - Value biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, national and local levels. India as a mega-diversity nation, Hot-spots of biodiversity -Threats to biodiversity, habitat, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation biodiversity - In-situ and Ex-situ conservation of biodiversity.

### Environmental Pollution

Definition, Causes, effects and control measures of ; - Air Pollution, Water pollution, Soil Pollution, Marine Pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management : Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution case studies - Disaster Management : floods earthquake, cyclone and landslides.

## UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

9

From Unsustainable to Sustainable development, Urban problems related to energy, nuclear accident and holocaust, case studies, wasteland reclamation, Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife protection Act, Forest Conservation Act, Issues involved in enforcement of environmental Legislation, public awareness –

Fireworks and its impact on the Environment – Chemicals used in Fireworks – (Fuel –oxidizing Agent – Reducing Agent –Toxic Materials – Fuel –Binder- Regulator) – Harmful nature of ingredients – chemical effects on health due to inhaling fumes – Noise produced by fire crackers – Noise pollution – Noise level standards for fire crackers – Intensity of sound – Impact on hearing – Safety measures.

## UNIT V HUMAN POPULATION AND THE ENVIRONMENT

9

Population growth, variation among nations, population explosion-Family Welfare programs, Environment and human health, Human Rights, Value Education, HIV and AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human health - Case Studies.

### TEXTBOOKS:

1. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., Second Edition, ISBN 81-297-0277-0, 2004.
  2. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
  3. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,Ahmedabad – 380 013, India, 1989.
- Benny Joseph, "Environmental Studies"., TATA McGraw Hill, 2010

**Computer usage:** Nil

### Professional component

General	-	100%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	0%

**Broad area:** Pollution control,waste management

## Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	Feb 1 <sup>st</sup> week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 <sup>nd</sup> week	Session 15 to 28	2 Periods
3	Model Test	April 2 <sup>nd</sup> week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

## Mapping of Instructional Objectives with Program Outcome

This Course is to introduce the principles of Environmental Studies and applications to Civil Engineering projects.	Correlates to program outcome		
	H	M	L
Play an important role in transferring a healthy environment for future generations	b	d	A
Analyze the impact of engineering solutions in a global and societal context	e	b	a
Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems	e	b	a
Ability to consider issues of environment and sustainable development in his personal and professional undertakings	a	c	b
Highlight the importance of ecosystem and biodiversity		d	a

H: high correlation, M: medium correlation, L: low correlation

**Draft Lecture Schedule**

Session	Topics	Problem Solving Yes/No	Text /Chapter
<b>UNIT 1 THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES</b>			
1.	Definition, scope and importance, Need of public awareness	No	T1/Chapter 1 R1/Chapter 1 R4/Chapter 1
2.	Renewable resources	No	
3.	Non Renewable resources	No	
4.	Forest Resources	No	
5.	Water Resources	No	
6.	Mineral Resources	No	
7.	Food Resources	No	
8.	Energy Resources	No	
9.	Land Resources	No	
<b>UNIT II ECO SYSTEMS</b>			
10.	Concepts of an ecosystem, Structure and function of an ecosystem,	No	T2/chapter 1 R1/Chapter 2 R4/Chapter 2
11.	producers, consumers and decomposers, Energy flow in the Ecosystem	No	
12.	Ecological succession	No	
13.	Food chains, food webs and ecological pyramids	No	
14.	Forest ecosystem	No	
15.	Grassland ecosystem	No	
16.	Desert ecosystem	No	
17.	Aquatic ecosystems (ponds, streams, lakes)	No	
18.	Aquatic ecosystems (rivers, oceans, estuaries)	No	
<b>UNIT III BIODIVERSITY AND ITS CONSERVATION</b>			
19.	Introduction Definition genetic, species and ecosystem Diversity	No	T2/chapter 2 R2/Chapter 2 R4/Chapter 3
20.	Bio-geographically classification of India	No	
21.	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values	No	
22.	Biodiversity at global, national and local levels	No	
23.	India as a mega-diversity nation, Hot-spots of biodiversity	No	
24.	Threats to biodiversity, habitat, poaching of wildlife, man-wildlife Conflicts	No	
25.	Endangered and endemic species of India,	No	
26.	Conservation biodiversity In-situ and Ex-situ conservation of Biodiversity	No	
27.	ENVIRONMENTAL POLLUTION	No	
<b>UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT</b>			
28.	From Unsustainable to Sustainable development, urban problems related to energy – (Fuel –oxidizing Agent – Reducing Agent –Toxic Materials – Fuel –Binder- Regulator) –	No	T1/chapter 3 R3/Chapter 4 R4/Chapter 4
29.	Water conservation rain water harvesting, watershed management, Resettlement and rehabilitation of people its problems and concerns Case studies	No	
30.	Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion nuclear accident and holocaust, Case studies	No	
31.	Wasteland reclamation, Environment Protection Act, Air {Prevention and Control of pollution} Act	No	
32.	Water (prevention and control of Pollution) Act	No	
33.	Wildlife protection Act, Forest Conservation Act	No	
34.	Issues involved in enforcement of environmental legislation,	No	

	Public awareness		
35.	Fireworks and its impact on the Environment, Chemicals used in Fireworks Harmful nature of ingredients, chemical effects on health due to inhaling fumes,.	No	
36.	Noise produced by fire crackers, Noise pollution, Noise level standards for fire crackers, Intensity of sound, Impact on hearing, Safety measures	No	
<b>UNIT V HUMAN POPULATION AND THE ENVIRONMENT</b>			
37.	Population growth	No	T1/chapter 5 R3/Chapter 5 R5/Chapter1
38.	variation among nations	No	
39.	population explosion- Family Welfare programme	No	
40.	Environment and human health, Human Rights	No	
41.	Value Education	No	
42.	HIV / AIDS	No	
43.	Women and Child Welfare	No	
44.	Role of Information Technology in Environment and human health	No	
45.	Case Studies	No	

### Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

### Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

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**Prepared by:** Ms.M.Aswathy Assistant Professor , Department of Civil

**Dated :**

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## **Addendum**

### **ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:**

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### **Program Educational Objectives**

#### **PEO1: PREPARATION**

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

#### **PEO2: CORE COMPETENCE**

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

#### **PEO3: PROFESSIONALISM**

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

#### **PEO4: SKILL**

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

**PEO5: ETHICS**

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

BCE406-

**Environmental Studies**

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<b>Course Teacher</b>	<b>Signature</b>
Ms.M,Aswathy	
Ms.L.MariaSubashini	
Mr. M.C.P.Chockalingam	

**Course Coordinator**

**HOD/CIVIL**