

## Academic Course Description

BHARATH UNIVERSITY  
 Faculty of Engineering and Technology  
 Department of Electronics and Communication Engineering  
**BCE306 - ENVIRONMENTAL STUDIES**  
**Third Semester, 2017-18 (Odd Semester)**

### Course (catalog) description

The goal of the Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them.

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

Credit & contact hours : 3 & 45

Course Coordinator : Ms. Aswathy, Asst. Professor.

**Instructors** :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in)	Consultation
Ms. Aswathy	II YEAR ECE	SA Block			12.45 - 1.15 PM
Ms.G.Kanagavalli	II YEAR ECE	SA Block		Kanagavalli.ece@bharathuniv.ac.in	12.45 - 1.15 PM

### Relationship to other courses:

Pre –requisites : Engineering Chemistry I & II

Assumed knowledge : The students will have a physics background obtained at a high school (or equivalent) level.

Following courses : Nil

### Syllabus Contents

#### UNIT I THE MULTI-DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

**9 HOURS**

Definition, scope and importance, Need for public awareness.

NATURAL RESOURCES:

RENEWABLE AND NON-RENEWABLE RESOURCES

Nature 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, floods, drought, conflicts over water, dams-

benefits and problems.

c) Mineral resources: Use 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 resources, Land degradation, man induced landslides, soil erosion and desertification

- Role of an individual in conservation of natural resources,
- Equitable use of resources for sustainable lifestyles.

## **UNIT II ECO SYSTEMS**

**8 HOURS**

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**

**7 HOURS**

Introduction Definition genetic, species and ecosystem diversity, Bio-geographically classification of India, Value of 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**

**7 HOURS**

Definition, Causes, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solids 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**

**8 HOURS**

From Unsustainable to Sustainable development, urban problems related to energy, Water conservation rain water harvesting, watershed management, Resettlement and rehabilitation of people its problems and concerns Case studies. Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion nuclear accident and holocaust, Case studies, Wasteland reclamation, Environment 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**

**6 HOURS**

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

**TOTAL : 45 HOURS**

**Text book(s) and/or required materials**

**Text Books:**

T1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2<sup>nd</sup> Edition, Pearson Education, 2004.

T2. Benny Joseph, "Environmental Science and Engineering", Tata Mc Graw-Hill, New Delhi, 2006.

**References:**

R1. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standard", Vol. I and II, Enviro Media.

R2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.

R3. Dharmendra S. Sengar, "Environmental law", Prentice Hall of India PVT LTD, New Delhi, 2007.

R4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press 2005

R5. <http://eng.mft.info/uploadedfiles/gfiles/c8e31c9e52d84c3.pdf>

**Computer usage:** Nil

**Professional component**

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

**Broad area :**

**Test Schedule**

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

**Mapping of Instructional Objectives with Program Outcome**

To understand what constitutes the environment, what are precious resources in the environment. Ways of conservation of resources. The role of human being in maintaining a	Correlates to program outcome
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clean environment and useful environment for the future generations. How to maintain ecological balance and to preserve bio diversity.	<b>H</b>	<b>M</b>	<b>L</b>
1. Play a important role in transferring a healthy environment for future generations		f,g,j	
2. To study the interrelationship between living organism and environment	g,j	f	a
3. Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems	b,g		
4. Ability to consider issues of environment and sustainable development in his personal and professional undertakings		g,j	
5. Highlight the importance of ecosystem and biodiversity	g	a,b	
6. Paraphrase the importance of conservation of resources.	g,j	f	

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, Public awareness	No	
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.
- 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	-	10%
Assignments/Seminar/online test/quiz	-	5%
Attendance	-	5%
Final exam	-	70%

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**Prepared by:** Ms. Aswathy , Assistant professor .

**Dated :**

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**Addendum****ABET Outcomes expected of graduates of B.Tech / ECE / 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**

Electronics Engineering graduates are provided with a strong foundation to passionately apply the fundamental principles of mathematics, science, and engineering knowledge to solve technical problems and also to combine fundamental knowledge of engineering principles with modern techniques to solve realistic, unstructured problems that arise in the field of Engineering and non-engineering efficiently and cost effectively.

**PEO2: CORE COMPETENCE**

Electronics engineering graduates have proficiency to enhance the skills and experience to apply their engineering knowledge, critical thinking and problem solving abilities in professional engineering practice for a wide variety of technical applications, including the design and usage of modern tools for improvement in the field of Electronics and Communication Engineering.

**PEO3: PROFESSIONALISM** Electronics Engineering Graduates will be expected to pursue life-long learning by successfully participating in post graduate or any other professional program for continuous improvement which is a requisite for a successful engineer to become a leader in the work force or educational sector.

**PEO4: SKILL**

Electronics Engineering Graduates will become skilled in soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, interpersonal relationship, group discussion and leadership ability to become a better professional.

**PEO5: ETHICS**

Electronics Engineering Graduates are morally boosted to make decisions that are ethical, safe and environmentally-responsible and also to innovate continuously for societal improvement.

<b>Course Teacher</b>	<b>Signature</b>
Ms.Aswathy	
Ms.G.Kanagavalli	

**Course Coordinator**

**HOD/ECE**