

Academic Course Description

BHARATH UNIVERSITY
 Faculty of Engineering and Technology
 Department of Mechanical Engineering
BCE406 - ENVIRONMENTAL STUDIES
Fourth Semester, 2015-16 (Even 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 students of Mech Students

Credit hour : 3 credits

Course Coordinator : Mrs.C.M.Meenakshi

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in)	Consultation
Mr. N. Lenin Rakesh	III Year Mech, Sec 'A'	JR 001,	9789917001	leninrakesh.mech@bharathuniv.ac.in	9.00 to 9.50 am
Mr. Arun V Rejus Kumar	III Year Mech, Sec 'B'	JR 002	9789492493	Karthikeyan.mech@bharathuniv.ac.in	10.50 to 11.40
Mr.S.Jeeva Bharathi	III Year Mech, Sec 'E' & F	JR 101 JR 102	9500015643	jeevabharathis.mech@bharathuniv.ac.in	9.50 to 10.40

Relationship to other courses:

Pre –requisites : Nil

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

9 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

9 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

9 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

9 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

9 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.

Field Work

15 HOURS

Visit to a local area to document environment environmental assets-river forest / grassland / hill mountain, Visit to a local polluted site-Rural/Industrial/Agricultural. Study of common plants, insects, birds, Study of simple ecosystems-ponds, river, hill slopes.

TOTAL : 60 HOURS

Text book(s) and/or required materials

Text Books:

- T1. Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd 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	Apr 2nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2nd Week	Session 15 to 28	2 Periods
3	Model Test	April 3 rd 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 clean environment and useful environment for the future generations. How to maintain ecological balance and to preserve bio diversity.	Correlates to program outcome		
	H	M	L
1. Play an important role in transferring a healthy environment for future generations		f,g,j	
2. Analyze the impact of engineering solutions in a global and societal context	g,j	f	a
3. Discuss contemporary issues that result 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
UNIT 1 THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES			
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	
UNIT II ECO SYSTEMS			
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	
UNIT III BIODIVERSITY AND ITS CONSERVATION			
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	
UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT			
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	
UNIT V HUMAN POPULATION AND THE ENVIRONMENT			
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%
Assignment / Seminar / Online Test / Quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by: Mr..Durai Raj

BCE406- ENVIRONMENTAL STUDIES

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 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:

To provide strong foundation in mathematical, scientific and engineering fundamentals necessary to analyze, formulate and solve engineering problems in the field of Electronics And Communication Engineering.

PEO2: CORE COMPETENCE:

To enhance the skills and experience in defining problems in Electronics And Communication Engineering design and implement, analyzing the experimental evaluations, and finally making appropriate decisions.

PEO3: PROFESSIONALISM:

To enhance their skills and embrace new Electronics And Communication Engineering Technologies through self-directed professional development and post-graduate training or education

PEO4: SKILL:

To provide training 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:

Apply the ethical and social aspects of modern communication technologies to the design, development, and usage of electronics engineering.

BCE306- ENVIRONMENTAL STUDIES

Course Teacher	Signature
Mr. N. Lenin Rakesh	
Mr. Arun V Rejus Kumar	
Mr.S.Jeeva Bharathi	

Course Coordinator
MS.C.M.Meenakshi

HOD/MECH