



# NEHRU INSTITUTE OF ENGINEERING AND TECHNOLOGY

An ISO 9001:2015 & 14001:2015 Certified Institution, Affiliated to Anna University, Chennai

Approved by AICTE, New Delhi, Recognized by UGC with 2(f) & 12(B)

Re-accredited by NAAC "A+", NBA Accredited (UG Courses: AERO & CSE)

Nehru Gardens, Thirumalayampalayam, Coimbatore – 641 105



**1.3.1 Institution integrates cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability, and Human Values into the curriculum**

## **Course file**

**Subject Name: ENVIRONMENTAL SCIENCES  
AND SUSTAINABILITY**

**Subject Code: GE 3451**

**Department of Information Technology**

**UNIT I ENVIRONMENT AND BIODIVERSITY 6**

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

**UNIT II ENVIRONMENTAL POLLUTION 6**

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions, Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

**UNIT III RENEWABLE SOURCES OF ENERGY 6**

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

**UNIT IV SUSTAINABILITY AND MANAGEMENT 6**

Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

**UNIT V SUSTAINABILITY PRACTICES 6**

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-83 carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization Socio economical and technological change.

TOTAL: 30 PERIODS

# UNIT I

## ENVIRONMENT AND BIODIVERSITY

### INTRODUCTION

The word environment is derived from the French word "Environ" meaning "Surroundings". Each and everything around us is called as environment.

Every organism is surrounded by materials and forces which constitute its environment, from which it must derive its needs. Environment creates favourable conditions for the existence and development of living organisms.

**Environment:** Environment is defined as, "the sum of total of all living and non - living things around us influencing one another."

**Environmental science:** Environmental science is the study of the environment, its biotic (ie., biological) and abiotic (ie., non biological) components and their interrelationship.

**Environmental engineering:** Environmental engineering is the application of engineering principles to the protection and enhancement of quality of the environment and public health and welfare.

**Environmental studies:** Environmental studies are the process of educating the people for preserving quality environment.

### TYPES OF ENVIRONMENT

Environment can be divided into two categories

#### I. Natural environment

Natural environment is characterized by natural components. All biotic (living) and abiotic components (non-living) are created through a natural process. Creation of these biotic and abiotic components do not require any human support.

**Examples:** Soil, water, air, trees, radiations, noise, etc.

#### Man - made environment

Man is the most powerful environmental agent. He modifies the environment using modern technologies, according to his needs to a great extent. Thus the man-made environment is created by man.

**Examples:** House, road, schools, railway lines, parks, etc

### COMPONENTS OF THE ENVIRONMENT

The environment consists of Abiotic (non living), Biotic (living) and energy component.

#### Abiotic (non living) component or physical component

The abiotic components enter into the living organism helps in metabolism and return to environment.

**Eg. Soil, air, water, mineral**

#### Abiotic components are divided into

1. **Atmosphere:** Component that moves substance from atmospheric sources to receptors.

## Regions of atmosphere

Region	Altitude	Temperature(°C)	Chemical species
Troposphere	0-18	15 to -56	N <sub>2</sub> ,H <sub>2</sub> O,CO <sub>2</sub> ,O <sub>2</sub>
Stratosphere	18-50	-56 to -2	Ozone
Mesosphere	50-85	-2 to -92	NO <sup>+</sup> ,O <sub>2</sub> <sup>+</sup>
Thermosphere	85-500	-92 to 1200	NO <sup>+</sup> ,O <sup>+</sup> ,O <sub>2</sub> <sup>+</sup>
Exosphere	Upto 1600		H <sub>2</sub> ,He

Oxygen in atmosphere supports living organisms, carbon dioxide is essential for photosynthesis and nitrogen for plant growth.

2. **Hydrosphere:** Component that collects the substances within the water shed and deliver them to the other sub component

3. **Lithosphere:** Solid shell of inorganic materials on the surface of the earth.

### **Biotic (Living) component**

The living components of the environment are biotic components.

Eg. Animals, plants, micro organisms

**Biosphere:** The biological environment where living organisms live and interact with physical environment (soil, air, water) is called biosphere.

### **Energy component**

The component of energy flows across biotic and abiotic components, play an important role to maintain the life of living organisms.

Eg. Solar energy, nuclear energy, geochemical energy.

### **SCOPE OF ENVIRONMENTAL STUDIES**

Environmental study is an important tool to educate the people for preserving quality environment. The main scope of environmental studies includes

1. To get an awareness and sensitivity to the total environment and its related problems.
2. To motivate society to actively participated in environmental protection and improvement.
3. To develop skills for identifying and solving environmental problems.
4. To know the necessity of conservation of natural resources.
5. To evaluate environmental programmes in terms of social, economic, ecological, and aesthetic factors.

### **IMPORTANCE (OR) SIGNIFICANCE OF ENVIRONMENTAL STUDIES**

Air we breathe, water we drink, food we consume and land we live on are all contaminated by industrial activities. There is no zero pollution industry. Because of the lack of self discipline and not worrying about our future generation, the valuable resources are polluted. To solve the above problems, knowledge of environmental studies is very important.

1. By environmental studies, we will understand the concept of "need of development without destruction of environment".
2. Through environmental studies, we can gain the knowledge of different types of environment and the effects of different environmental hazards.

### Examples

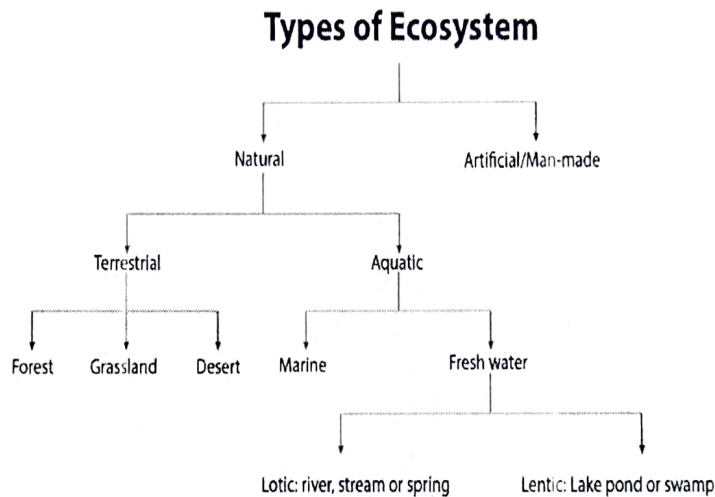
Animals cannot synthesis their food directly but depend on the plants either directly or indirectly.

### Biome (Small Ecosystem)

A kind of organisms which can live in a particular ecosystem depends on their physical and metabolic adoptions to the environment of that place. On earth there are many sets of ecosystems which are exposed to same climatic conditions and having dominant species with similar life cycle, climatic adoptions and physical structure. This set of ecosystem is called a biome.

Thus, the biome is a small ecosystem with in an ecosystem.

## TYPES OF ECOSYSYEM



### 1. Natural ecosystem

Natural ecosystems operate themselves under natural conditions. Based on habitat types, it can be further classified into

#### Terrestrial Ecosystem

This ecosystem is related to land and types of vegetation. **Examples:** Grassland ecosystem, forest ecosystem, desert ecosystem, etc.

#### Aquatic Ecosystem

This ecosystem is related to water, it is further sub classified into two types based on salt content.

##### (i) Fresh water ecosystem

(a) Running water ecosystems **Examples:** Rivers, streams

(b) Standing water ecosystems **Examples:** Pond, lake

(ii) Marine ecosystem **Examples:** Seas and sea shores

### 2. Artificial (or) Man-Engineered ecosystems

Artificial ecosystem is maintained by human.

**Examples:** Croplands, gardens

3. Environmental studies inform about peoples effective role in protecting the environment by demanding changes in laws and enforcement systems.
4. Environmental studies have a direct relation to the quality of life we live.
5. Environmental studies develop a concern and respect for the environment.

#### **NEED FOR PUBLIC AWARENESS**

Increasing population, urbanisation and poverty have generated pressure on the natural resources and lead to a degradation of the environment. To protect (or) prevent the environment from the pollution, Supreme Court has ordered and initiated the environmental awareness to the public through Government and Non - government agencies to take part to protect our environment.

#### **Importance of Public (or) Community participation**

Environmental pollution cannot be removed by the laws alone. The proper implementation and especially public participation are the important aspects, which should be given importance and stress. The public participation is useful in law making process and controlling the pollution activities. Thus the public participation plays a major role in the effective environmental management.

#### **Types of Public Participation**

Public participation in the decision making process can be at any stage and of various forms.

**Pressure Group:** The public "Pressure group" may be formed to influence the government on one hand and the industries on the other hand.

**Watch dog:** The public can act as "watch dog" to protect the interests of public against environmental hazardous activities.

**Advisory council:** The public can also act as advisory council and agencies, which is constituted to keep the environment suitable for living.

**Enforcing the environmental laws:** The services of public can be utilized to enforce the environmental laws. If necessary the member of public should conduct public interest litigations.

#### **Ecology**

All living organisms, whether plant or animal or human being are surrounded by the environment, from which they derive their needs for survival. Each living component interacts with non-living components for their basic requirements from different ecosystem.

**Ecology** is the study of interactions among organisms or group of organisms with their environment. The environment consists of both biotic components (living organisms) and abiotic components (non-living organisms).

(or)

Ecology is the study of ecosystems.

#### **Ecosystem**

Ecosystem is the basic functional unit of ecology. The term ecosystem is coined from a Greek word meaning "study of home".

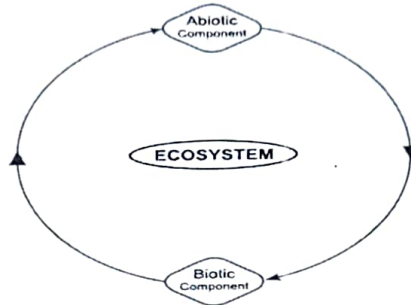
A group of organisms interacting among themselves and with environment is known as **ecosystem**. Thus, an ecosystem is a community of different species interacting with one another and with their non-living environment exchanging energy and matter.

## STRUCTURE (or) COMPONENTS OF AN ECOSYSTEM

The structure of an ecosystem explains the relationship between abiotic (non-living) and biotic (living) components.

An ecosystem has two major components

1. Abiotic (non-living) components.
2. Biotic (living) components.



### 1. Abiotic (non-living) components

Non-living components (physical and chemical) of an ecosystem collectively form a community called abiotic components (or) abiotic community.

**Examples:** Climate, soil, water, air, energy, nutrients, etc.

**1. Physical components:** It includes the energy, climate, raw materials and living space that the biological community needs. It is useful for the growth and maintenance of its member.

**Examples:** Air, water, soil, sunlight, etc.

**2. Chemical Components:** It is the sources of essential nutrients.

**Examples:**

(i) **Organic substances:** Protein, lipids, carbohydrates, etc.

(ii) **Inorganic substances:** All micro (Al, Co, Zn, Cu) and macro elements (C, H, O, P, N, P, K) and few other elements.

### 2. Biotic components

Living organisms (or) living members in an ecosystem collectively form its community called biotic components (or) biotic community. The living components are made of many different species. These species are distinguished on the basis of their nutritional (feeding) relationship. It includes

#### a. Autotrophic components

The members of autotrophic components are producers, which are autotrophs (self-nourishing organisms). They derive energy from sunlight and make organic compounds from inorganic substances.

Examples: Green plants, algae, bacteria, etc.

#### b. Heterotrophic components

The members of heterotrophic components are consumers and decomposers, which are heterotrophs (dependent on others for food). They consume the autotrophs (producers). The heterotrophs are

(a) Macro consumers: These are herbivores, omnivores (or) carnivores.

(b) Saprotrophs (micro consumers): These are decomposers (bacteria, fungi, etc).

# MEMBERS OF BIOTIC COMPONENTS OF AN ECOSYSTEM (OR) CLASSIFICATION OF BIOTIC COMPONENTS

The members of biotic components of an ecosystem are grouped into three groups based on how they get their food. Producers (Plants), Consumer (Animals) and Decomposers (Micro-organisms)

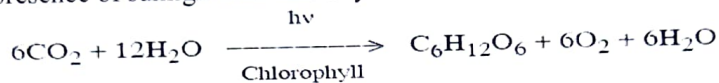
## 1. Producers (Autotrophs)

Producers synthesize their food themselves through photosynthesis.

**Examples:** All green plants, trees.

### Photosynthesis

The green pigments, called chlorophyll, present in the leaves of plants, converts CO<sub>2</sub> and H<sub>2</sub>O in the presence of sunlight into carbohydrates.



This process is called photosynthesis.

## 2. Consumers (heterotrophs)

Consumers are organisms, which cannot prepare their own food and depend directly or indirectly on the producers. They cannot make organic compounds, but can transform one form of organic compounds into other form of organic compounds.

### Examples

**Plant eating species:** Insects, rabbit, goat, deer, cow, etc.

**Animals eating species:** Fish, lions, tiger, etc.

### Types of consumers

Consumers are of the following types.

#### (i) Primary consumers (Herbivores) (plant eaters)

Primary consumers are also called herbivores; they directly depend on the plants for their food. So they are called plant eaters.

**Examples:** Insects, rat, goat, deer, cow, horse, etc.

#### (ii) Secondary consumers (primary carnivores) (meat eaters)

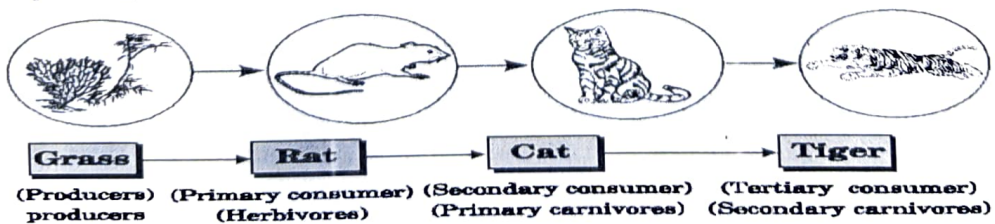
Secondary consumers are primary carnivores, they feed on primary consumers. They directly depend on the herbivores for their food.

**Examples:** Frog, cat, snakes, foxes, etc.

#### (iii) Tertiary consumers (Secondary carnivores) (Meat eaters)

Tertiary consumers are secondary carnivores, they feed on secondary consumers. They directly depend on the primary carnivores for their food.

**Examples:** Tigers, lions, etc.







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DEPARTMENT OF INFORMATION TECHNOLOGY



Department: Information Technology		Class/Sem.: II/IV						
Degree and Branch: B.Tech Information Technology		Class Room:						
Class Advisor: Mrs. Jeni Narayanan L.A		Class Committee Chairman: Dr.N.K.Sakthivel		WVEF: 04/03/2024				
Period DAY	1 9:00AM- 9:50AM	2 9:50AM-10:40AM	3 11:00AM-11:50AM	4 11:50AM-12:40PM	5 1:30PM-2:20PM	6 2:20PM-3:10PM	7 3:30PM-4:15PM	
Monday	IT3401	GE3451	CS3451	CS3491	IT3401	GE3451	Seminar/NPTEL	
Tuesday	CS3491	CS3452	IT3401	CS3491	IT3401 WE LAB		CS3492	
Wednesday	CS3492	CS3451	CS3481 DBMS LAB		CS3452	GE3451	CS3452	
Thursday	CS3452	CS3492	CS3461 OS LAB		GE3451	CS3452	LIBRARY/NPTEL	
Friday	CS3451	IT3401	CS3491	CS3492	CS3491 AI&ML LAB		CS3451	
Course Code	Course Title	L	T	P	C	Name of the Faculty	Department	Total Hrs
CS3452	Theory of Computation	3	0	0	3	Dr.L.Rathina Kumar	IT	5
CS3491	Artificial Intelligence and Machine Learning	3	0	2	4	Dr.N.K.Sakthivel, Dr.L.Rathina Kumar Mrs.M. Malabooba (S)	DEAN ACADEMIC IT	4 2
CS3492	Database Management Systems	3	0	0	3	Mrs.Jeni Narayanan L.A	IT	4
IT3401	Web Essentials	3	0	2	4	Dr.S.Sivakumar Mrs.Jeni Narayanan L.A	CSE	4 2
CS3451	Introduction to Operating Systems	3	0	0	3	Mrs.M.Malabooba	CSE	4
GE3451	Environmental sciences and Sustainability	2	0	0	2	Ms.Jenisha	S&H	4
CS3461	Operating Systems Laboratory	0	0	3	1.5	Mrs.M.Malabooba Dr.L.Rathina Kumar(S)	CSE	2
CS3481	Database Management Systems Laboratory	0	0	3	1.5	Mrs.Jeni Narayanan L.A Mrs.M. Gokila Vani(S)	IT IT	2
SEMINAR/NPTEL	Seminar					Mrs.Jeni Narayanan L.A	IT	1
LIB/NPTEL	Library					Mrs.Jeni Narayanan L.A	IT	1

IT Coordinator

*E. Malabooba*  
HoD  
13/2/24

*R. Sakthivel*  
Director-ITAC

*M. Malabooba*  
Dean (Academics)

*P. Swamy*  
AO/HR

*P.M. ...*  
Principal



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**Department of Science and Humanities**

**COURSE PLAN**

<b>Course Code &amp; Title</b>	<b>GE3451 &amp; ENVIRONMENTAL SCIENCES AND SUSTAINABILITY</b>					<b>L P T C</b> 3 0 0 3		
<b>Class</b>	<b>II B.Tech IT</b>	<b>Semester</b>	<b>IV</b>	<b>Regulation</b>	<b>2021</b>	<b>Academic Year</b>	<b>2023-2024</b>	
<b>Faculty</b>	<b>Mrs.S.Jenisha</b>		<b>E-Mail ID</b>		<b>nietjenisha@nehrucolleges.com</b>			
<b>Course Pre-requisite</b>	Higher Secondary Level							
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>• To study the nature and facts about environment.</li> <li>• To finding and implementing scientific, technological, economic and political solutions to environmental problems.To study the interrelationship between living organism and environment.</li> <li>• To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.</li> <li>• To study the dynamic processes and understand the features of the earth's interior and surface.</li> <li>• To study the integrated themes and biodiversity, natural resources, pollution control and waste management.</li> </ul>							
<b>Course Outcomes</b>	<p><b>CO.1-</b> Understand the natural environment, its relationships with human activities and to know about Biodiversity and its values.</p> <p><b>CO.2-</b> Apply the basic concepts of science and engineering for pollution abatement.</p> <p><b>CO.3-</b> Explain the different types of natural resources.</p> <p><b>CO.4-</b> Analyze the need for sustainability and environmental management.</p> <p><b>CO.5-</b> Understand about the sustainable practices.</p>							
<b>Program Outcomes</b>	<p><b>PO1 –Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.</p> <p><b>PO2 –Problem analysis:</b> Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.</p> <p><b>PO3-Design/development of Solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.</p> <p><b>PO6 –The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice</p> <p><b>PO7 –Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the</p>							



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	<p>knowledge of, and need for sustainable development.</p> <p><b>PO 12 -Life-long learning:</b> Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p>
<b>Program Specific Outcomes</b>	<ul style="list-style-type: none"><li>• Professional Skills: Acquaint in-depth knowledge on the basic and advanced computer science domains like Data Sciences, Cryptography, Cloud and Distributed Computing, Neural Networks and Artificial Intelligence</li><li>• Analyze and recommend the appropriate IT infrastructure required for the implementation of a project</li><li>• Entrepreneurship and Successful Career: Apply the standard practices to have successful career path in the field of information and communication technology and entrepreneurship</li></ul>
<b>Programme Educational Objectives</b>	<ul style="list-style-type: none"><li>• Acquire and Apply knowledge in Computer Science, Mathematics, Science and inter-disciplinary engineering principles in order to excel in computer professional career</li><li>• Analyze real life problems adapting to new Computing Technologies for professional excellence and ethical attitude in order to provide economically feasible engineering solutions</li><li>• Carry out complex engineering problems with best practices exhibiting communication skills, team work and interpersonal skills to enable continued computer professional development through life-long learning</li></ul>
<b>References</b>	<p><b>TEXT BOOKS</b></p> <ol style="list-style-type: none"><li>1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers ,2018.</li><li>2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.</li><li>3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.</li><li>4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.</li><li>5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.</li><li>6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.</li><li>7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.</li></ol> <p><b>REFERENCES</b></p> <ol style="list-style-type: none"><li>1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38.</li><li>2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.</li><li>3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD.</li></ol>



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	<p>New Delhi, 2007.</p> <p>4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.</p> <p>5. ErachBharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.</p>
<b>E-Learning Resources</b>	<p><a href="http://nptel.ac.in/courses/120108002/">http://nptel.ac.in/courses/120108002/</a></p> <p><a href="http://nptel.ac.in/courses/120108004/">http://nptel.ac.in/courses/120108004/</a></p> <p><a href="http://nptel.ac.in/courses/120108005/">http://nptel.ac.in/courses/120108005/</a></p> <p><a href="http://www.isfahanmetairpollution.ir/Dorsapax/Data/Sub_5/File/dictionary%20book.pdf">http://www.isfahanmetairpollution.ir/Dorsapax/Data/Sub_5/File/dictionary%20book.pdf</a></p>

**COURSE PLAN**

**GE3451 & ENVIRONMENTAL SCIENCES AND SUSTAINABILITY**

Lecture No.	Topic	Reference Book No. & Section	Scheduled on	Delivered on	Mode of Delivery
<b>UNIT- I - ENVIRONMENT AND BIODIVERSITY</b>					
1	Definition, Scope and Importance of Environment – Need for Public awareness	T.1,2,R.2.,3	11-3-24	20-3-24	PPT
2	Ecosystem and Energy flow – Ecological Succession	T.1,2,R.2.,3	18-3-24	21-3-24	PPT
3	Types and Values of Biodiversity	T.1,2,R.2.,3	23-3-24	23-3-24	PPT
4	India as a Mega-Diversity nation – Hot-spots of Biodiversity	T.1,2,R.2.,3	14-3-24	25-3-24	PPT
5	Threats to biodiversity: Habitat loss, Poaching of wildlife, Man-Wildlife conflicts – Endangered and Endemic species of India	T.1,2,R.2.,3	18-3-24	25-3-24	PPT
6	Conservation of biodiversity: In-situ and Ex-situ.	T.1,2,R.2.,3	18-3-24	28-3-24	PPT
<b>UNIT -II - ENVIRONMENTAL POLLUTION</b>					
7	Causes, Effects and Preventive measures of Water Pollution	T.1,2 R.1	20-3-24	1-4-24	Black Board
8	Causes, Effects and Preventive measures of Soil Pollution	T.1,2 R.1	21-3-24	1-4-24	Black Board
9	Causes, Effects and Preventive measures of Air and Noise Pollutions	T.1,2 R.1	25-3-24	2-4-24	Black Board
10	Solid, Hazardous and E- Waste management	T.1,2 R.1	25-3-24	8-4-24	PPT
11	Case studies on occupational Health and Safety Management System (OHASMS)	T.1,2 R.1	27-3-24	8-4-24	PPT



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12	Environmental Protection, Environmental Protection Acts		28-3-24	10-4-24	PPT
<b>UNIT - III - RENEWABLE SOURCES OF ENERGY</b>					
13	Energy Management and Conservation	T.2,3R.2,3,4	1-4-24	22-4-24	PPT
14	New Energy Sources: Need of New Sources	T.2,3R.2,3,4	1-4-24	24-4-24	PPT
15	Different types of New Energy Sources	T.2,3R.2,3,4	3-4-24	25-4-24	PPT
16	Applications of Hydrogen Energy - Ocean Energy Resources	T.2,3R.2,3,4	4-4-24	29-4-24	PPT
17	Tidal Energy Conversion	T.2,3R.2,3,4	8-4-24	2-5-24	Black Board
18	Concept, Origin and Power Plants of Geothermal energy	T.2,3R.2,3,4	8-4-24	8-5-24	PPT
<b>UNIT - IV - SUSTAINABILITY AND MANAGEMENT</b>					
19	Development, GDP, Sustainability - Concept, Needs and Challenges	T.1 R.3	10-4-24	6-5-24	PPT
20	Economic, Social and aspects of sustainability - From Unsustainability and Sustainability - Millennium development goals and Protocols	T.1 R.3	11-4-24	13-5-24	Black Board
21	Sustainable Development Goals - Target, Indicators, Intervention areas	T.1 R.3	15-4-24	13-5-24	Black Board
22	Climate Change - Global Regional and Local environmental issues and possible Solutions - Case studies	T.1 R.3	15-4-24	15-5-24	Black Board
23	Concept of Carbon Credit, Carbon Footprint	T.1 R.3	17-4-24	15-5-24	Black Board
24	Environmental Management in Industry - A case study	T.1 R.3	18-4-24	20/5/24	Black Board
<b>UNIT - V - SUSTAINABILITY PRACTICES</b>					
25	Zero waste and R concept, Circular economy, ISO 14,000 Series	T.1, 2,R.4,5	22-4-24	20/5/24	PPT
26	Material Life cycle assessment, Environmental impact assessment	T.1, 2,R.4,5	22-4-24	20/5/24	Black Board



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27	Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports	T.1, 2,R.4,5	24-4-24	22/5/24	PPT
28	Sustainable energy: Non-conventional sources	T.1, 2,R.4,5	25-4-24	27/5/24	PPT
29	Energy cycles-Carbon cycle, Emission and Sequestration	T.1, 2,R.4,5	29-4-24	29/5/24	PPT
30	Green engineering – Sustainable Urbanization- Socio Economical and Technological Change	T.1, 2,R.4,5	29-4-24	30/5/24	PPT

Topics beyond the Curriculum / Guest Lecture(s) / Industrial Visit proposed (if any)		Period	
Topics beyond the Curriculum	Non Conventional Energy Sources&Storage Devices	2	4
	Recent techniques for the development of energy sources	2	
Industrial Visit(s)/ Internship	Field trip	1	
<b>Total Hours required for the Course</b>		<b>30 + 5 = 35</b>	



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**MAPPINGS**

**COs- POs Mapping**

CY 3151	Cognitive Level	Program Outcomes (3 : High; 2 : Medium; 1 : Low)												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	
<b>DIRECT METHOD</b>														
CO1- Understand the natural environment, its relationships with human activities and to know about Biodiversity and its values.	Apply (K2)	2	1	2			3	3						1
CO2- Apply the basic concepts of science and engineering for pollution abatement.	Understand (K2)	2	1	2			3	2						1
CO3- Explain the different types of natural resources.	Apply (K3)	2	1	2			3	3						1
CO4- Analyze the need for sustainability and environmental management.	Understand (K2)	2	1	2			3	2						1
CO5- Understand about the sustainable practices.	Apply (K3)	2	1	2			3	3						1
<b>INDIRECT METHOD (Based on Classroom Activity / Event)</b>														
1	Event	Analyze	2	3										

CO/PSO	PSO1	PSO2
C104.1	2	1
C104.2	2	1
C104.3	2	1
C104.4	2	1
C104.5	2	1

*[Signature]*  
Faculty

*[Signature]*  
DQAC

*[Signature]*  
HoD

Registration Number																			
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### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

B.E./ B.Tech.(Full Time) –Continuous Internal Assessment Test-I, April 2024

REGULATION - 2021

SUB CODE & NAME: GE3451 – ENVIRONMENTAL SCIENCES AND SUSTAINABILITY

SET: II

(Common to all branches) (R 2021)

Course Instructor	: Mrs.A.Lakshmi Priya	Portion	: 2.5 Units			
Year - Semester	: II/IV	Date / Session	:			
Duration	: 180 minutes	Max. Marks	: 100			
Knowledge Level	K1: Remember	K2: Understand	K3: Apply	K4: Analyze	K5: Evaluate	K6: Create
Course Outcomes	C215.1	Understand the natural environment, its relationships with human activities and to know about Biodiversity and its values.				
	C215.2	Apply the basic concepts of science and engineering for pollution abatement.				
	C215.3	Explain the different types of energy resources.				

#### PART –A (10×2 = 20 Marks)

Q.No	Questions	Marks	Knowledge Level / Course Outcomes
1.	List the types of ecosystem	2	K1/ C215.1
2.	Discuss the habitat loss of biodiversity.	2	K2/ C215.1
3.	State the need for public awareness.	2	K1/ C215.1
4.	Recognize autotrophs from saprotrophs.	2	K2/C215.1
5.	Demonstrate the causes of noise pollution.	2	K3/C215.2
6.	Organize the objectives of hazardous waste management.	2	K4/C215.2
7.	Interpret the reasons for acid rain.	2	K3/ C215.2
8.	Examine 3R principles.	2	K4/ C215.2
9.	Defend the need of energy conservation .	2	K5/ C215.3
10.	Argue the need of upgrading HVAC system for energy efficiency.	2	K5/C215.3

#### PART-B (5×13 = 65 Marks)

Q.No	Questions	Marks	Knowledge Level / Course Outcomes
11 a.	Describe the types of conservation methods of bio diversity.	13	K2 C215.1
(Or)			
11 b.	Identify the ecosystem and its types with examples.	13	K2/ C215.1



12 a.	List the various threats to biodiversity with suitable examples. (Or)	13	K1/C215.1
12 b.	State hot spots of biodiversity. Why India is called mega diversity nation?	13	K1/C215.1
13 a.	Discuss the causes effects and control measures of soil pollution. (Or)	13	K2/C215.2
13 b.	Explain the case studies of OHASMS.	13	K2/C215.2
14 a.	Enumerate the Environmental Protection and explain its acts. (Or)	13	K3/C215.2
14 b.	Demonstrate the steps involved in waste shed management. What are its disposal methods?	13	K3/C215.2
15 a.	Examine the different ways by which you can conserve energy. (Or)	13	K4/C215.3
15 b.	Organize the non conventional energy sources with example.	13	K4/C215.3

**PART-C (1×15 = 15 Marks)**

Q.No	Questions	Marks	Knowledge Level / Course Outcomes
16 a.	i) Execute the classification of biodiversity	6	K3/C215.1
	ii) Define the effects and control measures of noise pollution.	6	K5/C215.2
	iii) Define energy resources. (Or)	3	K2/C215.3
16 b.	i) As an environmentalist, how do you control over harvesting of animals?	6	K3/C215.1
	ii) Argue the effect of e waste to the environment degradation.	6	K5/C215.2
	iii) Identify the problems associated with the hydrogen fuel cells.	3	K2/C215.3

  
Course Coordinator

  
DQAC

  
Exam Cell Coordinator

  
HoD

**VISION**

To produce exemplary competent Electrical and Electronics graduates with high moral values to face the challenges of industry / society.

**MISSION**

- To establish a strong Centre of Excellence for learning and research in Electrical and Electronics Engineering.
- To impart high quality education using innovative methods of teaching-learning process.
- To create globally recognized professionals in the field of Electrical and Electronics Engineering.
- To encourage entrepreneurship in the area of energy engineering by providing proper guidance.



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## CONTINUOUS INTERNAL ASSESSMENT TEST

Read the Instructions given overleaf carefully before filling in the title page. (To be filled in by the candidate)

College Code	7 2 1 4	REGISTER NUMBER	7 2 1 4 2 2 2 0 5 0 0 7
Degree & Branch	B.Tech & IT	Semester	IV
Subject Code	GE3451	Date & Session	03.05.24 & FN
Subject Title	Environmental Sciences and Sustainability	No of Pages Used	33

Put Tick (✓) Mark here:

Year of Study	I	II ✓	III	IV
Class	A ✓		B	
Internal Test	I ✓		II	
Question Paper Set	I		II ✓	

All particulars given are verified

*[Signature]*  
Signature of the Hall Superintendent with date

*N. Swathi*  
Name of the Hall Superintendent

Do not write the Register Number in any other part of the answer book

Instruction to the candidate : Put a tick mark (✓) for the questions attended in the tick mark column against each question

PART - A (10 X 2 = 20)			PART - B (5 X 13 = 65)							Total Marks	Grand Total (in words)
Question No.	✓	Marks	Question No.	i ✓	i Marks	ii ✓	ii Marks	iii ✓	iii Marks		
1	✓	2	11.	a	✓	13				13	Nine Seven
2	✓	2		b							
3	✓	2	12.	a	✓	13				13	
4	✓	2		b							
5	✓	2	13.	a	✓	13				13	
6	✓	2		b							
7	✓	2	14.	a	✓	13				13	
8	✓	2		b							
9	✓	2	15.	a	✓	13				13	
10	✓	2		b							
			PART - C (1 X 15 = 15)							Total Marks	GRAND TOTAL
			16.	a	✓	6	✓	5	✓		
			b								
Total		20	Total							77	C.A14

CO1		CO2		CO3		CO4		CO5	
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Declaration by the Examiner : Verified that all the questions attended by the student are valued and the total is found to be correct

Date	3/5/24	Name of the Examiner	S. Suresha	Signature of the Examiner	<i>[Signature]</i>
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Declaration by the Scrutiny : Verified that all the questions attended by the student are valued and the total is found to be correct

Date		Name of the Scrutiny		Signature of the Scrutiny	
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Knowledge Level (KL)	K1 : Remembering	K2 : Understanding	K3 : Applying	K4 : Analyzing	K5 : Evaluating	K6 : Creating
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## Department of Information Technology

### GE3451-Environmental Science and Engineering

#### Assignment - I

Course Instructor :Mrs. S Jenisha

Class / Sem : II- IT: IV Sem

Academic year : 2023-2024 (Even Sem)

Q.No	Assignment Questions	Level	Course Outcome
1.	(i) Discuss the hotspots of biodiversity in India.Explain about threats to bio diversity. (ii) Define biodiversity. Explain its values with significance.	K2	C215.1
2.	What is OHASMS? Explain it with a case study.	K2	C215.2
3.	Explain the measures by which energy can be conserved.	K4	C215.3

  
Course Instructor

  
HoD

NAME : S. Lanya Karson

BRANCH: B.Tech Information Technology

SUBCODE: GE 3451

SUBTITLE: Environmental Science & Sustainability

REG NO : 721422205032

Assignment-1

40  
40

S. J. A.