

UNIT I

Chapter 1 Environmental Pollution 1-1 to 1- 26

Syllabus :

Introduction : Definition of Environment and environmental pollution, Ecology, Control of environmental pollution.

Classification of pollution : Air pollution, Water pollution, Soil pollution, Noise pollution, Environmental laws for controlling pollution.

1.1	Introduction	1-1
1.1.1	Definition of Environment.....	1-1
1.1.2	Ecology	1-2
1.1.3	Environmental Pollution.....	1-3
1.2	Classification of Pollution.....	1-4
1.2.1	Air Pollution	1-4
1.2.1.1	Causes of Air Pollution	1-5
1.2.1.2	Effect of Air Pollution	1-7
1.2.1.3	Control Measures of Air Pollution	1-10
1.2.2	Water Pollution.....	1-11
1.2.2.1	Sources of Water Pollution	1-12
1.2.2.2	Effects of Water Pollution	1-13
1.2.2.3	Control of Water Pollution.....	1-14
1.2.2.4	Various Measures Adopted for Waste Water Treatment	1-15
1.2.2.5	Flow Diagram of Waste Water Treatment Plant	1-16
1.2.3	Soil Pollution	1-16
1.2.3.1	Sources of Soil Pollution.....	1-16
1.2.3.2	Effects of Soil Pollution.....	1-18
1.2.3.3	Control of Soil Pollution	1-19
1.2.4	Noise Pollution	1-20
1.2.4.1	Sources of Noise Pollution.....	1-20
1.2.4.2	Effect of Noise Pollution	1-22
1.2.4.3	Control of Noise Pollution	1-22
1.3	Environmental Laws for Controlling Pollution.....	1-23
1.3.1	The Environment (Protection) Act 1986	1-23



1.3.2	The Air (Prevention and Control of Pollution) Act.....	1-24
1.3.2.1	Main Objectives of Air (Prevention and Control of Pollution Act)....	1-24
1.3.3	The Water (Prevention and Control of Pollution) Act.....	1-25

UNIT II**Chapter 2 Environmental Audit and Environmental Impact****Assessment (EIA)****2-1 to 2- 23****Syllabus :****Environmental Audit :** Meaning, Necessity, Norms**Types :** Objective-based types : Liabilities audit, Management audit, Activities audit**Client-driven types :** Regulatory external audit, Independent external audit, Internal environmental audit, Third party audit**Environmental Impact :****Assessment (EIA) :** Introduction, EIA regulations, Steps in environmental impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for the civil engineering projects.

2.1	Environmental Audit.....	2-1
2.1.1	Benefits of Environmental Audit.....	2-2
2.1.2	Necessity of Environmental Audit.....	2-2
2.1.3	The Objectives of Environmental Audit in an Industry.....	2-3
2.1.4	Environmental Audit Norms.....	2-4
2.2	Types of Environmental Audit.....	2-5
2.2.1	Objective - Based Types.....	2-5
2.2.1.1	Liabilities Audit.....	2-5
2.2.1.2	Management Audit.....	2-6
2.2.1.3	Activities Audit.....	2-7
2.2.2	Client - Driven Types.....	2-7
2.2.3	Regulatory External Audit.....	2-7
2.2.4	Independent External Audit.....	2-8
2.2.5	Internal Environmental Audit.....	2-8
2.2.6	Third Party Audits.....	2-8
2.3	Environmental Impact Assessment (EIA).....	2-9
2.3.1	Introduction of EIA.....	2-9
2.3.2	Purpose of EIA.....	2-9
2.3.3	EIA Regulations.....	2-10



2.3.4	EIA Process	2-11
2.3.5	Screening.....	2-12
2.3.6	Initial Environmental Examination.....	2-12
2.3.6.1	Objectives of IEE.....	2-13
2.3.6.2	Possible IEE Outcomes.....	2-14
2.3.7	Scoping	2-14
2.3.7.1	Purpose of Scoping	2-14
2.3.8	Full Scale EIA.....	2-16
2.3.8.1	Impact Analysis / Prediction.....	2-17
2.3.8.2	Mitigation and Impact Management.....	2-18
2.3.8.3	Public Involvement	2-18
2.3.9	EIA Report.....	2-18
2.3.10	EIA Review.....	2-19
2.3.10.1	Key Objectives of EIA Review	2-20
2.3.11	Decision Making.....	2-20
2.3.12	Monitoring	2-20
2.3.13	Environmental Auditing.....	2-21
2.3.14	Benefits of EIA.....	2-21
2.3.15	Limitations of EIA	2-22
2.3.16	Environmental Clearance For Civil Engineering Projects	2-23

UNIT III**Chapter 3 Energy and Energy Conservation****3-1 to 3- 32****Syllabus :**

Renewable Energy Resources : Solar Energy, wind Energy, Ocean Energy, Hydro Energy, Biomass Energy.

Non-renewable Energy Resources : Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels

Energy conservation : Introduction, Specific objectices, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency.

Functions of Government organization working for Energy Conservation and Audit (ECA) –

National Productivity Council (NPC)

Ministry of New Renewable Energy (MNRE)

Bureau of Energy Efficiency (BEE)

Maharashtra Energy Development Agency (MEDA)

Salient features of Energy Conservation Act - 2001



3.1	Renewable Energy Sources	3-1
3.1.1	Solar Energy	3-2
3.1.1.1	Application of Solar Energy	3-3
3.1.2	Wind Energy.....	3-4
3.1.3	Ocean Energy	3-5
3.1.4	Hydro Energy	3-7
3.1.5	Biomass Energy	3-8
3.2	Non Renewable Energy Resources.....	3-9
3.2.1	Coal.....	3-10
3.2.2	Petroleum.....	3-10
3.2.3	Natural Gas	3-11
3.2.4	Nuclear Energy.....	3-11
3.2.5	Chemical Sources of Energy	3-13
3.2.6	Fuel Cell.....	3-14
3.2.7	Hydrogen Energy	3-14
3.2.8	Bio fuels	3-15
3.3	Energy Conservation	3-16
3.3.1	Introduction	3-16
3.3.2	Specific Objectives	3-16
3.3.3	Present Scenario.....	3-17
3.3.4	LEED - Indian Rating System and Energy Efficiency	3-17
3.3.5	Need of Energy Conservation.....	3-18
3.4	Functions of Government Organisation	
	Working For Energy Conservation and Audit (ECA)	3-26
3.4.1	National Productivity Council (NPC)	3-26
3.4.2	Ministry of New and Renewable Energy (MNRE).....	3-27
3.4.2.1	Functions of MNRE	3-27
3.4.3	Bureau of Energy Efficiency (BEE)	3-28
3.4.3.1	The Major Functions of BEE.....	3-29
3.4.4	Maharashtra Energy Development Agency (MEDA)	3-29
3.4.4.1	Functions of MEDA.....	3-30
3.4.5	Silent Feature of Energy Conservation Act 2001	3-30

**UNIT IV****Chapter 4 Green Building****4-1 to 4- 19****Syllabus :****Introduction :** Definition of Green building, Benefits of Green building**Principles :** Principles of Green building-planning concept of Green Building**Features :** Salient features of Green Building, Environmental design (ED) strategies for building construction**Process :** Improvement in environmental quality in civil structure**Materials :** Green building materials and products – Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. Reuse of waste material – Plastic, rubber, Newspaper wood, Non toxic paint, Green roofing

4.1	Introduction	4-1
4.1.1	Benefits of Green Building	4-2
4.2	Principles of Green Building.....	4-3
4.2.1	Planning Concept of Green Building	4-4
4.3	Features of Green Building	4-5
4.3.1	Salient Features of Green Building	4-5
4.3.2	Environmental Design (ED)	4-6
4.4	Process of Improvement in Environmental Quality in Civil for Structure	4-7
4.4.1	Pre-Design	4-7
4.4.2	Schematic Design	4-8
4.4.3	Design Development	4-8
4.4.4	Construction Documents	4-8
4.4.5	Bidding Phase	4-9
4.4.6	Construction Phase	4-9
4.4.7	Final Acceptance / Occupancy	4-10
4.5	Materials : Green Building Materials and Products	4-10
4.5.1	Bamboo.....	4-10
4.5.2	Rice Husk Ash Concrete.....	4-11
4.5.2.1	Application of Rice Husk Ash.....	4-12



4.5.3	Plastic Bricks	4-12
4.5.3.1	Advantages of Plastic Brick	4-13
4.5.4	Bagasse Particle Board	4-13
4.5.5	Insulated Concrete Forms	4-14
4.5.5.1	Advantages of ICFs	4-15
4.5.6	Newspaper Wood	4-16
4.5.7	Reuse and Recycling of Rubber Waste in Construction	4-16
4.5.8	Reuse Recycling of Plastic Waste in Construction	4-17
4.5.9	Non Toxic Point	4-18
4.5.10	Green Roofing	4-18

UNIT V**Chapter 5 Rating System for Green Building****5-1 to 5-6****Syllabus :****Introduction :** Definition of Green building, Benefits of Green building**Principles :** Principles of Green building-planing concept of Green Building**Features :** Salient features of Green Building, Environmental design (ED) strategies for building construction**Process :** Improvement in environmental quality in civil structure**Materials :** Green building materials and products – Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. Reuse of waste material – Plastic, rubber, Newspaper wood, Non toxic paint, Green roofing

5.1	Leadership in Energy and Environmental Design (LEEF) Criteria	5-1
5.2	Indian Green Building Council (IGBC) Green Rating	5-2
5.2.1	Aspects Addressed for IGBC Rating System	5-3
5.3	Green Rating for Integrated Habitat Assessment (GRIHA) Criteria	5-5
5.4	HVAC Unit in Green Building	5-6

