

Subject Code: CHM 2049 Subject Name: Management Topic in Environmental Studies

	ITER, SIKSHA 'O' ANUSANDHAN Deemed to be University	LESSON PLAN
Programme	B.Tech.	Academic Year 2025-26
Department	All branches of Engineering	Semester 7 th
Instructor/Course coordinator	Dr Naresh Kumar Sahoo Dr Abanti Pradhan	Grading Pattern 6
Subject Code	CHM2049	
Subject Name	Management Topic in Environmental Studies	
Text Books(s):		
(1) Environmental Studies : Supplied by the UGC (in the form of an E Book), Text book of Environmental Studies for undergraduate students, E. Bharucha (EB) (2) Disaster Management by Mrinalini Pandey Wiley 2014 (3) Manual on Disaster Management, National Disaster Management, Agency Govt of India. https://ndma.gov.in/Governance/Guidelines		
Course Format: 2 Class/week		
Course Outcomes	Students will be able to	
	CO1	Ability to understand the Environment, its importance, interdisciplinary approach, Environment and its segments, Natural resources, Structure and function of ecosystem, ecological succession, Biodiversity, its values and conservation strategies
	CO2	Analyze different types, sources and effect of water and air pollution, pollutants, their standard and applies engineering science principles to design of water pollution control strategies.
	CO3	Apply the knowledge on MSW Management, Hazardous waste management. Analyze different types of noise pollutions, sources, standard and control strategies for noise pollution. Nuclear pollution.
	CO4	Analyse different contemporary issues related to global effects of air pollution and their mitigation measures. Rainwater harvesting and watershed management. Environmental legislations, EIA for developmental project approval.
	CO5	Principles, components, control, mitigation strategy, of disaster management. SWOT analysis; hazard and vulnerability analysis Sustainable Development. Discuss disaster preparedness and its principle. Ability to recognise and comprehend various causes, disaster management strategies for cyclone, flood and earthquake disasters. Ability to understand disaster response control processes.

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	CO6	To analyses disaster recovery, disaster capacity building. Describe the roles and responsibilities of different agencies, public health system triage process, Charting a hazard map, the effect of culture, and disaster management. Ability to recognize and comprehend various causes, and disaster management strategies for nuclear, fire and land slide disaster. To analyses behavioral aspects of disaster management. Ethical issues in disaster management.
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Lecture/ Problem Solving (PS)	Lessons/Topics to be covered	Boo k refer ence (sect ions)	Map ping with COs	Assign ments/ Quizzes Home Work/
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Week #1:

Lecture# 1	Syllabus, Exam pattern, Definition, scope and importance of Environmental Studies. Environment and its segments (atmosphere, lithosphere, hydrosphere and biosphere).	EB, pg.3-12)	CO1	
Lecture# 2	Concept of an ecosystem, Structure of an ecosystem. Producers, consumers and decomposers, Function of Ecosystem, Food chains, food webs.	EB, pg.54-62)	CO1	

Week #2:

Lecture# 3	Nutrient flow: nitrogen cycle, carbon cycle and hydrological cycle. Energy flow in the ecosystem. Primary production and 2ndary production.	EB, pg.58-62)	CO1	Structure and function of:- 1. Forest ecosystem; 2. Grassland ecosystem; 3. Desert ecosystem 4. Aquatic ecosystems (Assign
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Lecture# 4	Ecological pyramids, Ecological succession: types, primary and 2ndary ecological succession, process and example.	EB, pg.62-63)	CO1	
Week #3:				
Lecture# 5	Definition, Types (genetic, species and ecosystem biodiversity). Classification and value of biodiversity.	EB, pg.82-88)	CO1	
Lecture# 6	Biodiversity at global, National and local levels. Biogeographical classification of India. Hot-spots of biodiversity.	EB, pg.88-90)	CO1	
Week #4:				
Lecture# 7	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 conservation of biodiversity.	EB, pg.91-108)	CO1	
Lecture# 8	Definition, sources, cause, effects of water pollution, eutrophication, biomagnification and control measures of water pollution. .	EB, pg.123-131)	CO2	Soil pollution and Marine pollution. (Assignments)
Week #5:				
Lecture# 9	Control measures of Water pollution: Screening, Grid chamber, Coagulation and flocculation, activated sludge process	EB, pg.123-131)	CO2	
Lecture# 10	Definition, sources cause, effects of air pollution. Control measures of particulate matter from air: Working principle of Grit channel, cyclone separator, bughouse fabric filter, and electrostatic precipitator, absorption and adsorption technology for removal of gaseous pollutants.	EB, pg.113-123)	CO3	
Week #6:				
Lecture# 11	Climate change, global warming	EB, pg.184-186)	CO5	
Lecture# 12	Acid rain, ozone layer depletion	EB, pg.182-	CO5	

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Week #7:				
Lecture# 13	Solid waste management: Causes, effects and control measures of urban and industrial wastes.	EB, pg.1 45- 150)	CO4	Thermal pollution (Assignments)
Lecture# 14	Causes, effects and control measures of Noise pollution	EB, pg.1 40- 142)	CO4	
Week #8:				
Lecture# 15	Causes, effects and control measures of Nuclear hazards.	EB, pg.1 40- 143)	CO4	
Lecture# 16	Renewable and non-renewable resources: Natural resources and associated problems. Forest resources: Use and overexploitation, deforestation, Timber extraction, mining, dams and their effects on forest and tribal people.	EB, pg.1 6- 23)	CO1	Role of an individual in conservation of natural resources*.
Week #9:				
Lecture# 17	Water resources: Use and over-utilization of surface and ground water, Hydrological cycle, floods, drought, dams- benefits and problems and Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources	EB, pg.2 6- 32)	CO1	
Lecture# 18	Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources	EB., pg.3 5-48	CO1	Brief on:, Land, Food resources (Assignments)
Week #10:				
Lecture# 19	Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management.	EB, pg.1 65- 171)	CO6	Resettlement and rehabilitation

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					of people; its problems and concerns. (Assignments)
Lecture# 20	Environment Protection Act, Air (Prevention and Control of Pollution) Act and Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act and Issues involved in enforcement of environmental legislation.	EB, pg.193-199)	CO6		
Lecture# 21	Environmental Impact Assessment.	EB, pg.199-204)	CO6		
Lecture# 22	Public awareness, Environment and Human Health, Human Rights, Value Education	EB, pg.204-247)	CO6	Population Explosion – Family Welfare Programme HIV/AIDS, Women and Child Welfare, (Assignments)	
23	Introduction to Disaster Management, Concept of Disaster, Causes disaster Types of Disasters, Natural and Man-made disaster.	MP, pg.2-20	CO1		
24	Aim of Disaster Management, Principles and components of disaster managements. Disaster Management and Planning, Nature, Scope and Management Process, Policy of Disaster Management. Types of Plans: Management by Objectives.	MP, pg.20-41	CO1		
25	SWOT Analysis, Hazard and Vulnerability Analysis Identifying Crisis Situations: A Framework. Organisational Structure and Design, Authority,	MP, pg.41-57	CO1	Approach, and attitude	

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	Delegation and Decentralisation Roles, Skills and Competencies. Importance of Control Process in Disaster Management, Group Dynamics: Nature. Understanding the Importance of Team-Building in Disaster Management, Capability Assessment.			s required establishing effective autonomous work Groups. (Assignments)
26	Various causes, preventative measures, and disaster management strategies for cyclones disasters.	https://ndm.a.gov.in/Governance/Guidelines	CO1	
27	Disaster Management Cycle: An Overview, Disaster Mitigation: Meaning and Concept. Structural Mitigation.	MP, pg.59-70	CO2	
28	Non-Structural Mitigation, Disaster Mitigation Strategies Importance of Information and Communication in Disaster Mitigation. Emerging Trends in Disaster Mitigation, Strengthening Capacity for Reducing Risk, Role of Team and Coordination. Sustainable Development for Disaster Mitigation.	MP, pg.70-78	CO2	
29	Introduction to Disaster Preparedness. The Three A's of Disaster Preparedness. Principles of Disaster Preparedness Steps of Disaster Preparedness. Organisational Structure for Disaster Preparedness	MP, pg.-83-97	CO2	
30	Essential Services Preparedness and Logistical Readiness. Contingency Planning. Importance of Building Team and Community Relations for Environmental and Emergency Managers. Training Needs Analysis and. Emergency Operational Plan: Contents.	MP, pg.-97-105		Human Resource Development Plan
31	Various causes, preventative measures, and disaster management strategies for floods disasters.	https://ndm.a.gov.in/Governance/Guidelines	CO2	
32	Disaster Response, Learning Objectives, Opening Case, Aims of Response, Control Process and Measurement, Security Issues, Profile of an Effective Crisis Leader, Leading at the Time of Crisis: Competencies and Challenges. Evacuation and Migration, Administering First-Aid,	MP, pg.-109-121	CO3	

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	Handling of Injured at Hospitals: Challenges and Issues, Mobilisation and Restoration of Essential Services, Search and Rescue Work			
33	Modern and Traditional Methods of Response, such as remote sensing, GIS etc. A Model of an Ideal Command Centre. Various causes OF earth quake disasters	MP, pg.- 121-125	CO3	
34	Various causes, preventative measures, and disaster management strategies for earth quake disasters	https://ndma.gov.in/Governance/Guidelines	CO3	
35	Disaster Recovery, Introduction to Medium- and Long-Term Recovery Aspects. Community Participation in Defining Objectives and their priorities. Participative Rehabilitation: Physical and Social Infrastructure. Social and Economic Rehabilitation: Capacity Building for Reconstruction and Rehabilitation Recovery and Rebuilding Works,	MP, pg.- 131-145	CO4	
36	Facilitating Compensations to be Paid through Insurances and Government, Coping Strategies: Providing Counselling and Psychological Support. Summary and case problem. Various process of nuclear energy, causes of nuclear disasters	MP, pg.- 145-149	CO4	
37	Various preventative measures, and case study disaster management strategies for nuclear disasters	https://ndma.gov.in/Governance/Guidelines	CO4	
38	Ascertaining Roles and Responsibilities of agencies, Roles and Responsibilities of Agencies, International and National Agencies. State and Local Bodies Philanthropic Organisations, Role of Stakeholders. Impact and Role of Media,	MP, pg.- 153-166	CO5	
39	Planning Commission and Its Role, Community-Based Approach to Disaster Management. Insights on Challenges in Management of Disaster. Education on Disasters, Public Awareness, Public Health System: Its Role in Disaster Management Prevention.	MP, pg.- 166-185	CO5	Public health system: its role in disaster management prevention. (Assignments)

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40	<p>Addressing Challenges Through Triage Process, Charting a Hazard Map, Effect of Culture and Disaster Management.</p> <p>Environmental Degradation and Disasters: Addressing Challenges, Summary</p>	MP, pg.- 185-195	CO5	
41	Ability to recognize and comprehend various causes, preventative measures, for land slide	https://ndma.gov.in/Governance/Guidelines	CO5	
42	Disaster management strategies for land slide. Various types and causes of fire disasters.	https://ndma.gov.in/Governance/Guidelines		
43	Various preventative measures, and disaster management strategies for fire disasters.	https://ndma.gov.in/Governance/Guidelines	CO6	
44	Behavioral Aspects of Disaster Management. Identifying Socio-Psychological Needs in Mass Emergency, Different Psychological Considerations, Training in Humanitarian Professionalism, Community and Individual Empowerment	MP, pg.- 199-205	CO6	
45	<p>Community Building in Developing Local Resilience to Disasters, Developing Leaders. Importance of Communication and Commitment.</p> <p>Negotiating the Conditions and Effects of Vulnerability and Disaster. Ethical Issues in Disaster Management Summary.</p>	MP, pg.- 205-215	CO6	