

Course Code	Course Name	Credits
26CH602	ENVIRONMENTAL CHEMISTRY	04

Course Objectives

- To provide an overview of water pollution.
- To explain air pollution and its effects.
- To describe soil pollution and its impact.
- To introduce noise pollution and its consequences.
- To discuss methods for prevention of environmental pollution.
- To outline various pollution control measures.

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Explain the cause, consequence and cure of various types of pollution.
- Acquired knowledge on sustainable energy.
- Assess the implication of climate change.
- Describe methods to analyze and control pollutions.

Unit-1 – Earth System Interactions and Biogeochemical Cycles (12 Hrs.)

Lithosphere, atmosphere and biosphere interactions; atmosphere–hydrosphere interaction; history of Earth's atmosphere; nitrogen cycle; carbon cycle; air–sea interactions; biosphere–hydrosphere interaction.

Unit 2 – Air and Water (12 Hrs.)

Introduction and definition of air; composition of air; air pollution – definition; air pollutants; types of air pollution; causes and effects of air pollution on human health; prevention of air pollution; water – introduction and definition; sources of water; types of water; water quality parameters; water pollution – definition; types of water pollution; causes and effects of water pollution on human health; prevention of water pollution.

Unit 3 – Noise Pollution and Energy (12 Hrs.)

Physics of sound waves; noise – sources, measurement and effects; control techniques with special reference to industrial noise and permissible limits; energy – introduction and definition; sources of energy; types of energy; renewable energy sources; non-renewable energy sources; nuclear energy and its applications.

Unit 4 – Sampling of air pollutants (14 Hrs.)

Ambient and stack emission sampling; analysis of air pollutants such as SO₂, NO_x, NH₃, TSPM and RSPM; sampling of water from different sources; preservation techniques; analysis of common water quality parameters – pH, solids, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), oil and grease.

Unit 5 – Case Studies of Industrial Pollution and Contaminant Analysis (10 Hrs.)

Case studies and references of different industries; specific polluting parameters present in air, water and wastewater.

References:

1. A.K. De, Environmental Chemistry, New Age International Ltd.
2. S. E. Manahan, Environmental Chemistry, Lewis Publishers, London.
3. J. W. Moore & E. A. Moore, Environmental Chemistry, Academic Press, London.
4. Pulford & H. Flowers, Environmental Chemistry at a Glance, Blackwell Publishing.
5. Radon handbook published by BARC. 2013.
6. V. K. Ahluwalia and M. Kidwai, New Trends in Green Chemistry, 2004, Anamaya Publishers, New Delhi.

Websites and eLearning Sources:

1. <https://nptel.ac.in/courses/122106030>
2. <https://youtu.be/mcdIV1eWjJg?si=r0V3HU01jST0C3Zk>
3. <https://world-nuclear.org/information-library/safety-and-security/safety-of-plants/chernobyl-accident>

COs and Bloom's Taxonomy Mapping – 26CH602

Course Outcomes	On completing P.G. program the students will be able to	BTL
CO1	Understand the interactions among Earth's environmental systems, pollutants in air, water, and noise pollution.	K1, K2
CO2	Apply environmental science principles to manage industrial impacts through pollution control, water sampling, and regulatory compliance.	K3
CO3	Analyze air-sea interactions, water pollution impacts, and noise control techniques; conduct water quality analysis.	K4
CO4	Evaluate water quality, energy sources and their impacts, interpret environmental quality data, and improve pollution control technologies.	K5
CO5	Create pollution prevention plans, design monitoring systems, and propose policy solutions to mitigate industrial pollution and safeguard health.	K6

BTL K1 and K2 – remembering and understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6- Create

Relationship Matrix – 26CH602

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)					Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	1	1	1	2	3	3	2	2	2	2
CO2	2	3	3	2	2	2	2	3	2	2	2	2.2
CO3	2	3	2	2	2	1	2	3	2	3	2	2.2
CO4	3	3	3	2	2	2	3	3	2	3	2	2.5
CO5	3	3	3	2	2	3	3	3	3	3	3	2.8
Total												2.3

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

