

25UMCET302	ENVIRONMENTAL POLLUTION AND ABATEMENT	Category	L	T	P	R	Credit	Year of Introduction
		VAC	4	0	0	0	4	2025

Preamble:

This course introduces the fundamental concepts of environmental pollution, its sources, impacts, and control strategies. It covers pollution control technologies for air and water, along with solid and hazardous waste management practices. Emphasis is given to sustainable approaches such as cleaner production, circular economy, and emerging environmental issues.

Prerequisite: Nil

Course Outcomes: After the completion of the course, the student will be able to:

CO	Course Outcomes	Knowledge Level
CO1	Explain sources, types, impacts, and monitoring approaches of environmental pollution.	K2 Understand
CO2	Describe air and water pollution sources, monitoring techniques, and control technologies.	K2 Understand
CO3	Explain solid and hazardous waste management methods and treatment approaches.	K2 Understand
CO4	Explain emerging pollution challenges and sustainable pollution control strategies.	K2 Understand

Mapping of course outcomes with program outcomes and program specific outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	–	–	–	2	–	–	–	–	–
CO2	1	2	2	-	–	3	–	–	–	–	–
CO3	1	1	2	–	–	3	1	–	–	–	–
CO4	–	2	1	–	–	3	1	–	–	–	2
Avg	1.33	1.75	1.66	-	-	2.75	1	-	-	-	2

Mapping of course outcomes with Knowledge and Attitude Profile (WK)

	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
CO1	*	*	*	*			*		
CO2	*	*	*	*	*		*		
CO3	*	*	*	*	*		*		*
CO4	*	*	*	*	*		*	*	*

Wks Mapped with the course

WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9
*	*	*	*	*		*	*	*

Mark Distribution:

Total Marks	CIE Marks	ESE Marks	ESE Duration
100	40	60	2.5 hrs

Continuous Internal Evaluation Pattern:

Attendance : 5 marks
 Continuous Assessment Test : 20 marks
 Continuous Assessment Assignment/Activity : 15 marks

SYLLABUS**Module 1 (14 hrs)**

Introduction to Environmental Engineering: scope and importance -Components of environment: air, water, and soil systems - Basic concepts: mass balance, material flow, and environmental cycles- Definition, classification, and sources of environmental pollution-Types of pollutants and their transport and transformation in air, water, and soil-Environmental quality standards and indicators - Overview of environmental legislation and regulatory framework.

Module 2 (14 hrs)

Air Pollution Control: Sources, effects, and dispersion of air pollutants- Air quality monitoring and standards-Control equipment: cyclone separator, scrubber, electrostatic precipitator, bag filter.

Water Pollution Control: Sources and characteristics of water pollutants- Wastewater treatment: primary, secondary, and tertiary processes- Industrial wastewater treatment and reuse-Water quality standards and monitoring- Effluent standards and zero liquid discharge (ZLD) concepts- Role of CPCB

and SPCBs.

Module 3 (14 hrs)

Sources, classification, and characteristics of solid waste- Functional elements of solid waste management-Waste processing: composting, bimethanation, incineration, sanitary landfills- Hazardous waste: definition, sources, treatment, storage, and disposal- Hazardous waste handling and management rules- industrial waste management principles- Case studies on solid waste management practices.

Module 4 (14 hrs)

Emerging pollution issues:Plastic pollution and microplastics - e-waste management -Biomedical and construction waste concerns- Sustainable solutions & management: Waste minimization and cleaner production -3R principles and circular economy -Extended Producer Responsibility (EPR) -Green technologies for pollution prevention - Role of IT and AI in pollution monitoring - Public awareness, environmental ethics, and stakeholder participation

Recommended Activity(Suggested topics)

1. Visit a wastewater treatment plant, solid waste management facility, or recycling unit. Observe treatment processes and prepare a brief technical report.
2. Conduct waste characterization of campus/household.Propose segregation, recycling, and reduction strategies based on 3R principles.

Text Books:

1. Dutt, N. H. G. (2014). *Environmental pollution and control* (16th ed.). Neelkamal Publications Pvt. Ltd.
2. Bhatia, H. S. (2003). *A text book of environmental pollution and control* (19th ed.). Galgotia Publications.
3. Trivedi, P. R. (2004). *Environmental pollution and control*. A.P.H. Publishing Corporation.
4. Davis, M. L., & Masten, S. J. (2013). *Principles of environmental engineering and science*. McGraw-Hill Education.
5. Bhatia, S. C. (2013). *Environmental pollution and control in chemical process industries* (3rd ed.). Khanna Publications.

Reference Books:

1. Peavy, H. S., Row, D. R., & Tchobanoglous, G. (1985). *Environmental engineering*. McGraw-Hill.
2. Rao, C. S. (2006). *Environmental pollution control engineering* (2nd ed.). New Age International Publishers.
3. Masters, G. M., & Ela, W. P. (2013). *Introduction to environmental engineering and science* (3rd ed.). Pearson Education.
4. Michelle, J. R., & Zimmerman, J. B. (2014). *Environmental engineering: Fundamentals, sustainability, design* (2nd ed.). Wiley.

END SEMESTER EXAMINATION – MODEL QUESTION PAPER

Course Code	25UMCET302
Course Name	ENVIRONMENTAL POLLUTION AND ABATEMENT
Max. Marks: 60	Duration: 2.5 Hours

Part A (Answer all questions. Each question carries 3 marks)				
Qn No.	Question	Marks	CO	BL
1	Explain the scope and importance of Environmental Engineering.	3	1	L2
2	Differentiate between point source and non-point source pollution.	3	1	L2
3	Explain the major sources of air pollution.	3	2	L2
4	Explain the purpose of air quality monitoring.	3	2	L2
5	Classify the various types of solid waste.	3	3	L2
6	Describe hazardous waste with suitable examples.	3	3	L2
7	Explain the need for e-waste management.	3	4	L2
8	Describe the role of AI in pollution monitoring.	3	4	L2
Part B (Answer any one full question from each Module. Each carry 9 marks)				
Module I				
Qn No.	Question	Marks	CO	BL
9.a	Explain the components of environment	6	1	L2
9.b	Describe the significance of environmental quality standards.	3	1	L2
OR				
10.a	Explain the concept of material flow and environmental cycles.	6	1	L2
10.b	Describe the importance of environmental legislation and regulatory frameworks in environmental protection.	3	1	L2
Module II				
Qn No.	Question	Marks	CO	BL
11.a	Describe the dispersion of air pollutants.	5	2	L2
11.b	Explain the working principles of cyclone separators and bag filters.	4	2	L2
OR				
12.a	Explain the stages involved in wastewater treatment.	5	2	L2
12.b	Describe the importance of water quality standards.	4	2	L2
Module III				
Qn No.	Question	Marks	CO	BL
13. a	Explain the functional elements involved in an integrated solid waste management system.	5	3	L2

13. b	Describe the processes of composting and bimethanation for waste treatment.	4	3	L2
OR				
14. a	Explain the major provisions of hazardous waste handling and management rules.	5	3	L2
14. b	Describe the operation and environmental benefits of sanitary landfills.	4	3	L2
Module IV				
Qn No.	Question	Marks	CO	BL
15	Explain the principles of the circular economy and Extended Producer Responsibility (EPR)	9	4	L2
OR				
16	Describe the role of green technologies, Information Technology (IT), and Artificial Intelligence (AI) in pollution prevention and environmental monitoring.	9	4	L2