



SSN School of Engineering

DEPARTMENT OF CHEMICAL ENGINEERING

Master of Technology

Environmental Science & Technology

CURRICULUM

REGULATIONS 2026

VISION AND MISSION OF THE DEPARTMENT

VISION

To be a globally recognized Chemical Engineering department with excellence in teaching, research and consultancy services.

MISSION

- To prepare our students to become successful professional Chemical Engineers capable of undertaking advanced studies and life-long learning.
- To produce Chemical Engineers who will contribute to the process industries worldwide.
- To provide the students a strong fundamental technical education that makes them capable of catering to the needs of a changing technological environment and the society.
- To nurture the innovative capabilities of students by providing them with a research platform and exposure to current technologies.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- **PEO 1:** To provide the engineering graduates with technical expertise in environmental science and technology which will enable them to have a career and professional accomplishment in the public or private sector, to pursue higher studies or may start up their own business.
- **PEO 2:** Address the complexities of real-life environmental problems related to domestic and industrial waste management, environmental impact assessment, industrial pollution prevention and control.
- **PEO 3:** Identify, formulate, analyze, develop processes and technologies to meet desired environmental protection needs of society and formulate solutions that are technically sound and economically feasible.

PROGRAM OUTCOMES (POs)

- **PO1:** An ability to independently carry out research /investigation and development work to solve practical problems.
- **PO2:** An ability to write and present a substantial technical report/document.
- **PO3:** Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
- **PO4:** An ability to select/design the treatment units to mitigate environmental pollution.

PEO / PO Mapping

	PO		
	PO1	PO2	PO3
PEO1	3		3
PEO2	3	1	3
PEO3	3	1	3

Mapping Programme Outcomes with Graduate Attributes

S.No	NBA-GA	M.Tech EVST PO
1	Scholarship of knowledge	3
2	Critical thinking	1
3	Problem solving	1
4	Research skill	1

5	Usage of modern tools	2
6	Collaborative and multidisciplinary research	1
7	Project management and finance	4
8	Communication	2
9	Life-long learning	3
10	Ethical practices and social responsibility	4
11	Independent and reflective learning	1

COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

Sl. No	Broad Category of Course	Minimum Credit Requirement	Proposed Credits
1	Department Core Course (DC)	10	10
2	Major Core Course (MC)	30	30
3	Multidisciplinary Course (MD)	10	10
4	Open Elective (OE)	2	2
5	Project Dissertation (PD)	20	20
6	Research Internship (RI)	4	4
7	Skill Enhancement Course (SEC)	4	4
Total		80	80

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

Semester\Category	DC	MC	MD	OE	PD	RI	SEC	TOTAL
I	7	8	4	2	-	-	2	23
II	3	14	3	-	-	-	2	22
III	-	8	3	-	8	4	-	23
IV	-	-	-	-	12	-	-	12
Total	10	30	10	2	20	4	4	80



SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Advanced Mathematics for Environmental Technology	MD	4	60	0	0	60	120	4
2		Physico-Chemical Treatment Technologies	DC	5	45	0	30	45	120	4
3		Water and Wastewater Treatment Technologies	DC	3	45	0	0	45	90	3
4		Solid and Hazardous Waste Management	MC	4	60	0	0	60	120	4
5		Elective 1	MC	5	45	0	30	45	120	4
6		Research Methodology / IPR/Operations Research	OE	2	30	0	0	30	60	2
7		Industrial Effluent Treatment Design Laboratory	SEC	2	0	15	30	15	60	2
TOTAL				25	285	15	60	330	690	23

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Elective 2	MD	3	45	0	0	45	90	3
2		Separation Processes in Environmental Applications	DC	3	45	0	0	45	90	3
3		Analytical Techniques and application in Environmental Science and Engineering	MC	5	45	0	30	45	120	4
4		Air and Noise Pollution Control	MC	5	60	0	0	60	120	4
5		Elective 3	MC	3	45	0	0	45	90	3
6		Elective 4	MC	3	45	0	0	45	90	3
7		Computational Simulation in Environmental Engineering	SEC	2	0	15	30	15	60	2

		Laboratory								
TOTAL				24	285	15	40	320	660	22

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Multi-disciplinary OPEN Elective	MD	3	45	0	0	45	90	3
2		Elective 5	MC	5	45	0	30	45	120	4
3		Elective 6	MC	5	45	0	30	45	120	4
PRACTICALS										
4		Project/Dissertation Phase I	PD	16	0	0	160	80	240	8
5		Research Internship	RI	-	0	0	0	120	120	4
TOTAL				29	135	0	200	355	690	23

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
PRACTICALS										
1		Project/Dissertation Phase II	PD	24	0	0	240	120	360	12
TOTAL				24	0	0	240	120	360	12

ELECTIVE 1

Basket 1: Environmental Biotechnology and Bioenergy

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Environmental Toxicology and Risk Assessment	MC	5	45	0	30	45	120	4
2		Bioremediation: Principles and Applications	MC	5	45	0	30	45	120	4
3		Environmental Nanotechnology	MC	5	45	0	30	45	120	4
4		Ecology and Environment	MC	5	45	0	30	45	120	4

ELECTIVE 2

Basket 2: Mathematical Applications in Environmental Science and Technology

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Advanced Numerical Methods	MD	3	45	0	0	45	90	3
2		Mathematical Modeling and Simulation of Environmental Systems	MD	3	45	0	0	45	90	3
3		Probability and Statistics for Engineers	MD	3	45	0	0	45	90	3

ELECTIVE 3

Basket 3: Environmental Policy, Governance, and Impact Assessment

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Climate Change and Adaptation	MC	3	45	0	0	45	90	3
2		Environmental Policies and Governance	MC	3	45	0	0	45	90	3
3		Environmental Regulations and Management System	MC	3	45	0	0	45	90	3

4		Environmental Impact Assessment and Management	MC	3	45	0	0	45	90	3
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ELECTIVE 4

Basket 4: Industrial Safety and Risk analysis

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Industrial Safety and Health Management	MC	3	45	0	0	45	90	3
2		Risk Assessment and Hazard Analysis	MC	3	45	0	0	45	90	3
3		Safety and Hazard Control	MC	3	45	0	0	45	90	3
4		Occupational Health and Environmental Safety	MC	3	45	0	0	45	90	3

ELECTIVE 5

Basket 5: Computational and Data-Driven Environmental Systems

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Computational Fluid Dynamics for Environmental Engineering	MC	5	45	0	30	45	120	4
2		Artificial Intelligence and Machine Learning Methods for Environmental Applications	MC	5	45	0	30	45	120	4
3		Big Data Analytics for Environmental Monitoring and Management	MC	5	45	0	30	45	120	4
4		Optimization and Process Control in Environmental Systems	MC	5	45	0	30	45	120	4

ELECTIVE 6

Basket 6: Sustainable Energy and Resource Systems

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Desalination and Water Purification	MC	5	45	0	30	45	120	4
2		Waste-to-Energy Technologies	MC	5	45	0	30	45	120	4
3		Carbon Capture and Storage	MC	5	45	0	30	45	120	4
4		Renewable Energy Systems for Environmental Sustainability	MC	5	45	0	30	45	120	4

MULTI-DISCIPLINARY OPEN ELECTIVE

S. No.	COURSE CODE	COURSE TITLE	COURSE CATEGORY	CONTACT PERIODS	Teaching and Learning Scheme (per semester)					
					L	T	P	TW&SL	TH	C
1		Waste to Wealth: Circular Economy Approaches	MD	3	45	0	0	45	90	3
2		Environmental Pollution Control and Monitoring	MD	3	45	0	0	45	90	3
3		Green Technologies and Sustainable Materials	MD	3	45	0	0	45	90	3
4		Sustainable Development and Environmental Management	MD	3	45	0	0	45	90	3

Note: Students from M.Tech. Environmental Science & Technology must not opt for this Open Elective.

L - Lecture, T - Tutorial, P - Practical, TW & SL – Term Work & Self Learning, TH – Total Hours and C – Credits