CURRICULUM OF MASTERS' ACADEMIC PROGRAMMES

M. Tech. (Environmental Technology)

Academic Session-2025 Onwards

School of Environment & Natural Resources

DOON UNIVERSITY

Master of Technology

(*M. Tech. - Environmental Technology*)

A UGC Sponsored Programme

Under

Innovative Programme – Teaching & Research in Interdisciplinary and Emerging Areas

(Approved Structure April 2025 onwards)

As per NEP 2020

School of Environment & Natural Resources

DOON UNIVERSITY

Dehradun-248001, Uttarakhand (INDIA)

M. Tech. Environmental Technology

Course duration: 4 semesters

About the Programme

The Master in Environmental Technology aims to produce environmental engineers/experts/professionals with an ability to apply the scientific knowledge, techniques, skills and modern tools of mathematics, bio/science. Engineering and technology to solve the ever-growing environmental issues and challenges that different industries and sectors are facing.

Programme Objectives

- To impart the key knowledge of environmental sciences and develop skills of conducting laboratory work/experiments to prepare the students for choosing careers in academia and/or industry in environmental science and related areas with strong scientific depth and temperament.
- To prepare students for higher studies in environmental science and the area of their choice.

Programme Outcomes (POs)

- **PO1**: To develop the capacity to apply the knowledge of environmental science and engineering to provide sustainable solutions to environmental issues and challenges that different industries and sectors are facing.
- **PO2**: To sensitise the students on the environmental issues and challenges at the regional, national and global scale.
- **PO3**: To impart knowledge, practical training, analytical techniques and skills to solve the environmental problems industries and other sectors are facing.
- **PO4**: To prepare environmental engineers for a successful career in industry, government and private sectors for the development of sustainable technologies in the respective sector.

Programme Specific Outcome (PSOC)

Upon completion of this programme, the student will be able to:

- **Academic competence**: (i) Understand fundamental concepts, principles and processes underlying the field of Environmental Science, its interdisciplinary nature (ii) Demonstrate an understanding of a wide range of Environmental techniques (e.g. basic water and soil analysis, microbiological methods, spectrophotometry, GIS based analysis, Ecological data analysis, Bio- assays)
- **Personal and Professional Competence**: (i) Carry out laboratory-oriented numerical calculations and be capable of data visualization and interpretation. related to Environmental

Science (ii) Analyse environmental data (e.g. in Natural resource Management, Habitat analysis and biological databases). (iii) Formulate ideas, write scientific reports, and demonstrate effective presentation and communication skills.

- **Research Competence**: (i) Apply environmental data analysis methodology to conduct research and demonstrate appropriate skill to seek innovative solutions to problems that emerge in various fields of Ecology and Environmental Science and interdisciplinary fields (ii) Integrate informatics and statistical skills to explore and authenticate biological data for experimental and research purposes.
- **Entrepreneurial and Social competence**: (i) Employ skills in specific areas related to Environmental Science, such as industrial pollution, green technology development, Ecological health, agriculture, and ensure multilevel commitment to the health and well-being of society at large. (ii) Exhibit awareness of environmental and ethical issues: emphasising academic and research ethics, scientific misconduct, intellectual property rights and issues of plagiarism

Course definitions

- a) **Discipline Specific Core (DSC)**: A Discipline Specific Core course is a mandatory requirement for students within their program of study. These core credit courses are specific to a particular discipline and are graded and scheduled across the semesters with multiple exit options by NEP 2020. The relevant department will identify the DSCs outlined in the framework as essential courses for the program. For instance, to earn a single discipline-specific honours degree, such as a B.A. (Honours) in Economics, B. Com (Honours), or B.Sc. (Honours) in Physics, the core courses will be those in Economics, Commerce, and Physics, respectively.
- b) **Discipline Specific Elective (DSE)**: Discipline Specific Electives (DSEs) are a collection of credit courses related to a specific discipline (for single-discipline programs) or multiple disciplines (for multidisciplinary programs), from which students select according to their field of study. There will be a range of DSEs available for students to choose from. The [2] relevant department will designate the DSEs listed in the framework as elective courses to be offered in a program. For example, for a B.Sc. (Honours) in Physics, the DSEs selection should be drawn from the available Physics DSEs.
- c) **Generic Elective (GE)**: Generic Electives (GE) are a set of courses intended to offer students a multidisciplinary or interdisciplinary education. These electives include courses from various disciplines, excluding those from the student's primary discipline, and are available during both odd and even semesters. Students can choose from this range of courses. The relevant department will designate the GEs outlined in the framework as electives for the program. If a student selects DSEs outside their specific discipline, those DSEs will be considered as GEs for that student.
- d) **Ability Enhancement course (AEC), Skill Enhancement Course (SEC)** and **Value Addition Course (VAC)**: These three courses will be available from a range of offerings

provided by all departments in both odd and even semesters, allowing students to choose according to their interests. To pursue an Academic Project or Entrepreneurship as a Minor, a student must select a suitable combination of GE, SEC, VAC, and Internship/Apprenticeship/Project/Community (IAPC) courses. These options will be presented in different modules as outlined in the study scheme.

(i) **AEC courses** are intended to broaden knowledge through different fields of study. These courses, which include Language and Literature, are required for all the disciplines.
(ii) **SEC courses** focus on skill development across various disciplines and aim to provide practical training to enhance students' competencies and abilities. Students can choose from a range of skill-based courses specifically designed for this purpose. Each discipline may offer its skill-based course(s), some of which are reserved for its students, while others are available to students from different disciplines.
(iii) **VAC courses** are a set of offerings from different disciplines designed to foster personality development. These courses emphasize the incorporation of ethical, cultural, and constitutional values, as well as the promotion of critical thinking, Indian knowledge systems, scientific mindset, communication skills, creative writing, presentation abilities, physical education, and teamwork in sports, etc. contributing towards the comprehensive development of students.

Academic Framework for 2-Year (4 Semesters) **M. Tech. Environmental Technology** Programme

Table 1: Semester-wise distribution of credits.

Semester	**Minimum Credit Requirement**				**Total Credits**
	DSC	**GE/DSE**	**SEC/Project/ Dissertation**	**AEC/ VAC**	
Semester-1st	(DSC) 3x4=12	(DSE) 2x4=8	(SEC) 1x2=2	-	22
Semester-2nd	(DSC) 3x4=12	(DSE) 2x4=8	(SEC) 1x2=2	-	22
Exit option after one year with 44 credits with a PG Diploma in Environmental Technology					
Semester-3rd	-	-	Dissertation-I (1x20=20)	(VAC) 1x2=2	22
Semester-4th			Seminar 1x2=2 Dissertation-II (1x20=20)	-	22
Total	24	16	46	2	88
After two years with 88 credits, the student will be awarded the Degree of M.Sc. in Environmental Technology					

Course Structure

Table 2: Semester-wise Course Framework

S. No.	Course Code	Course Type	Name of the Course	L	T	P	Total Credits
Semester I							
1	DSC1	ETC – 520	Applied Environmental Chemistry	2	0	2	4
2	DSC2	ETC – 500	Fundamentals of Environmental Science and Technology	3	0	1	4
3	DSC3	ETC – 530	Solid and Hazardous Waste Management	3	0	1	4
4	DSE	DSE1	Choose from the pool of courses – I	3	1	0	4
5	DSE	DSE2	Choose from the pool of courses – I	3	1	0	4
6	SEC	ETC-596	Computer Applications in Environmental Engineering	1	0	1	2
Total Credits 22							
Semester II							
1	DSC1	ETC – 510	Principles and Design of Wastewater Treatment and Disposal Systems	3	0	1	4
2	DSC2	ETC – 540	Air Pollution and Its Control	3	0	1	4
3	DSC3	ETC – 570	Environmental Impact Assessment and Management	3	0	1	4
4	DSE	DSE1	Choose from the pool of courses – II	3	1	0	4
5	DSE	DSE2	Choose from the pool of courses – II	3	1	0	4
6	SEC	ETE-555	Environmental Instrumentations	1	0	1	2
Total Credits 22							
Exit option after one year with 44 credits with a PG Diploma in Environmental Technology							
Semester III							
1	VAC	VAC	Choose from the courses offered by other/MOOC	2	0	0	2
2	SEC	ETC – 593	Project - I	0	0	20	20
Total Credits 22							
Semester IV							
1	SEC	-	Seminar	2	0	0	2
2	SEC	ETC – 594	Project - II	0	0	20	20
Total Credits 22							
After two years with 88 credits, the student will be awarded the Degree of M. Tech. in Environmental Technology							

L-Lecture, T-Tutorial, P-Practical

List of Discipline-Specific Elective Papers: (4 credits each)

The Discipline Specific Electives (DSEs) are a pool of credit courses offered by the School of Environment & Natural Resources from which a student will choose to study based on his/ her interest. A student of M. Sc. in Environmental Science can choose DSE in I, II and III semesters.

Table 3: Pool of Discipline-Specific Elective Courses (DSE-I)

S. No.	Course Code	Name of the Course
1	ETC – 590	Remote Sensing & GIS Application in Environmental Management
2	ETE-542	Air Pollution Modelling
3	EES - 627	Environmental Microbiology & Biotechnology
4	EGC-571	Environmental Issues, Laws, and Policies
5	ETE-528	Ecological Engineering

Table 4: Pool of Discipline-Specific Elective Courses (DSE-II)

S. No.	Course Code	Name of the Course
1	ETE – 575	Industrial Safety & Health Management
2	EES-590	Atmospheric Modelling
3	ENR-559	Disaster Management
4	ETE – 557	Environmental Quality and Pollution Monitoring Techniques
5	EES-570	Global climate change and its impacts

In addition to the above proposed courses, students may select courses from Swayam.org as MOOCs courses up to the permissible limit.

Examination and Evaluation System

Core, General, discipline electives and skill-based courses			**Internships and dissertation**	
	Marks	**Evaluation**	**Marks**	**Evaluation**
Mid-semester exam	30	Descriptive exam**	100	Report (80%) Presentation and viva voce (20%)
End-semester exam	30/50*	Descriptive exam		
Practical	20	Performance and Evaluation		
Assignments	20	Evaluation of		

		assignments, presentations, class attendance, quizzes, etc.		

* Course without practical hours

**** Descriptive exam question paper pattern:**

Sections	Description	Weightage
Section-A	Objective or short answer questions (word limits <50 - 100) Question standard: Easy to moderate	30%
Section-B	Medium answer questions (word limits up to 300) Question standard: Easy (20%); moderate (40%); difficult (40%)	50%
Section-C	Large answer questions (word limits up to 700) Question standard: moderate (60%); difficult (40%)	20%

Maximum period for completing an academic programme:

2-Year PG programme — Up to a maximum of 04 years