

CURRICULUM OF MASTERS' ACADEMIC PROGRAMMES

M.Sc. (Environmental Science)

Academic Session-2025 Onwards



School of Environment & Natural Resources

DOON UNIVERSITY

Dehradun-248001, Uttarakhand, India

M. Sc. (Environmental Science)

As per NEP 2020

(w.e.f. Academic Session 2010)

Updated on: April 2025)



School of Environment & Natural Resources

DOON UNIVERSITY

Dehradun-248001, Uttarakhand (INDIA)

M. Sc. Environmental Science

Course duration: 4 semesters

About the Programme

The Master's in Environmental Science aims to broadly appreciate the significant environmental change processes and the people and institutions involved in environmental protection. The course seeks to produce environmental experts/professionals who are interdisciplinary and analytical in their approach to environmental issues and competent and aware decision-makers.

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 understand the relationship between social and natural systems by mastering the skills needed to develop solutions to environmental problems.
- **PO2.** Examining environmental responsibility's ethical, cultural, economic and legal aspects and providing systemic solutions such as remediation, mitigation and adaptation to environmental changes at different scales.
- **PO3.** To sensitize the students to regional, national, and global environmental issues and challenges.
- **PO4.** To impart knowledge, practical training, analytical techniques and skills to solve environmental problems.
- **PO5.** To prepare students for successful careers in environmental departments in universities and colleges, research institutes, industries, consultancy and NGOs, etc.

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 DSEs listed in the framework will be designated by the [2] relevant department 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 GEs outlined in the framework will be designated by the relevant department 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. Sc. Environmental Science Programme

Table 1: Semester-wise distribution of credits.

Semester	Minimum Credit Requirement				Total Credits
	DSC	GE/DSE	SEC/Project/ Dissertation	AEC/ VAC	
Semester-1 st	(DSC) 3x4=12	(DSE) 2x4=8	(SEC) 1x2=2	-	22
Semester-2 nd	(DSC) 3x4=12	(DSE) 2x4=8	(SEC) 1x2=2	-	22
Exit option after one year with 44 credits with a PG Diploma in Environmental Science					
Semester-3 rd	(DSC) 2x4=8	(DSE) 3x4=12	Internship/project (1x2=2)	0	22
Semester-4 th			Dissertation (1x20=20)	(VAC) 1x2=2	22
Total	32	28	26	2	88
After two years with 88 credits, the student will be awarded the Degree of M.Sc. in Environmental Science					

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	EES-511	Fundamentals of Ecology and Environment	3	0	1	4
2	DSC2	EES - 517	Environmental Chemistry	3	0	1	4
3	DSC3	EES-516	Environmental Impact Assessment and Management	3	1	0	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	EES- 561	Statistical Applications and Modelling in Environmental Science	2	0	2	2
Total Credits 22							
Semester II							
1	DSC1	EES - 515	Environmental Pollution and Control	3	0	1	4
2	DSC2	EES - 514	Geomatics	3	0	1	4
3	DSC3	ETC-530	Solid & Hazardous Waste 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	EES- 618	Analytical Techniques and Instrumentation	2	0	2	2
Total Credits 22							
Exit option after one year with 44 credits with a PG Diploma in Environmental Science							
Semester III							
1	DSC1	EES - 520	Atmosphere, Weather and Climate	3	0	1	4
2	DSC2	ENR- 516	Biodiversity Assessment and Conservation	3	1	0	4
3	DSE	DSE1	Choose from the pool of courses – III	3	0	1	4
4	DSE	DSE2	Choose from the pool of courses – III	3	1	0	4
5	DSE	DSE3	Choose from the pool of courses – III	3	1	0	4
6	AEC	EES -635	Internship (6 – 8 Weeks)	0	0	2	2
Total Credits 22							
Semester IV							
1	VAC	VAC	Choose from the courses offered by other/MOOC	2	0	0	2
2	SEC	EES-690	Dissertation	0	0	20	20
Total Credits 22							
After two years with 88 credits, the student will be awarded the Degree of M.Sc. in Environmental Science							

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 gets an option of choosing 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	EES-575	Environmental Geoscience
2	EES - 518	Environmental Toxicology
3	EES - 627	Environmental Microbiology & Biotechnology
4	EGC-571	Environmental Issues, Laws, and Policies

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

S. No.	Course Code	Name of the Course
1	EES-513	Aquatic Environment
2	EGC-596	Computational Methods in Environmental Science
3	ENR-559	Disaster Management
4	ENR- 558	Wildlife Management and Ecotourism
5	ENR - 512	Energy Resources and Their Management

Table 5: Pool of Discipline-Specific Elective Courses (DSE-III)

S. No.	Course Code	Name of the Course
1	EES - 619	Green Technology
2	EES-555	Hazards, Risk Analysis and Management
3	ETC-510	Water and Wastewater Engineering
4	EGC-556	IPR Traditional Knowledge
5	ETC-540	Air Pollution
6	EES-570	Global climate change and its impacts
7	EGC-566	Environmental Economics
8	ENR-514	Forest Ecosystem and Management
9	EES-515	Hazards, Risks Analysis and Management

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

Academic Framework for 1-Year* (2 Semesters) M. Sc. Environmental Science Programme

*[For those who have completed a 4-Year UG Programme as per UGC norms (without any back paper)]

Table 6: Semester-wise distribution of credits.

Semester	Minimum Credit Requirement				Total Credits
	DSC	GE/DSE	SEC/Project/ Dissertation	AEC/ VAC	
Semester-1 st	(DSC) 2x4=8	(DSE) 3x4=12	Seminar (1x2=2)	0	22
Semester-2 nd			Dissertation/Academic Project/Entrepreneurship (1x20=20)	(VAC) 1x2=2	22
Total	8	12	22	2	44
After completing the 1-Year with 44 credits, the student will be awarded the Degree of M.Sc. in Environmental Science					

Course Structure

Table 7: Semester-wise Course Framework

S. No.	Course Code	Course Type	Name of the Course	L	T	P	Total Credits
Semester I							
1	DSC1	EES-580	Fundamentals of Environmental Science	3	0	1	4
2	DSC2	EES- 618	Analytical Techniques and Instrumentation	2		2	4
3	DSE	DSE1	Choose from the pool of courses – I	3	0	1	4
4	DSE	DSE2	Choose from the pool of courses – II	3	1	0	4
5	DSE	DSE3	Choose from the pool of courses – III	3	1	0	4
6	SEC	EES -635	Internship (6 – 8 Weeks)	0	0	2	2
Total Credits 22							
Semester II							
1	VAC	VAC	Choose from the courses offered by other/MOOC	2	0	0	2
2	SEC	EES-690	Dissertation	0	0	20	20
Total Credits 22							
After one year with 44 credits, the student will be awarded the Degree of M.Sc. in Environmental Science							

L-Lecture, T-Tutorial, P-Practical

List of Discipline-Specific Elective Papers: (4 credits each) – One-year M. Sc. Environmental Science

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 gets an option of choosing DSE in I semester.

Table 8: Pool of Discipline-Specific Elective Courses (DSE-I)

S. No.	Course Code	Name of the Course
1	EES-575	Environmental Geoscience
2	EES - 518	Environmental Toxicology
3	EES - 627	Environmental Microbiology & Biotechnology
4	EGC-566	Environmental Economics
5	ENR - 512	Energy Resources and Their Management
6.	EES-516	Environmental Impact Assessment and Legal Framework
7	EES - 515	Environmental Pollution and Control
8	EES - 514	Geomatics

Table 9: Pool of Discipline-Specific Elective Courses (DSE-II)

S. No.	Course Code	Name of the Course
1	EES-513	Aquatic Environment
2	EES-590	Atmospheric Modelling
3	ENR- 516	Biodiversity Assessment and Conservation
4	EES-515	Hazards, Risks Analysis and Management
5	ETC-540	Air Pollution
6	ETC-530	Solid & Hazardous Waste Management
7	ENR- 558	Wildlife Management and Ecotourism
8	EES - 520	Atmosphere, Weather and Climate

Table 10: Pool of Discipline-Specific Elective Courses (DSE-III)

S. No.	Course Code	Name of the Course
1	ENR-559	Disaster Management
2	EGC- 576	Environmental Sociology/Environmental Sustainability
3	EES - 619	Green Technology
4	EES-555	Hazards, Risk Analysis and Management
5	ENR- 558	Wildlife Management and Ecotourism
6	ETC-510	Water and Wastewater Engineering
7	EGC-556	IPR Traditional Knowledge
8	EES-625	Microbial Ecology
9	EES-570	Global climate change and its impacts
10	ETE-553	Resource recovery from waste material
11	ENR-514	Forest Ecosystem and Management
12	ENR-557	Himalayan Ecosystem and People

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:

1-Year PG programme — Up to a maximum of 03 years

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