

PROGRAMME PROJECT REPORT

Master's in Environmental Science (PGEVS) Programme (2 Year Programme)



School of Sciences

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1. Master's Degree Programme

The National Education Policy (NEP) 2020 envisions a new vision that enable an individual to study one or more specialized areas of interest at a deep level, and also develop capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. The NEP 2020 focuses on the formulation of expected learning outcomes for all higher education programmes. It states that “National Higher Education Qualifications Framework (NHEQF)” shall be align with the National Skills Qualifications Framework (NSQF) to ease the integration of vocational education into higher education. It also points out that higher education qualifications leading to a degree/diploma/certificate shall be described by the NHEQF in terms of Outcome Based Education (OBE).

The design of M.Sc.-**Environmental Science** programme in line with NHEQF offers opportunities and avenues to learn core subjects but also to explore additional avenues of learning beyond the core subjects for holistic development of a learner.

The uniform grading system will also enable potential employers in assessing the performance of the learner. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on learner's performance in examinations, guidelines framed by the UGC are followed. Hence, adoption of NHEQF helps to overcome the gap between university degree and employability by introducing skills and competencies in the graduates.

2. M.Sc.-Environmental Science Programme

The structure and duration of postgraduate programme of Master's in **Environmental Science** in accordance with NEP 2020 includes multiple exit options within this period, with appropriate certifications:

- Level 6.5: a **Master in Science (Environmental Science)** programme after 2 years (4 semesters) of study;

2.1 Programme Mission & Objectives

In line with the mission of the University to provide flexible learning opportunities to all, particularly to those who could not join regular colleges or universities owing to social, economic and other constraints, the 2-year Post-Graduate Programme in Environmental Science aims at providing holistic and value-based knowledge and guidance to promote scientific temper in everyday life. The program offers a platform to the learners to fulfill the eligible criteria in various scientific jobs in government and private sector.

The Master of Environmental Science Programme aims at the following objectives:

- Develop a broad academic and practical literacy in environmental science deals with study of socio economic, scientific and technological aspect concern with environmental and resources management, thus the students are able to know understand the physical, chemical and biological nature of environment.

- Provide specialization in different areas such as ecology and biodiversity conservation, environmental chemistry, environmental impact assessment and management, biotechnology, biosafety and IPR.
- Enable students to understand major environmental challenges at local, regional and global scale such as to identify environmental pollution, climate change, global warming, and depletion of natural habitat and energy resources.
- Integrate fields within computer science, optimization, and statistics to developed environmental monitoring skills, including conduct of experiments and data analysis.
- Expose students to real-world problems in the classroom and through experiential learning of modern instrument ion and analytical techniques for environmental analysis.
- These program objectives acknowledge the interdisciplinarity of physical, chemical and biological sciences that make building block of strong foundation with our students.

2.2 Relevance of the Programme with Mission and Goals

The 2-year Post-Graduate Programme in M.Sc.-Environmental Science is designed with the objective of equipping learners to cope with the emerging trends and challenges in the scientific domain. In congruence with goals of the University the Programme also focuses to provide skilled manpower to the society to meet global demands. The Programme is designed in such a manner so that a successful learner can go for higher studies as well as join the research and development industries, pollution abatement projects, central/state pollution control board, environmental monitoring projects and different (NGOs) organizations.

2.3 Nature of Prospective Target Group of Learners

The Program is targeted to all individuals looking to earn a postgraduation degree for employment, further higher education, promotion in career, professional development.

2.4 Appropriateness of Programme to be conducted in ODL mode to acquire specific skills & competence

Learning outcomes after Level 6.5		
Learning Outcomes	Elements of the descriptor	Level 6.5 (Master's in -Environmental Science)
LO 1	Knowledge and understanding	• advanced knowledge about a specialized field of enquiry with a critical understanding of the emerging developments • advanced knowledge and understanding of the research principles, methods, and techniques applicable professional practice, • Procedural knowledge required for performing and accomplishing complex and specialized professional tasks relating to teaching, and research and development.
LO 2	Skills required to perform and accomplish tasks	• advanced cognitive and technical skills required for performing and accomplishing complex tasks • advanced cognitive and technical skills required for evaluating research findings and designing and conducting relevant research that contributes to the generation of new knowledge, • Specialized cognitive and technical skills relating to a body of knowledge and practice to analyse and synthesize complex information and problems.
LO 3	Application of knowledge and	• apply the acquired advanced theoretical and/or technical knowledge about professional practice and a range of cognitive

	skills	and practical skills to identify and analyse problems and issues, including real-life problems, associated with the environmental science.
LO 4	Generic learning outcomes	• listen carefully, read texts and research papers analytically and present complex information in a clear and concise manner to different groups/audiences, • communicate, in a well-structured manner, technical information and explanations, and the findings/ results of the research studies. • meet one's own learning needs relating to the chosen fields of learning, work/vocation, and an area of professional practice, • pursue self-paced and self- directed learning to upgrade knowledge and skills, including research-related skills, required to pursue higher level of education and research.
LO 5	Constitutional, humanistic, ethical and moral values	• embrace and practice constitutional, humanistic, ethical and moral values in one's life, • adopt objective and unbiased actions in all aspects of work and professional practice, • participate in actions to address environmental protection and sustainable development issues,
LO 6	Employment ready skills, and entrepreneurship skills and mindset	• adapting to the future of work and responding to the demands of the fast pace of technological developments and innovations that drive shift in employers' demands for skills, particularly with respect to transition towards more technology-assisted work involving the creation of new forms of work and rapidly changing work and production processes. • exercising full personal responsibility for output of own work as well as for group/ team outputs and for managing work that are complex and unpredictable requiring new strategic approaches.

2.5 Instructional Design

2.5.1 2-year M.Sc.-Environmental Science Programme Structure

The University follows the credit system in all its programmes. One credit is equal to 30 hours of learner's study time which is equivalent to 15 lectures in conventional system. To earn a Master's Degree, a learner has to earn 80 credits in minimum four semesters (two years) with 20 credits per semester. For earning 80 credits, a learner has to go through the following Programme Structure:

Programme Structure of M.Sc.-Environmental Science under NHEQF

Level	Year	Sem	Core Course 1	Core Course 2	Core Course 3	Research component	Practical Lab/ Dissertation with viva voce	Total credit
8	1	1 st	4	4	4	4	4	20
		2 nd	4	4	4	4	4	20
9	2	3 rd	4	4	4	4	4	20
		4 th	4	4	4	4	4	20
Total credit								80

Explanation of terms used for categorization of courses:

- A. **Course 1 to 3:** A course, which should compulsorily be studied by a learner as a core requirement is termed as a Core course.
- B. **Research Component:** The components included in this category are Basics in Research (PGBR-01), Mini Project (PGMP-02), Basic Research Tools (PGRT-03).
- C. **Practical Lab:** Lab based on courses discussed in theory papers.
- D. **Industrial Training/ Survey/ Research Project/ Field Work/Apprenticeship/ Dissertation/Internship:** A course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a learner studies such a course on his own with an advisory support by a counsellor/faculty member.

2.5.2 Course curriculum: The details of syllabus is given in Appendix-I

2.5.3 Language of Instruction: SLM is provided in English. However, learner can write assignment and give Term End Examination (TEE) either in Hindi or English.

2.5.4 Duration of the Programme

Minimum duration in years: 02

Maximum duration in years: 04

2.5.5 Faculty & Support Staff

Director(1), Assistant Professor (3) and support staff (3)

2.6 Instructional Delivery Mechanisms

The Open University system is more learner-oriented, and the student is an active participant in the teaching-learning process. Most of the instructions are imparted through distance rather than face-to-face communication.

The University follows a multi-media approach for instruction. It comprises of:

- self-instructional printed material (Self Learning Material)
- audio and video lectures
- face-to-face counselling
- assignments
- laboratory work
- Project work in some courses
- teleconference/web conference
- Web Enabled Academic Support Portal

2.6.1 Self-Learning Material

The Self Learning Material (SLMs) is prepared in line with the UGC guidelines on preparation of SLMs. The prepared study materials are self-instructional in nature.

The course material is divided into blocks. Each block contains a few units. Lessons, which are called Units, are structured to facilitate self-study. The units of a block have similar nature of contents. The first page of each block indicates the numbers and titles of the units comprising the block. In the first block of each course, we start with course introduction. This is followed by a brief introduction to the block. After the block introduction, emphasis is given on contribution of ancient Indian knowledge into that specific course. Next, each unit begins with an introduction to talk about the contents of the unit. The lists of objectives are outlined to expect the learning based outcome after working through the unit. This is followed by the main body of the unit, which is divided into various sections and sub-sections. Each unit is summarized with the main highlights of the contents.

Each unit have several “Check Your Progress” Questions and Terminal Questions /exercises. These questions help the learner to assess his/her understanding of the subject contents. At the end of units, additional references/books/suggested online weblink for MOOCs/Open Educational Resources for additional reading are suggested.

2.6.2 Audio and Video lectures

Apart from SLM, audio and video lectures have been prepared for some courses. The audio-video material is supplementary to print material. The video lectures are available at YouTube channel of university(https://www.youtube.com/channel/UCj2XTEB6iCZwwIqmKw_jzYg).

2.6.3 Counselling Classes

The face to face (F2F) counselling classes are conducted at head quarter and study centers. The purpose of such a contact class is to answer some of questions and clarify the doubts of learner which may not be possible through any other means of communication. Well experienced counsellors at study centers provide counselling and guidance to the learner in the courses that (s) he has chosen for study. The counselling sessions for each of the courses will be held at suitable intervals throughout the whole academic session. The time table for counselling classes are displayed at head quarter as well as by the coordinator of study center, however, attending counselling sessions is not compulsory. It is noted that to attend the counselling sessions, learner has to go through the course materials and note down the points to be discussed as it is not a regular class or lectures.

2.6.4 Assignments

The purpose of assignments is to test the comprehension of the learning material that learner receives and also help to get through the courses by providing self-feedback to the learner. The course content given in the SLM will be sufficient for answering the assignments.

Assignments constitute the continuous evaluation component of a course. The assignments are available at the SLM section of the home page of university website. In any case, learner has to submit assignment before appearing in the examination for any course. The assignments of a course carry 30% weightage while 70% weightage is given to the term-end examination (TEE). The marks obtained by learner in the assignments will be counted in the final result. Therefore, It is advised to take assignments seriously. However, there will be no written assignments for Lab courses.

2.6.5 Laboratory Work

Laboratory courses are an integral component of the M.Sc. programme. While designing the curricula for laboratory courses, particular care has been taken to weed out experiments not significant to the present-day state of the discipline. Importance has been given to the utility of an experiment with respect to real life experience, development of experimental skills, and industrial applications. It is planned to phase the laboratory courses during suitable periods (such as summer or autumn vacations) so that in-service persons can take them without difficulty. Laboratory courses worth 2 credits will require full-time presence of the student at the Study Centre for one week continuously. During this time a student has to work for around 60 hours. Around 40 hours would be spent on experimental work and the remaining time will be used for doing calculations, preparations of records, viewing or listening to the video/audio programmes.

2.6.6 Teleconference/Web conference

Teleconference/web conference, using done through ZOOM/webex in form of online special counselling sessions is another medium to impart instruction to and facilitate learning for a distance learner. The students concerned would be informed about the teleconferencing schedule and the place where it is to be conducted by sending bulk SMS.

2.6.7 Web Enabled Academic Support Portal

The University also provides Web Enabled Academic Support Portal to access the course materials, assignments, and other learning resources.

2.6.8 Learner Support Service Systems

(a) Study Centre

A Study Centre has following major functions:

- (i) **Counselling:** Counselling is an important aspect of Open University System. Face to face contact-cum-counselling classes for the courses will be provided at the Study Centre. The detailed programme of the contact-cum-counseling sessions will be sent to the learner by the Coordinator of the Study Centre. In these sessions learner will get an opportunity to discuss with the Counsellors his/her problems pertaining to the courses of study.
- (ii) **Evaluation of Assignments:** The evaluation of Tutor Marked Assignments (TMA) will be done by the Counsellors at the Study Centre. The evaluated assignments will be returned to the learner by the Coordinator of Study Centre with tutor comments and marks obtained in TMAs. These comments will help the learner in his/her studies.
- (iii) **Library:** Every Study Centre will have a library having relevant course materials, reference books suggested for supplementary reading prepared for the course(s).
- (iv) **Information and Advice:** The learner will be given relevant information about the courses offered by the University. Facilities are also provided to give him/her guidance in choosing courses.
- (v) **Interaction with fellow-students:** In the Study Centre learner will have an opportunity to interact with fellow students. This may lead to the formation of self-help groups.

(b) Learner Support Services (LSS)

The University has formed an LSS cell at the head quarter. The LSS cell coordinate with the Study Centre to get rid of any problem faced by the learner.

2.7 Procedure for admissions, curriculum transaction and evaluation

2.7.1 Admission Procedure

- (a) The detailed information regarding admission will be given on the UPRTOU website and on the admission portal. Learners seeking admission shall apply online.
- (b) Direct admission to 2-year M.Sc. (Environmental Science) program is offered to the interested candidates.
- (c) **Programme Fee:** Rs. 12000 / year. The fee is deposited through online admission portal only.

2.7.2 Evaluation

The evaluation consists of two components: (1) continuous evaluation through assignments, and (2) term-end examination. Learner must pass both in continuous evaluation as well as in the term-end examination of a course to earn the credits assigned to that course. For each course there shall be one written Terminal Examination. The evaluation of every course shall be in two parts that is 30% internal weightage through assignments and 70% external weightage through terminal exams.

(a) **Theory course**
Terminal Examination

Max. Marks
70

Assignment	30
Total	100
(b) Practical course:	Max. Marks
Terminal Practical Examination	100

Marks of Terminal Practical Examinations shall be awarded as per following scheme:

i.	Write up /theory work	30
ii.	Viva-voce	30
iii.	Execution/Performance/Demonstration	20
iv.	Lab Record	20

The following 10-Point Grading System for evaluating learners' achievement is used for CBCS programmes:

10-Point Grading System in the light of UGC-CBCS Guidelines

Letter Grade	Grade Point	% Range
O (Outstanding)	10	91-100
A+ (Excellent)	9	81-90
A (Very Good)	8	71-80
B+ (Good)	7	61-70
B (Above Average)	6	51-60
C (Average)	5	41-50
P (Pass)	4	36-40
NC (Not Completed)	0	0-35
Ab (Absent)	0	
Q	Qualified	Applicable only for Non-Credit courses
NQ	Not Qualified	

Learner is required to score at least a 'P' grade (36% marks) in both the continuous evaluation (assignments) as well as the term-end examination. In the overall computation also, learner must get at least a 'P' grade in each course to be eligible for the M. Sc. degree.

Computation of CGPA and SGPA

(a) Following formula shall be used for calculation of CGPA and SGPA

For jth semester $SGPA (S_j) = \sum (C_i * G_i) / \sum C_i$	where, C_i = number of credits of the i th course in j th semester G_i = grade point scored by the learner in the i th course in j th semester.
$CGPA = \sum (C_j * S_j) / \sum C_j$	where, S_j = SGPA of the j th semester C_j = total number of credits in the j th semester

The CGPA and CGPA shall be rounded off up to the two decimal points. (For e.g., if a learner obtained 7.2345, then it will be written as 7.23 or if s(he) obtained 7.23675 then it be will written as 7.24)

CGPA will be converted into percentage according to the following formula:

$$\text{Equivalent Percentage} = CGPA * 9.5$$

(b) Award of Division

The learner will be awarded division according to the following table:

Division	Classification
1 st Division	6.31 or more and less than 10 CGPA
2 nd Division	4.73 or more and less than 6.31 CGPA
3 rd Division	3.78 or more and less than 4.73 CGPA

2.8 Requirement of the laboratory support and Library Resources

The practical sessions are held in the science laboratories of the Study Centre. In these labs, the learner will have the facility to use the equipment and consumables relevant to the syllabus. The SLM, supplementary text audio and video material of the various courses of the program is available through the online study portal of the University. The University also has a subscription of National Digital Library to provide the learners with the ability to enhance access to information and knowledge of various courses of the programme.

2.9 Cost estimate of the programme and the provisions

2-year M.Sc. programme consists of 15 theory courses, 4 laboratory courses and (basic research, mini and major project, and Dissertation) research activities. One course is of 4 credits which consist of approx. 12 units. The total approximated expenditure on the development of 15 courses is:

S. No.	Item	Cost per Unit (writing & editing)	Total cost (Rs.)
1	Total no. of units in 12 courses = $15 \times 12 = 180$	5000	900000
2	BOS Meetings etc.	100000	100000
Total			1000000

2.10 Quality assurance mechanism and expected programme outcomes

(a) **Quality assurance mechanism:** The program structure is developed under the guidance of the Board of studies comprising external expert members of the concerned subjects followed by the School board. The program structure and syllabus is approved by the Academic Council of the University. The course structure and syllabus is reviewed time to time according to the feedback received from the stakeholders and societal needs.

The Centre for Internal Quality Assurance will monitor, improve and enhance effectiveness of the program through the following:

- ✓ Annual academic audit
- ✓ Feedback analysis for quality improvement
- ✓ Regular faculty development programs
- ✓ Standardization of learning resources
- ✓ Periodic revision of program depending upon the changing trends by communicating to the concerned school

(b) Expected programme outcomes (POs)

PO1	Demonstrate a fundamental/coherent understanding of the academic in all disciplines of biological/physical science, its different learning areas and applications, and its linkages with related disciplinary areas/subjects
PO 2	Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of environmental related experiments
PO 3	Identify and apply appropriate principles and methodologies to solve different types of environmental problems.
PO 4	Equip students to face the employment challenges and instill confidence to turn into entrepreneur and also step into research career.
PO 5	Generation of new scientific insights or to the innovation of new applications of environmental, chemical and biological research
PO 6	The students will improve their competencies on par with their counterparts in premier institutions across the nation.

Programme specific outcomes (PSOs):	
PSO-1	Learn will be able to understand the fundamental concepts, principle and processes underlying the field of environmental science such as sustainable development, pollution abatement, biodiversity conservation, environmental issue, challenges and their management etc at regional and global scale.
PSO-2	Appreciates the importance of various elements of ecosystem and its factor that govern and regulate the ecological balance, this course also explain the origin and processes of atmospheric activity and its adverse effected on living beings.
PSO-3	Gathers attention about the physical and biological aspects of environmental by analysis of environmental data through using wide range of environmental techniques such as water, air, soil analysis techniques, specially cover, spectroscopic and Electrophoretic techniques. In addition also cover, microbiological, methods, Remote sensing and GIS techniques
PSO-4	It is useful to contact research existing environmental issues and also demonstrate appropriate skill to every emerging problem that rises in field of ecology and environmental or any interdisciplinary sciences.
PSO-5	Learn will be able to get their entrepreneurship because it provide skill in specific areas related to environmental science such as industrial pollution abatement, wastewater treatment and water resources management techniques, techniques of environmental modeling, township and urban planning management, housing and highway contraction project, agriculture and soil health and toxicology and occupational health and safety management etc.
PSO-6	Create awareness on environmental and ethical issue, specially emphasizing on academic and research ethics, scientific misconduct, plagiarism, IPR and biosafety etc.
PSO-7	Carry out laboratory experiments taught in Core Theory papers and to understand good laboratory practices with safety.
PSO-8	Enhance students' ability to develop different environmental management system and model for ecological balance
PSO-9	Global level research opportunities to pursue Ph.D. programme targeted approach of CSIR/UGC– NET examination

PSO-10	Discipline specific competitive exams conducted by service commission
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Newly Introduced programme : Yes	
Programme:	Master in Science
Year: NA	First Introduction year: 2023
Programme prerequisites: Bachelor degree in concerned subject (B.Sc. (Life Science/ B.Sc. Physical Science/B.Sc. Agriculture/B.Sc. Home Science, and their allied subject	