Savitribai Phule Pune University

Pune, India

Faculty of Science and Technology

TWO YEAR MASTERS PROGRAMME IN SCIENCE

Subject: ENVIRONMENTAL SCIENCES

Structure and Syllabus of Two Year

Masters in Environmental Sciences (M.Sc) Degree Program

(for affiliated colleges)

(with Multiple Entry and Exit Options)

Effective from Academic year 2023 – 2024

vide the university circular 122/2023/ dated 21/06/2023

Preamble

The syllabus on Two year Masters Programme in Environmental Science is presented here as an outcome of deliberations amongst distinguished academia and on the skill and demands of the industry. It aims at catering to impart skills and knowledge to budding Environmentalist so that they may provide an informed choices and solutions to a plethora of national and international environment based industries. It also aims at equipping students at developing cutting-edge solutions and technologies that can prove fruitful in monitoring, nurturing, preserving and predicting environmental issues in the new paradigm of global warming and climate change. It is thus designed for students interested in studying environmental problems from a scientific perspective.

The syllabus for the two years Master Programme (M.Sc.) in Environmental Sciences under the Faculty of Science and Technology offered by the Savitribai Phule Pune University is multidepartmental and interdisciplinary in nature and has been prepared under the Credit Framework guidelines of National Education Policy (NEP) 2020. The Master's program is divided into two distinct Academic years consisting of two semesters for First year (6.0) and two semesters (6.5) for the second year. The two year program i.e. Master in Environmental Sciences amounts to a sum of minimum 88 credits, with minimum of 22 credits for each semester. If a student chooses to exit at the end of first year as per the NEP 2020, he/she will be awarded a Post Graduate Diploma in Environmental Sciences, provided he completes all necessary credits as per SPPU guidelines. The Masters and Diploma programme are comprehensive and contain multidisciplinary courses that can be broadly classified into Major Core, Major Electives, and Research Methodology courses, Each semester, the student can choose subjects from a 'basket of Elective Courses' on offer. Students are encouraged to select interdisciplinary science subjects on offer across the School or University campus. They are also encouraged to select the Elective courses from National Educational Platforms such as MOOCS/NPTL/SWAYAM, noted in the table in consultation with the Department. Besides, Research Projects (Masters Dissertations) and On Job Training (Internship) are also designed and included in this syllabus to offer a plethora of research based and skilled based learning experiences.

This programme will involve teaching-learning activities by class-room teaching and conducting practicals in laboratories. It will involve learning concepts through presentations, black board teaching, group discussions and student assignments. In addition, fieldworks related to Forest and wildlife, and visits to field based best practices, environment based industries, laboratories of national/international repute, botanical and zoological gardens, etc. will also be included and encouraged during the semester breaks. Students will submit field reports for evaluation after such activities.

The PG Diploma and Masters students will be assessed through a Continuous Assessment (CA) and End Semester Assessment (ESA). Candidates will be examined and evaluated under grade system at the end of each semester separately for theory and practical papers as per the credits offered by each course.

The overall aim of this new syllabus is to empower our students to acquire skills and competence so as to adopt careers in environmental science sector and to serve the Nation and global industries in the solving the problems and perils faced by Mother Earth.

Structure of the Syllabus with Credit Framework

First Year

I. M. Sc. First year Environmental Sciences - Semester I

Assessment of Credits:

ENV: Environmental Sciences; CT: Core Compulsory Theory; CP: Compulsory Practical;

ET: Elective Theory; EP: Elective Practical; RMT: Research Methodology Theory; RMP: Research Methodology Practical

Components of Study	Course Code		Course Name	Credit	Sub Total
Core Compulsory Theory Papers	ENV 111 MJ		Fundamentals of Environmental Biology & Biodiversity	4	14
	ENV 112 MJ		Fundamentals of Environmental Physics & Chemistry	4	
	ENV 113 MJ		Environmental Statistics	2	
Core Compulsory Practical paper	ENV 114 MJP		Practicals based on ENV11 MJ ENV112 MJ and ENV 113 MJ	4	
Research Methodology Theory	ENV 110 RM		Research Methodology	2	4
Research Methodology Practical	ENV 110 RMP		Research Methodology Practical	2	
Choice Based Optional Papers Elective/ Departmental Course **Any one group**	Group I	ENV 115 MJ	Fundamentals of Atmospheric Sciences	2	4
		ENV 116 MJ	Fundamentals of Geo-Sciences	2	
	OR				
	Group II	ENV 117 MJ	Sustainable Development	2	4
		ENV 118 MJP	Environmental Education	2	
			Total		**22**

II. M. Sc. First year Environmental Science Semester II

Assessment of Credits:

ENV: Environmental Sciences; CT: Core Compulsory Theory; CP: Compulsory Practical;

ET: Elective Theory EP: Elective Practical; OJT- Internship/On job training

Course Type	**Course Code**		**Course Name**	**Credit**	**Sub Total**
Core Compulsory Theory Papers	ENV 121 MJ		Water & Soil Pollution: Management & Mitigation	4	14
	ENV122 MJ		Air, Noise & Radiation Pollution: Management & Mitigation	4	
	ENV 123 MJ		Environmental Law	2	
Core Compulsory Practical paper	ENV 124 MJP		Practicals based on ENV121 MJ, ENV522 MJ and ENV 123 MJ	4	
Internship On job training	ENV 120 OJT		Internship /On job training	4	4
Choice Based Optional Papers Elective / Departmental Course **Any one group**	Group I	ENV 125 MJ	Water & wastewater technology-I (Basic)	2	4
		ENV 126 MJ	Water & wastewater technology-II (Advanced)	2	
	OR				
	Group II	ENV 127 MJ	Environmental Management	2	4
		ENV 128 MJ	International Environmental Law	2	
			Total		**22**

III. M. Sc. Second year Environmental Science Semester III

Assessment of Credits:

ENV: Environmental Sciences; CT: Core Compulsory Theory; CP: Compulsory Practical;

ET: Elective Theory EP: Elective Practical; RP: Research Project

Course Type	Course Code		Course Name	Credit	Sub Total
Core Compulsory Theory Papers	ENV 231 MJ		Environmental Impact Assessment & Environmental Audit	4	14
	ENV232 MJ		Remote Sensing & GIS	4	
	ENV 233 MJ		Watershed management	2	
Core Compulsory Practical paper	ENV 234 MJP		Practicals based on ENV121 MJ, ENV522 MJ and ENV 123 MJ	4	
Choice Based Optional Papers Elective / Departmental Course **Any two groups**	Group I	ENV 235 MJ	Environmental Resource monitoring	2	4
		ENV 235 MJP	Practicals based on ENV 235	2	
	OR				
	Group II	ENV 236 MJ	Restoration ecology	2	4
		ENV 236 MJP	Practicals based on ENV 236MJ	2	
	OR				
	Group 3	ENV 237 MJ	Forestry & Wildlife Management	2	4
		ENV 237 MJP	Practicals based on ENV 237 MJ	2	

IV. M. Sc. Second year Environmental Science Semester IV

Assessment of Credits:

ENV: Environmental Sciences; CT: Core Compulsory Theory; CP: Compulsory Practical;

ET: Elective Theory EP: Elective Practical; RP: Research Project

Course Type	Course Code		Course Name	Credit	Sub Total
Core Compulsory Theory Papers	ENV 241 MJ		Solid & Hazardous Waste Management	4	12
	ENV 242 MJ		Renewable and Nonrenewable Energy	4	
	ENV 243 MJ		Environmental Design & Planning	2	
Core Compulsory Practical paper	ENV 244 MJP		Practicals based on ENV241 MJ and ENV242 MJ	4	
Research Project	ENV 240 RP		Dissertation	4	4
Choice Based Optional Papers Elective / Departmental Course **Any one group**	Group I	ENV 245 MJ	Industrial health & safety	2	4
		ENV 246 MJ	Environmental Policy, Climate Change	2	
	OR				
	Group II	ENV 247 MJ	Environmental Biotechnology & nanotechnology	2	4
		ENV 247 MJP	Practical's related to ENV 246	2	
			Total		22

Assessment and Evaluation

a) **In-semester Assessment**: The Departmental Internal Assessment Committee will coordinate this activity. Internal assessment for each course would be continuous and dates for each tutorials/practical tests will be pre-notified in a separate time table.

i) Theory Courses: There will be a minimum one test of 10 marks for each credit in a theory course comprising of 4 credits (i.e. 4 tests per course) and will compose multiple choice and or short answer questions. The marks for each test will be displayed on the notice board within a week of conducting the test. Of the total period of 15 weeks of teaching, the internal assessment tests will commence after 3 weeks and 2 to 4 tests will be conducted for 2 credit and 4 credit courses respectively. In addition, 10 marks oral examination will be conducted for each 4 credit theory course.

ii) Practical Courses: Practical courses will be evaluated on the basis of each practical. For 4 credit practical course minimum 10 practicals will be conducted, there will be two practical tests of 10 marks each and 5 marks will be given for attendance and journal completion.

b) **Term End Examination**: The term end examination for 50 marks per course, would be held about two weeks after completion of teaching for the semester. Paper setting and assessment for a particular course would be the responsibility of the course In-charge. These activities would be co-ordinated by the Department Examination Committee chaired by the Head of Department. . The Department Examination committee would undertake preparation of the result-sheets for the students.

c) Field Work: Fieldwork/visits is compulsory (amounting to 4 credits). At least 1 major interdisciplinary fieldwork (2 credits) and two visits (1 credit each) is envisaged separately or combined together. and there will be a continuous evaluation of the same. The overall scheme for each credit evaluation is as follows:

Component	**Marks**	**Evaluating Authority**
Performance of the student in the field (Punctuality, enthusiasm, and aptitude)	05	Faculty accompanying the students
Field Diary	05	Faculty accompanying the student
Viva-voce	05	Faculty accompanying the student
Comprehensive Tour Report	10	By Departmental Committee

GPA Rules:

1. The formula for GPA will be based on Weighted Average. The final GPA will not be printed unless a student passes courses equivalent to minimum 80 credit hours (Science). Total credits hours means the sum of credit hours of the courses which a student has passed.
2. A seven-point grade system [guided by the Government of Maharashtra Resolution No. NGO – 1298 / [4619] / UNI 4 dt. December 11, 1999 and University regulations] will be followed. The corresponding grade table is attached herewith.
3. If the GPA is higher than the indicated upper limit in the third decimal digit then the student be awarded higher final grade (e.g. a student getting GPA of 4.492 may be awarded 'A')
   For Semester I, II, III examinations, only the grade points will be awarded for each subjects. Final GPA along with final grade will be awarded only at the end of IVth semester. There is also a provision for verification and revaluation. In case of verification, the existing rules will be applicable. The revaluation result will be adopted if there is a change of at least 10% marks and in the grade of the course.
4. After the declaration of result, for the improvement of Grade, the student can reappear for the examination of 30 credit worth theory courses.

Explanation of Grade & Grade Point Average:

Marks Obtained	Grade	Grade Points
100 – 80	**'O'** Outstanding	10
79 - 70	**'A+'** Excellent	9
69 - 60	**'A'** Very Good	8
59 - 55	**'B+'** Good	7
54 - 50	**'B'** Above average	6
49 - 45	**'C'** Average	5
44 - 40	**'P'** Pass	4
39 -0	**'F'** Fail	0
0	**Ab**	Absent

Final Grade Points:

Grade Points	Final Grade
10.0 - 9.0	**O**
8.99 - 8.5	**A+**
8.49 - 7.5	**A**
7.49- 6.5	**B+**
6.49 - 5.5	**B**
5.49- 4.25	**C**
4.24 - 4.0	**P**
>3.99	**F**

Common Formula for GPA:

$$\text{Grade Point Average (GPA)} = \frac{\text{Total of (Grade Points earned x Credit hours for each course)}}{\text{(Total Credit hours)}}$$

Note: The Departmental Examination Committee in consultation with Head of Departmental will have the full rights to make changes in the evaluation system but within the norms of the SPPU Board of Examination and Evaluation.