JSS Academy of Higher Education and Research, Mauritius

(A Degree Awarding Institution Registered with the Higher Education Commission, Mauritius)

Master of Science (Environmental Sciences)

Programme Handbook

Table of contents

	Details
	Programme Handbook **A. Programme Information** **B. Programme Aims** **C. Programme Objectives** **D. Overall Programme Learning Outcomes** **E. Entry Requirements** **F. Fees Structure** **G. Programme Mode and Duration** **H. Teaching and Learning Strategy** **I. Program Committee** **J. Student Support and Guidance** **K. Attendance Requirement** **L. Credit System** **M. Student Progress and Assessment** **N. Award Classification** **O. Programme Organisation and Management** **P. Programme Structure**

Programme Handbook

A. Programme Information

The MSc Environmental Sciences programme is about to study of food safety and hygiene, control of air pollution, solid and hazardous waste management, occupational safety and health, environmental management and water resources etc. The applied aspects and branches of Environmental Sciences are covered by the Master's degree programme. The programme is based on core-skill, career-focused and oriented towards the management of environmental risk, environmental laws and standards, epidemiology, health planning, wastewater reuse, water treatment, water quality, water legislation, rural water supply and sanitation, industrial hygiene, work place safety and standards. The researchers and industries striving to solve major global challenges such as air pollution, climate change, renewable energy, health policy, industrial hygiene, green economy, sustainable development, shared water resources, hazardous waste management, clean drinking water and food security.

The curriculum is intended to advance theoretical knowledge and practical skills required for a strong foundation for Environmental Sciences to increase the employability opportunities for students. It seeks to prepare graduates for a wide range of occupations or further studies in solid and hazardous waste management, wastewater reuse, water quality management, food safety and hygiene, industrial hygiene, workplace safety and standards, project management, organizational management and leadership settings. Students will study various fields of Environmental sciences during the course that are of interest to the health, environmental, ecological and hazardous waste management sectors. The programme is also meant for the students coming from the Indian Ocean and African region including countries such as South Africa, Zambia, Zimbabwe, Uganda, Kenya, Ghana, Ethiopia, Tanzania, Rwanda, Nigeria, Namibia, India, Sri Lanka, and Nepal. The job outlook for environmental scientists is excellent. Employment is projected to grow 15% up to 2022, which is faster than the average for all occupations. Issues like climate change and fracking have spurred more public interest in the environment.

After completion of the programme, students will be able to provide their expertise in the fields of clean drinking water and food security, water quality, water legislation and sanitation, industrial hygiene, workplace safety and standards, global challenges such as air pollution, climate change, renewable energy, hazardous waste management, environmental laws and standards, epidemiology and health planning.

B. Programme Aim

The aim of MSc Environmental Sciences is to equip students with the advanced knowledge and skills necessary to embark on further research or jobs in industries/academics that are trying to solve major global challenges such as air pollution, water pollution, clean drinking water and food safety, climate change, hazardous waste management.

Job Prospects:

1. Research and development firms (Research Scientist, Research Officer)
2. Educational Institutions (Associate Professor & Professor)
3. Environmental Chemist
4. Food Standard Agencies (Analyst)
5. Waste Management Companies (Environmental Scientist)
6. Pharmaceutical Companies (Environmental Scientist)
7. Agri-Chemical Companies (Environmental Scientist)
8. Environmental geologist (Analyst)
9. Water Companies (Analyst)
10. Trainer Scientific Officer
11. Project Assistant and Field Assistant
12. Oceanographer
13. Toxicologist
14. Environmental biologist
15. Environmental lawyer

C. Programme Objectives

The programme objectives are to equip the students with:

1. Adequate scientific information regarding basic principles of Environmental Sciences.
2. The phenomenon related to environmental issues at global level like air pollution, water pollution and hazardous waste management.
3. To facilitate research approach in Environmental Sciences that leads to the better understanding of environmental problems and other ecological concepts.
4. Thorough knowledge and skills needed to measure environmental chemistry concepts and the diversity issues as they interact with the environmental problems.
5. The knowledge of use of environmental strategies and remediation techniques to solve environmental problems.
6. Ability to apply skills to assess environmental risks and related disciplines.

D. Overall Programme Learning Outcomes

This programme will enable students to:

- Gain knowledge in the environmental problems that affect the health of citizens and the integrity of the eco system.
- Develop competent knowledge with updated version in different fields of Environmental Sciences enables to find impetus avenues in different branches of science such as food safety and hygiene, occupational safety and health, environmental management and water resources.
- Enhance in latest trends and concepts of Environmental Sciences to carry out research study, survey, project management and entrepreneurial skills, advanced analytical laboratory skills and air pollution control, environmental risk assessment, environmental laboratory analysis, solid and hazardous waste management, food safety and hygiene, industrial hygiene, work place safety and standards that equip them for building a successful career.

- Advance knowledge and skills to work with wide range of employers, including universities, industries like pharmaceutical, agrochemicals and food and drinks, consumer goods and Environmental Consultancy, etc.,

E. Entry Requirements

Candidates must be:

Graduates of a recognised university or any other institutions of higher education with at least a second-class BSc degree or equivalent.

Overseas Candidates

Overseas candidates whose first language is not English and who do not hold a BSc degree or equivalent qualification taught in English, will be required to produce evidence of their competence in English.

F. Fees Structure

The extract of fee structure and breakdown refund policy are given below;

Programme MSc (Environmental Sciences)	**MUR**	**USD**
Tuition fee per annum (F/T)	200,000	5900
Tuition fee per annum (P/T)	150,000	4500
Other Fees		**Amount (MUR)**
Application Fees	Non-refundable	1,000 One off
Registration Fees	Non-refundable	5,000 One off
Administrative Fees	Non-refundable	5,000 per annum
Library Fees	Non-refundable	5,000 per annum
Library Deposit	Refundable	5,000 One off
Laboratory Fees	Non-refundable	5,000 per annum
Examination Fees	Non-refundable	5,000 per annum
Marks card fees	Non-refundable	1,000 per annum
Convocation Fees	Non-refundable	2,000 One off

Hostel Fees:

Accommodation Charges	Non-refundable	45,000 per annum
Food Charges	Non-refundable	40,000 per annum
Caution Deposit	Refundable	15,000 One Off

Refund Policy:

Tuition fees are not refundable except in special circumstances on a limited number of grounds, which are as follows:

- A refund of full tuition fees paid is considered for students having for some reasons made the wrong choice or who realise that they are unable to cope with the regime of higher studies, provided that the application for refund is made to the Management within the first ten working days of the start of the programme.

- A refund of 50% of the full semester tuition fees is considered on medical, family or other acceptable grounds if full fees for the semester have been paid, provided the request is received before the fifth week of the semester. No refund will be made if a lesser amount has been paid.

- There is no refund for the accommodation charges. Food charges may be refunded on a pro rata basis by giving one-month notice. Caution deposit is refundable at the end of the stay.

G. Programme Mode and Duration

(i)	**Delivery mode**	Full Time and Part Time
(ii)	**Delivery Type**	Face to face/contact Face to face and distance with an online learning platform
(iii)	**Duration (minimum and maximum) in terms of years, and contact hours per year**	**Full time:** Minimum 1.5 year – Maximum 3 years **Part-time:** Minimum 2 years- Maximum 4 years
(iv)	**Number of semesters**	**Full time:** Minimum 3 Semesters – Maximum 6 Semesters **Part-time:** Minimum 4 Semesters - Maximum 8 Semesters

H. Teaching and Learning Strategies

The programme includes combination of lectures, tutorials, individual or group projects, assignments, presentations, workshops, seminars, laboratory practical's, problem-based-learning group sessions, independent learning and research projects. The programme will also consist of class tests, structured discussions, self-development activities. Self-learning will be the key feature of the programme, enabling students to explore, investigate and research in various issues related to environmental health world.

Positive learning outcomes reflect interplay between the teaching activities and learning environment provided by JSSAHERM and the skills, knowledge,

attitudes and behaviours of its students. The institution has brought forward a few principles to help ensuring that the quality of teaching and learning is always respected.

The following principles aim to guide excellence in learning and teaching practices, while recognising that effective learning and teaching involves a partnership between students and the institution:

- Creating an engaging, motivating, and intellectually stimulating learning environment and experience.
- Encouraging the spirit of critical inquiry and creative innovation informed by current research.
- Emphasising the importance, relevance and integration of theory and knowledge with professional practice to develop solutions to real world issues.
- Providing learning experiences that develop inter-culturally capable graduates who can make a difference as socially and ethically responsible global citizens.
- Valuing and recognising individual and cultural diversity through the provision of an inclusive context of support and respect for all students.
- Enhancing student engagement and learning through effective curriculum design, pedagogy and assessment strategies.
- Continuously improving teaching practice through academic staff professional development, and critical reflection informed by a range of evaluation approaches.;
- Conducting evaluation (feedback) exercises, through which the students will be encouraged to give their view and rate the teaching quality of each lecturer – The feedback survey forms would be analysed and reports would be generated. Appropriate measures would be taken to eliminate weaknesses and shortcomings; All feedback survey forms would be securely kept for verification and consultation as and when required; The feedback exercise will be conducted every semester before the end of courses to ensure that students' views are appropriately taken care prior to their sitting for examinations;
- Conducting Performance Appraisal exercises for all teaching and non-teaching staff members; This exercise allow the institution to find room for improvement, evaluate the staff's opportunities for promotion and to channel staff members for training and development as learning is an on-going process not only students but for lecturers and other staff members also.

I. Program Committee:

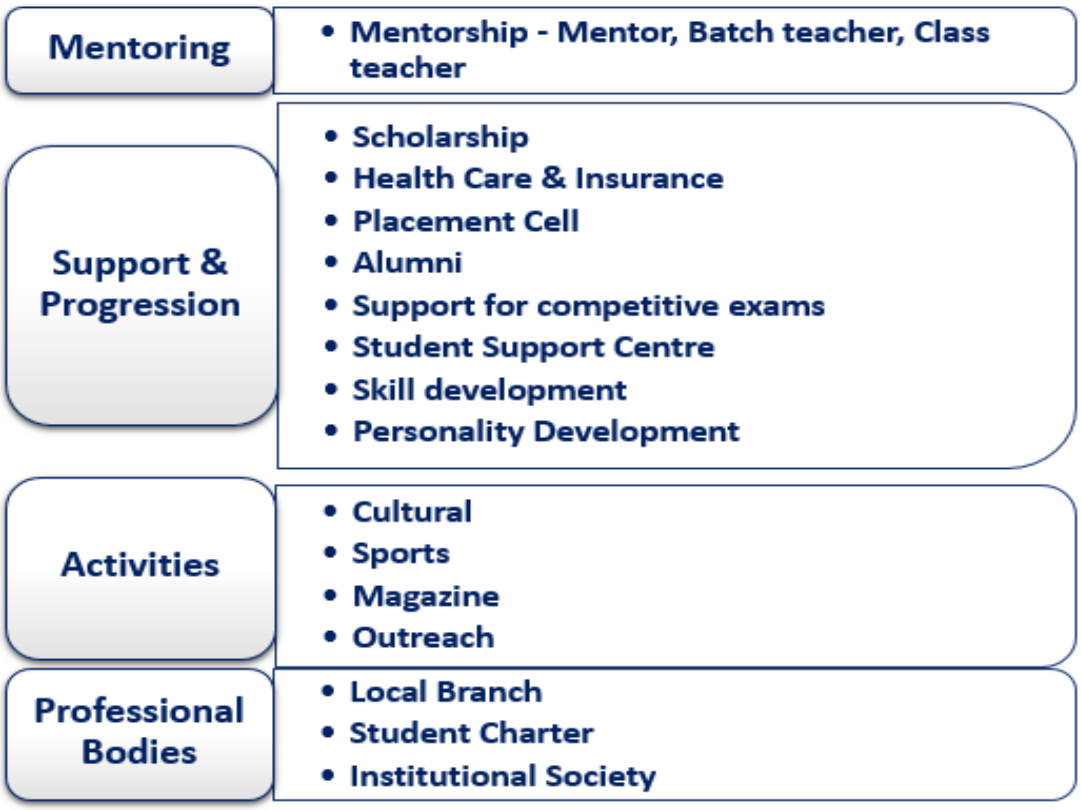
- Every post graduate program shall have a Program Committee constituted by the HOD in consultation with all the Course Teachers of the corresponding program.
- The composition of the Program Committee shall be as follows: Among the faculty member one will be the Chairperson; Teacher of all courses of the corresponding program; Student Adviser and two student representatives of the program (one in I year and other in II year), nominated by the Head of the Department.
- Duties of the Program Committee:

i. Reviewing periodically the progress of the classes.
ii. Discussing the problems concerning curricula, syllabi and the conduct of classes.
iii. Providing consultation of the Course Teachers on the nature and scope of assessment for the course, this shall be announced, to the students at the beginning of respective semesters.
iv. Communicating its recommendation to the Head of the Department on academic matters.
v. The Program Committee shall meet at least thrice in a semester preferably at the end of each internal continuous assessment tests and before the final end semester exam.

J. Student Support and Guidance

JSSAHERM provides career counselling, remedial coaching, bridge courses, soft skill development, personal counselling and guidance for competitive examinations besides improving their communication and language skills to improve their employability as well as build human values in their personality. The institution strongly believes that its primary stakeholders are students. The institution tries to realize its vision and mission centering on student empowerment, inclusive practices, and knowledge – skill – competence development. Accordingly, the institution has implemented suitable supporting steps and facilities for the benefit of students. Towards this, the institution has a provision for counsellors/ mentors /advisors for each class or group of students for academic and personal guidance.

The various student support mechanisms are summarised in the Figure 2 below:



Each cohort of the programme is allocated a Programme Coordinator who will act as a liaison officer between the students and the institution. The programme coordinator will also provide support for academic management of the programme

Student support and guidance at JSSAHERM include:

1. Tutoring
2. Access to library / E-library
3. Access to IT workshop
4. A variety of student welfare activities
5. Workshop and Laboratories

K. Attendance Requirement

The students must secure a minimum of 80% attendance in each subject to become eligible to take term end examination. All students must attend every lecture, tutorial and practical classes except for approved leave like medical emergencies etc. Each course of the semester shall be treated as a separate unit for calculation of the attendance. A student, who does not satisfy the attendance requirement, mentioned as above, shall not be eligible to appear for the examination of that semester and not promoted to higher semester. The student shall be required to repeat that semester along with regular students later by paying the prescribed fee as per the regulations of JSSAHERM.

L. Credit System

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, practical classes, seminars, assignments, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, research activities is dependent upon the quantum of work expected to be put in for each of these activities per week/per activity.

Credit System

(i) 1 credit = 15 hours of lecture

(ii) 1 credit = 30 hours of practical/tutorials/seminars

Total Number of Credits – For 1.5 Years Full time (III Semesters)	
Semester	**No. of Credits**
I	26
II	30
III	24
TOTAL	**80**
Total Number of Credits – For 2 years Part time (IV Semesters)	
Semester	**No. of Credits**
I	22
II	26
III	16
IV	16
TOTAL	**80**

M. Student Progress and Assessment

The regulations for assessment, evaluation and grading of student performance are as follows:

1. The evaluation of performance of the students' is based on the marks obtained in each module. Semester Percentage Average (SPA) and Cumulative Percentage Average (CPA) are calculated to determine their final awards at the end of their programme of study.
2. Modules are assessed through written examinations of duration of 3 hours.
3. All modules are normally assessed over 100 marks, except for project/dissertation which will be assessed over 300 marks.
4. The overall pass mark for a module shall be 50%, subject to the students submitting their continuous assessment within set deadlines.
5. All modules must be passed in the examinations, coursework and other forms of assessment.

   The modules will be assessed as follows:
   - End semester examinations contributing to 70% of the total marks
   - Continuous assessment carrying 30% of total marks. Continuous assessment can be based on seminars and/or assignments or class tests.

In order to pass in a module, a minimum of 50% should be attained in:

- Continuous assessment, and in
- End semester examination

Continuous Internal Assessment (CIA)

- The Continuous Internal Assessments may be in the form of a combination of periodical tests, % of attendance and other research activities carried out.
- The assessment procedure to be followed for each course shall be approved by the Program Committee and announced to the students at the commencement of each semester by the Course Teacher.
- Such schedule for continuous assessment procedure will be displayed on the notice board in the beginning of the semester.
- The course teacher shall intimate the internal marks of the candidates and their attendance detail to the student through notice board.
- The HOD/Dean will send the internal assessment marks together with attendance secured by each candidate and forward to Controller of Examinations office. Based on these details the Controller of Examinations will issue hall ticket (admit cards) for end semester examination, through HOD/Dean.

Scheme for awarding Continuous mode marks:

Criteria	Maximum Marks
Attendance	4
Academic activities (Seminar/assignment/publications), Participation in international Level Seminar/ Conference/ Workshop/ Symposium/ Training Programs (related to the specialization of the student)	4
Student–Teacher interaction	2
Total	**10**

Guidelines for the allotment of marks for attendance

Percentage of Attendance	Marks
95 – 100	4
90 – 94	3
85 – 89	2
80 – 84	1
Less than 80	0

Two sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the institute. The scheme of question paper for theory and practical

sessional examinations is given below. The average marks of two sessional exams shall be computed for internal assessment.

Question paper pattern for theory sessional examinations

I. Long Answers (Answer 1 out of 2) = 1 x 10 = 10
II. Short Answers (Answer 4 out of 5) = 4 x 5 = 20

Total = **30 marks**

Question paper pattern for practical sessional examinations

I. Synopsis = 05
II. Experiment = 30
III. Viva voce = 05

Total = **40 marks**

Scheme for internal assessments and end semester examinations

Subject	**Assessment**				**End Semester Exams**		**Total Marks**
	Continuous Mode	**Sessional Exams**		**Total**	**Marks**	**Duration**	
		Marks	**Duration**				
Theory	10	20	1 Hr	30	70	3 Hrs	100
Practical	10	30	4 Hrs	40	60	4 Hrs	100

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given below;

Postgraduate			
Overall Marks	**Grade**	**Grade point**	**Performance**
90≤ X ≤100	O	10	Outstanding
80≤ X <90	A	9	Excellent
70≤X<80	B	8	Very Good
60≤X<70	C	7	Good
50≤X<60	D	6	Satisfactory
X<50	F	0	Fail
Absent	AB	0	Fail

The calculation of the semester grade point average (SGPA) and the cumulative grade point average (CGPA) is shown below.

Calculation of Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students' SGPA is equal to:

$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F grade awarded in that semester. For example, if a learner has a F grade in course 4, the SGPA shall then be computed as:

$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * \text{ZERO} + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

Calculation of Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + \ldots + C_nS_n}{C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + \ldots + C_n}$$

where C1, C2, Cn,…. is the total number of credits for semester I,II,…n, and S1,S2, Sn,….is the
SGPA of each semester I,II,,,,n.

Evaluation of Performance

a. Seminar/Assignment-

The contact hours of seminars and assignments shall be treated as that of practical module. In this module the latest developments, advancements and applications in the field of any one of the other modules, taken during the semester shall be assigned to a student and the student is supposed to work on the topic and present the same in the form of power point presentation and submit the assignment in hard copy. The

student is evaluated based on his/her extent of understanding of the subject, time management, communication skills etc. The presentation evaluation will be done through course in charge. The assignment will be in the form of report of at least 1000-3000 based on same topic of seminar.
This module has no summative assessment.

b. All modules carry equal weight, except for dissertation which counts for the equivalent of 3 modules.

c. Project/dissertation

Candidates should compulsorily submit a related project at the end of the final semester of the programme or a dissertation. The scope of the research will be assessed and approved through a project proposal that will be due after completion of the Operations Research and Research Methodology module. The project will mainly involve real problems solving situation or will be on health system administration themes as approved by the post graduate dissertation committee. The project should be around 15000-20000 words and may have to be defended in a viva-voce as may be decided by the Post-Graduate Dissertation Committee.

Evaluation of Dissertation and Presentation

Dimensions	Percentage of Marks
Achievement of Objective(s)	**25**
Methodology	**50**
Results and Discussions	**70**
Conclusions and Outcomes	**30**
Question and answer skills	**25**
Presentation of work	**75**
Communication skills	**25**
Total	**300**

N. Award Classification

The class shall be awarded on the basis of CGPA as follows:

Classification of Award	CGPA
Distinction	8.00 and above
Merit	7.00 to 7.99
Pass	6.00 to 6.99
No Award	less than 6.00

O. Programme Organization and Management

Programme Coordinator:

Name : Dr. Jaishree Vaijanathappa
Email : vjaishree@jssuni.edu.in

P. Programme Structure

MSc Environmental Sciences for 1.5 years (FULL TIME), 3 SEMESTERS

Module code	Modules	Hrs/Wk L/P	Credits
Year 1 - Semester I			
MSCES101T	Principles of Environmental Sciences	4	4
MSCES 102T	Environmental Microbiology and Biotechnology	4	4
MSCES 103T	Environmental Chemistry	4	4
MSCES 104T	Environmental Earth Science	4	4
MSCES 105P	Environmental Microbiology & Biotechnology, Chemistry, Earth Science Practicals	12	6
MSCES 106P	Seminar/Assignment	8	4
Total			**26**
Year 1 - Semester II			
MSCES 201T	Environmental Toxicology	4	4
MSCES 202T	Remote Sensing & GIS	4	4
MSCES 203T	Water Resource and Ground Water Hydrology	4	4
MSCES 204T	Environmental Economics and Management	4	4
MSCES 205T	Biostatistics and Research Methodology	4	4
MSCES 206P	Environmental Toxicology, Wastewater Treatment Techniques, Waterborne Disease and Chemical Agents practicals	12	6
MSCES 207P	Seminar/Assignment	8	4
		Total	**30**
Year 2 - Semester III			
MSCES 301T	Wastewater Treatment Techniques, Water borne diseases and chemical agents	4	4
MSCES 302T	Environmental Safety, Health Management, Pollution and Law	4	4
MSCES 303T	Environmental Nanoscience, Bio-Energy Technologies	4	4
		Total	**12**
	Research/Project work – Dissertation / Final presentation	12	12
		Total	**24**

Semester wise credits distribution

Semester Credit Points	Semester Credit Points
I	**26**
II	**30**
III	**24**
Total Credit Points	**80**

MSc Environmental Sciences (Part Time 2 YEARS, 4 Semesters)

Module code	Modules	No. of hours	Credit points
Year 1 - Semester I			
MSCES 101T	Principles of Environmental Sciences	4	4
MSCES 102T	Environmental Microbiology and Biotechnology	4	4
MSCES 103T	Environmental Chemistry	4	4
MSCES 105P	Environmental Biology, Chemistry & Earth Science	12	6
MSCES 106P	Seminar/Assignment	8	4
	Total		**22**
Year 1 - Semester II			
MSCES 104T	Environmental Earth Science	4	4
MSCES 201T	Environmental Toxicology	4	4
MSCES 202T	Remote Sensing & GIS	4	4
MSCES 203T	Water Resource and Ground Water Hydrology	4	4
MSCES 206P	Environmental Toxicology, Microbiology & Biotechnology, Water Treatment Techniques, Waterborne Disease and Chemical Agents	12	6
MSCES 207P	Seminar/Assignment	8	4
		Total	**26**
Year 2 - Semester III			
MSCES 204T	Environmental Economics and Management	4	4
MSCES 205T	Biostatistics and Research Methodology (Statistical Methods for Biology)	4	4
MSCES 301T	Wastewater Treatment Techniques, Waterborne Disease and Chemical Agents	4	4
MSCES 302T	Environmental Safety and Health Management, Environmental Pollution and Law	4	4
		Total	**16**
Year 2 - Semester IV			
MSCES 303P	Environmental Nanoscience, Bio-Energy Technologies	4	4
	Total	4	4
	Research/Project work – Dissertation / Final presentation	12	12
			16

Semester wise credits distribution

Semester Credit Points	Semester Credit Points
I	**22**

II	**26**
III	**16**
IV	**16**
Total Credit Points	**80**