

# JSS Academy of Higher Education And Research (Mauritius)

## *PROGRAMME DOCUMENT*

## Faculty of Life Sciences

# **B.Sc (Hons) Environmental Sciences** **(Full-Time)**

## **B.Sc. (Hons.) in Environmental Sciences**

### **A. Programme Information**

The prudent management of our precious water resources, environment conservation, and sustainable development are high on the agenda of global concerns. Addressing these challenges requires professionals with a high degree of specialization and interdisciplinary approach. In order to develop improved systems and practices to preserve the most precious resource of our planet, there are a great demand for trained people. In view of the huge focus and investment made by all nations on the water sector, there is a tremendous need for specially trained work force for supporting the institution involved in the development and management of water, at both the grass roots levels and at the institutional level. Applying knowledge gained through environmental science is the only way to solve these problems so that the environment can be preserved. The rapid urbanization of the environment needs to be studied constantly in order to avoid altering and damaging the environment significantly. Ultimately, environmental science is necessary to save the environment from destruction and all of its dependents from extinction.

B.Sc. Environmental Sciences at JSSAHER is intended for high school graduates and students from wide range of backgrounds who aim to develop their knowledge and insights pertaining to the environment. The course is designed to provide critical and practical skills to analyses, evaluate, design and implement solution and strategies with regard to water and health issues.

### **B. Programme Aims**

This BSc programme aims to lead students from conceptual to practical skills, from service delivery to strategic scientific and research skills and to problem-solving and project management by equipping them with the latest advanced technical knowledge and relevant skills necessary to facilitate efficiency, effectiveness and a high quality of delivery with regards to environmental problems. The programme aims to provide a thorough understanding of sustainable management principles and their application to the complex spheres affecting the environment.

### **C. Programme Objectives**

The programme aims to provide the students with:

- A curriculum which provides a broader range of subjects to facilitate the development of skills, abilities, pursuit of interest and promotion of career development
- The ability to contribute to the new and modern developments with reduced impact on the environment
- The confidence to tackle with modern issues affecting the environment
- A wider range of transferable and marketable skills and knowledge leading to a variety of employment opportunities within the environmental sector
- Teaching and learning techniques which place emphasis on active and participative education
- The ability to apply modern technologies to solve various environmental issues and problems

## **D. Overall Programme Learning Outcomes**

This programme will enable students to:

### **Knowledge and Understanding**

- Appraise the relationship between human and physical aspects of the landscape and the environment in a variety of contexts in the past and present.
- Evaluate examples of the growth, decline and sustainability of human societies within different environmental contexts, and their relation to issues of climate change.
- Critically review issues relating to the management of the contemporary environment including their causes, monitoring and management strategies in the context of sustainable development.
- Confident understanding and use of subject specific principles and methods associated with environmental science, including laboratory practices, appropriate use of instrumentation, and monitoring regimes

### **Professional Skills**

- Critically develop, apply, report, interpret and reflect on strategies for collecting data in the lab and field including laboratory investigation techniques, use of basic numerical and statistical techniques, and environmental monitoring regimes.
- Formulate a research design and complete a substantial work of independent study

### **Personal Transferable Skills**

- Employ skills in independent learning including: identifying, accessing and citing authoritative information from a variety of sources; time management, IT and computer assisted learning skills; and critical reflection on own learning
- Appropriately employ written and oral communications skills including essay writing, report writing, the preparation of a curriculum vitae, and presentation within a conference format
- Work effectively in a team, taking full responsibility for both process and outcome

## **E. General Entry Requirements**

*JSSAHER will follow the admission requirements of TEC for tertiary education level programmes. The Faculty of Life Sciences, on a case-to-case basis, will make admission decisions.*

Candidates must have:

### **EITHER**

- (i) Pass in 3 Subjects at A-level and 1 subject at subsidiary level of Higher School Certificate Examination;

### **OR**

(ii) Pass in 2 Subjects at A-level and 2 subjects at subsidiary level of Higher School Certificate Examination;

**OR**

(iii) Pass in 3 Subjects at A-level at the London General Certificate Examination;

**OR**

(iv) A qualification equivalent to the above.

### **Overseas Candidates**

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

## **F. Programme Entry Requirements**

“A” Level in Mathematics and Chemistry.

## **G. Programme Mode and Duration**

Full Time: Minimum 3 Years (6 Semesters) – Maximum 6 Years (12 Semesters)

## **H. Teaching and Learning Strategy**

The programme will consist of a wide variety of teaching methods, including lectures, tutorial and practical, individual or group projects, assignments, presentations, workshops, seminars and case studies. Self-learning will be the key feature of the programme, enabling students to explore, investigate and research in various issues related to infrastructure and construction management.

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:

- a) Creating an engaging, motivating, and intellectually stimulating learning environment and experience.
- b) Encouraging the spirit of critical inquiry and creative innovation informed by current research.
- c) Emphasising the importance, relevance, and integration of theory and knowledge with professional practice to develop solutions to real world issues.
- d) Providing learning experiences that develop inter-culturally capable graduates who can make a difference as socially and ethically responsible global citizens.
- e) Valuing and recognising individual and cultural diversity through the provision of an inclusive context of support and respect for all students.
- f) Enhancing student engagement and learning through effective curriculum design, pedagogy and assessment strategies.
- g) Continuously improving teaching practice through academic staff professional development, and critical reflection informed by a range of evaluation approaches.;
- h) 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 improve 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;

- i) 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.

JSS Academy of Higher Education and Research, Mauritius considers feedback from students as vital and has established a student feedback form for each module being taught every semester. The criterion under which a course will be evaluated is as follows:

- a) Knowledge of the lecturer related to the subject;
- b) Coverage of the syllabus – Was the syllabus covered completely and thoroughly or was any topic not covered;
- c) Delivery of lecturer or demonstration for practical;
- d) Discipline in class (theory and practical) – Did the lecturer have control over his batch of students;
- e) Interaction in class – Did the lecturer invite students to participate in class?
- f) Audibility of voice – Did the lecturer express himself clearly and could all students hear / understand when he/ she explained?
- g) Explanation and emphasis on important points – Was the subject being explained with respect to the syllabus and were important points highlighted? Did the lecturer make use of relevant examples to support the explanations?
- h) Evaluation of subject notes or learning materials being provided to students – clarity, conciseness and relevance;
- i) Infrastructure being given for the subject being taught – classroom quality (clarity of white board, aeration, LCD and multimedia projector equipment, etc.)
- j) Evaluation of practical sessions – laboratories, equipment, safety, knowledge of the lecturer, etc.;
- k) Information being given students – Did the lecturer provide students with information that were related to only the subject matter or did they provide a broader picture of the subject for more learning.
- l) Were students motivated to attend conferences/ seminars / industrial training to enhance their knowledge?

The feedback exercise would be carried out anonymously meaning that students do not divulge their identities while filling the form Once the feedback exercise has been carried out, the administrative department would work on each form and compile the data and submit same to the Head of Faculty. The latter will analyze the information and call the lecturers to inform them of the evaluation of the subject and work on ways to improve effectiveness and efficiency of lecturers and implementation of new ways of teaching and learning.

The feedback mechanism is expected to assist JSS Academy of Higher Education and Research, Mauritius, to improve the following:

- Quality of teaching
- Service provided to students both academic and non-academic

- Infrastructure – new equipment in laboratories, classrooms
- Organization of extra-curricular activities – outings, sports activities, cultural events, etc.
- Quality of learning materials distributed to students
- Importance of courses being delivered;
- Objectives and career pathway of students
- Creation of short training programmes to enhance learning
- Encouraging faculty members to pursue their studies to higher levels
- Converting weaknesses of faculties to strengths to provide better learning opportunities for students.

### **I. Student Support and Guidance**

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

The student support and guidance include:

- Tutoring
- Access to library / E-library
- Access to IT workshop
- A variety of student welfare activities.

### **J. 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.

### **K. Credit System**

#### **a. Credit Equivalence**

1. (i) 1 credit = 15 hours of lecture  
(ii) 1 credit = 30 hours of practical/tutorials/seminars
2. Project / Dissertation: 12 credits.

#### **b. Credits Per Level**

Each level shall constitute of the following number of credit subject to the required number of credits for award:

Level 1	(Certificate)	:33 - 53 credits
Level 2	(Diploma)	:33 - 48 credits

Level 3 (BSc)

:33 - 58 credits

**L. Student Progress and Assessment**

- The evaluation of performance of the student 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.
- Modules are assessed through written examinations of duration of 3 hours.
- All modules are normally assessed over 100 marks, except for project/dissertation which will be assessed over 300 marks.
- The overall pass mark for a module shall be 40%, subject to the students submitting their continuous assessment within set deadlines.
- 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 40% should be attained in:

- Continuous assessment, and in
- End semester examination

**Grading**

Undergraduate		
Overall Marks	Grade	Remarks
$70 \leq X \leq 100$	A	Excellent
$60 \leq X < 70$	B	Very Good
$50 \leq X < 60$	C	Good
$40 \leq X < 50$	D	Satisfactory
$X < 40$	F	Fail

**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  $C_1, C_2, C_3, C_4$  and  $C_5$  and the student’s grade points in these courses are  $G_1, G_2, G_3, G_4$  and  $G_5$ , respectively, and then students’ SGPA is equal to:

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

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:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4*0 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

### 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:

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

where  $C_1, C_2, C_n, \dots$  is the total number of credits for semester I, II, ..., n, and  $S_1, S_2, S_n, \dots$  is the SGPA of each semester I, II, ..., n.

### M. Award Classification

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

Classification of Award	CGPA
First Class with Distinction	7.00 and above
First Class	6.00 to 6.99
Second Class	5.00 to 5.99
Third Class	4.00 to 4.99
No Award	less than 4.00

### N. Programme Organisation and Management

Programme Coordinator :

Name : Dr S Balasubramanian

Email : director\_research@jssuni.edu.in



**O. Programme Structure: B.Sc (Hons.) in Environmental Sciences – Full-Time**

YEAR 1									
SEMESTER 1				SEMESTER 2					
Code	Modules	Hrs/Wk	Credits	Code	Modules	Hrs/Wk	Credits		
BES101	Introduction to Environmental Sciences	4	4	BES201	Natural Resources & Management	4	4		
BES102	Ecosystem Dynamics	4	4	BES202	Environmental Chemistry	4	4		
BES103	Components of Biodiversity & Conservation	4	4	BES203	Environmental Pollution	4	4		
BES104	Statistical Applications #	4	4	BES204	Environmental Microbiology##	4	4		
BES105	Environmental Science Laboratory-I	4	4	BES205	Environmental Sciences Laboratory – II	4	4		
			<b>Total</b>	<b>20</b>				<b>Total</b>	<b>20</b>

# Common for all UG courses

## Common for B.Sc (Hons.) in Biotechnology, B.Sc (Hons.) in Environmental Science, B.Sc (Hons.) in Microbiology

YEAR 2									
Semester 3				Semester 4					
Code	Modules	Hrs/Wk	Credits	Code	Modules	Hrs/Wk	Credits		
BES301	Environmental Monitoring Techniques	4	4	BES401	Water & Waste Water Treatment	4	4		
BES302	Environmental Management	4	4	BES402	Solid Waste Management	4	4		
BES303	Marine Ecology	4	4	BES403	Hydrology	4	4		
BES304	Basics of Computers###	4	4	BES404	Environmental Biotechnology#*	4	4		
BES305	Environmental Sciences Laboratory – III	4	4	BES405	Environmental Sciences Laboratory – IV	4	4		
			<b>Total</b>	<b>20</b>				<b>Total</b>	<b>20</b>

### Common for B.Sc (Hons.) in Biotechnology, B.Sc (Hons.) in Environmental Science, B.Sc (Hons.) in Microbiology

\* Common for B.Sc (Hons.) in Biotechnology, B.Sc (Hons.) in Environmental Science, B.Sc (Hons.) in Microbiology

**YEAR 3**

<i>Semester 5</i>				<i>Semester 6</i>				
Code	Modules	Hrs/Wk	Credits	Code	Modules	Hrs/Wk	Credits	
BES 501	Climate Change & Sustainability	4	4	BES 601	Elective-I*	4	4	
BES 502	Environmental Impact Assessment	4	4	BES 602	Elective-II**	4	4	
BES 503	Environmental Sciences Laboratory – IV	4	4	BES 603	Dissertation	10	10	
BES 504	Project work/Industrial Visit/Field work	8	8		Viva-voce	2	2	
			<b>Total</b>				<b>Total</b>	<b>20</b>

\*For Elective – I (One of the following paper)

BES601a-Disaster management

BES601b-Geoinformatic Science

BBT601a- Agricultural Biotechnology

BBT601b- Medical Biotechnology

BMB601a- Biopesticides and Biofertilizers

BMB601b- Fermentation Technology

\*\* For Elective – II (One of the following paper)

BES602a-Renewable Energy& Green Chemistry

BES602b-Integratedwater resource management

BBT602a- Industrial Biotechnology

BBT602b- Food Preservation and Adultration

BMB602a- IPR, Bioethics and Biosafety

BMB602b- Vermiculture Technology

### Summary of Number of Credits

<b>Total Number of Credits</b>	
<b>Semester</b>	<b>No. of Credits</b>
I	20
II	20
III	20
IV	20
V	20
VI	20