



**JSS Academy of Higher Education and Research,
Mauritius**

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

**Master of Science
(Microbiology)**

Programme Handbook

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Programme Handbook

A. Programme Information

The MSc microbiology programme is about to study of microorganisms, their effects on humans, on climate and on culture, etc. The applied aspects and branches of microbiology are covered by the Master's degree programme. The programme is career-focused and oriented towards entrepreneurship and industries striving to solve major global challenges such as antibiotic resistance, clean drinking water and food security. Microbiology is becoming more and more important and dynamic science over time. It is continuously changing with more data in line with the latest literature, including rapid modification and refinement of all microbiological techniques.

The curriculum is intended to advance theoretical knowledge (conventional and contemporary), comprehension and practical skills required for a strong foundation in core and applied microbiology, along with the transferable skills necessary to increase the employability opportunities of students. It seeks to prepare graduates for a wide range of occupations or further postgraduate studies in manufacturing, commercial, government and environmental settings. Students will study various fields of microbiology during the course that are of interest to the health, environmental, ecological and biotechnological sectors. There is also an opportunity to conduct medical, environmental, or industrial microbiology research that will further advance expertise, skills, and career opportunities.

After completion of the programme, students will be able to provide their expertise in the fields of medical, industrial and environmental microbiology, cellular, cell and system biology, recombinant DNA technology, biochemistry of proteins, structural biology, fermentation, bioengineering, etc.

B. Programme Aim

The aim of MSc Microbiology is to equip students with the advanced knowledge and skills necessary to embark on further research or jobs in industries that are trying to solve major global challenges such as resistance to antibiotics, clean drinking water and food safety.

Job Prospects:

1. Research and development firms (Research Scientist, Research Officer)
2. Educational Institutions (Associate Professor & Professor)
3. Food and Beverage Companies (Analyst)
4. Food Standard Agencies (Analyst)
5. Waste Management Companies (Microbiologist)

6. Pharmaceutical Companies (Microbiologist and analyst)
7. Agri-Chemical Companies (Analyst)
8. Environmental Consultants (Analyst)
9. Water Companies (Analyst)
10. Food & Hygiene Quality Controller
11. Associate Consultant - Health Care
12. Quality Systems Coordinator
13. Trainer Scientific Officer
14. Project Assistant and Field Assistant
15. Medical Coding Trainer

C. Programme Objectives

The programme objectives are to equip the students with:

1. Adequate scientific information regarding basic principles of microbiology including virology, parasitology, enzymology and medical microbiology.
2. To facilitate basic research approach in microbiology that leads to the better understanding of molecular techniques that are used to study and comprehend complex forms from microbes to humans including diagnostic areas like Biotechnology, Synthetic biology, production of therapeutic proteins etc.,
3. Thorough knowledge in various branches of microbiology viz., Food, Dairy, Agricultural, Industrial, Environmental sectors in academia, research and development, corporate including entrepreneur set-ups.
4. Required knowledge, Skills and Competencies for Food industry, Pharmaceutical industry and GMP Considerations.
5. To accelerate the creative power and capability in microbiology that promotes to apply the advanced principles for managing the accurate diagnostic study.
6. To enable the students to explore the intricacies of life forms, cellular, molecular and at the nano level.

D. Overall Programme Learning Outcomes

This programme will enable students to:

- Advance in latest trends and concepts of microbiology that equip them for building a successful career.
- Gain knowledge in bacteriology and work with wide range of food born microbes, industrial microbiology, molecular biology and Environmental microbiology etc.
- Develop competent knowledge with updated version in different fields of microbiology enables to find impetus avenues in different branches of science.

- Advance knowledge and work with wide range of employers, including hospitals, universities, industries including pharmaceuticals, agrochemicals, food and drinks, consumer goods and water supply, corporate fields, Agri-Chemical Companies, Environmental Consultancy, etc.,

E. Entry Requirements

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

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	Duration (Years)	Tuition Fee per annum (MUR)	USD
M.Sc Microbiology	FT - 1.5 PT - 2	PT - 100,000 FT - 150,000	PT - 2,500 FT - 3,600
Other Fees		Refund Policy	Amount (MUR)
Application Fees		Non-refundable	1,000
Registration Fees		Non-refundable	5,000
Administrative Fees		Non-refundable	5,000 per annum
Library Fees		Non-refundable	5,000 per annum
Library Deposit		Refundable	5,000
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
Examination Resit Fees		Non-refundable	2,000 per paper for Theory and 2,500 per paper for Practical
Sports Fees		Non-refundable	1,000 per annum

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 microbial world.

Positive learning outcomes reflect an 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 representative 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:



Mentoring	<ul style="list-style-type: none"> • Mentorship - Mentor, Batch teacher, Class teacher
Support & Progression	<ul style="list-style-type: none"> • Scholarship • Health Care & Insurance • Placement Cell • Alumni • Support for competitive exams • Student Support Centre • Skill development • Personality Development
Activities	<ul style="list-style-type: none"> • Cultural • Sports • Magazine • Outreach
Professional Bodies	<ul style="list-style-type: none"> • Local Branch • Student Charter • Institutional Society

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
- iii. 12 credits = Project / Dissertation

Total Number of Credits – For 1.5 Years Full time (III Semesters)	
Semester	No. of Credits
I	20
II	21
III	20
Total	61

Total Number of Credits – For 2 years Part time (IV Semesters)	
Semester	No. of Credits

I	15
II	16
III	12
IV	18
Total	61

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 will send the internal assessment marks together with attendance secured by each candidate and forward to Controller of Examinations office. Based on this detail and CBCS regulations, the Controller of Examinations will issue hall ticket (admit cards) for end semester examination, through HOD.

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

1. 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
$90 \leq X \leq 100$	O	10	Outstanding
$80 \leq X < 90$	A	9	Excellent
$70 \leq X < 80$	B	8	Very Good
$60 \leq X < 70$	C	7	Good
$50 \leq X < 60$	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:

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

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. **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 Microbiology for 1.5 years (FULL TIME), 3 SEMESTERS

SEMESTER I					
Sl no	Module Code	Paper	Hrs/week	Hrs/module (L+P)	Total Credit
I	MSCMB101	Laboratory Methods in Microbiology(L+P)	7	(45+60)	5
II	MSCMB102	Microbial Enzymology (L)	4	60	4
III	MSCMB103	Biostatistics and Research Methodology (L+P)	5	(45+30)	4

IV	MSCMB104	Soil, Agriculture and Environmental Microbiology(L+P)	7	(45+60)	5
V	MSCMB105	Seminar/Assignment	2	30	2
Total marks and credits					20
SEMESTER II					
I	MSCMB201	Molecular Biology and Genetic Engineering (L+P)	7	(45+60)	5
II	MSCMB202	Biofertilizer and Biomanure Technology (L+P)	6	(30+60)	4
III	MSCMB203	Medical Microbiology and Immunology (L+P)	7	(45+60)	5
IV	MSCMB204	Food, Dairy and Industrial Microbiology (L+P)	7	(45+60)	5
V	MSCMB205	Seminar/Assignment	2	30	2
Total marks and credits					21
SEMESTER III					
I	MSCMB301	Microbial Nanotechnology	3	45	3
II	MSCMB302	Disease Diagnostic Technology	3	45	3
III	MSCMB303	Seminar/Assignment	2	30	2
Total marks and credits					08
Dissertation and viva					12
Total					20
Total (Semester I to III)					61

MSc Microbiology (Part Time 2 YEARS, 4 Semesters)

SEMESTER I					
Sl no	Module Code	Paper	Hrs/week	Hrs/module (L+P)	Total Credit
I	MSCMB101	Laboratory Methods in Microbiology (L+P)	7	(45+60)	5
II	MSCMB102	Microbial Enzymology (L)	4	60	4
III	MSCMB103	Biostatistics and Research Methodology (L+P)	5	(45+30)	4
IV	MSCMB105	Seminar/Assignment	2	30	2
Total marks and credits					15
SEMESTER II					
I	MSCMB104	Soil, Agriculture and Environmental Microbiology (L+P)	7	(45+60)	5
II	MSCMB201	Molecular Biology and Genetic Engineering (L+P)	7	(45+60)	5
III	MSCMB202	Biofertilizer and Biomanure Technology (L+P)	6	(30+60)	4
IV	MSCMB205	Seminar/Assignment	2	30	2

Total marks and credits					16
SEMESTER III					
I	MSCMB203	Medical Microbiology and Immunology (L+P)	7	(45+60)	5
II	MSCMB204	Food, Dairy and Industrial Microbiology (L+P)	7	(45+60)	5
III	MSCMB303	Seminar/Assignment	2	30	2
Total marks and credits					12
SEMESTER IV					
I	MSCMB301	Microbial Nanotechnology (L)	3	45	3
II	MSCMB302	Disease Diagnostic Technology (L)	3	45	3
Total marks and credits					6
Dissertation and viva-voce					12
Total of Semester IV					18
Total (Semester I to IV)					61

Summary of Number of Credits

Total Number of Credits for Full time	
Semester	No. of Credits
I	20
II	21
III	20
TOTAL	61

Total Number of Credits for Part time	
Semester	No. of Credits
I	15
II	16
III	12
IV	18
TOTAL	61

Students can carry out the project work for a period of 6 months at any recognized institutes pertaining to their area of interest and the internal faculty being the principal mentor and the institute supervisor being the co-mentor.