JSS Academy of Higher Education and Research (Mauritius)

BSc (Hons) Biotechnology

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A. Programme Information

In the last decade, JSS AHER has emerged as a leading center for education and research in biotechnology and allied disciplines. Biotechnology is a multi-disciplinary course designed to meet the growing demand for the trained manpower in the field of life science (both academic and industries) across the globe. The courses are designed to train the students in recent advanced developments in the area of Biotechnology and their application in industry, agriculture and medicine.

B.Sc. Biotechnology at JSS AHER, offered by Faculty of Life Sciences, is intended for professionals, practitioners, researchers, and students, from wide range of backgrounds, who aim to develop their knowledge and insights pertaining to the Biotechnology. The course is designed to provide critical and practical skills to analyze, evaluate, design and implement solutions and strategies related to Biotechnology issues.

B. Programme Aims

The course aims to provide an advanced understanding of the core principles and topics of Modern-day Biotechnology, and to enable students to acquire a specialized knowledge and understanding of selected aspects by means of a lecture series and a research project.
Hence, the main objectives of the program are:

- To provide strong fundamentals of biotechnology and its industrial application.
- To discover in depth knowledge of animal and plant biotechnology, and also broad area of biochemistry, Immunology and molecular biology.
- It will provide the students to develop independent learning skills all biochemical and biotechnology studies.
- This course will provide the students to apply their knowledge and skills in their future professional areas.
- This course will help in contributing to the education of academics which impart its effect for university to play an active role in other advanced studies.

C. Programme Objectives

After successfully completing this course, the student should be able to:

- Understand the basic knowledge and concepts of biotechnology and other related areas.
- Understand the ability to apply their knowledge for practical which they can conduct independently.
- Apply their knowledge in other advanced subject area like nanobiotechnology, immunotechnology, and animal and plant biotechnology for the betterment and advancement of their professional career.

- Learn the theoretical and practical exposure to the basic and the advanced fields of biotechnology.

D. Overall Programme Learning Outcomes

This programme will enable students to:

- Apply knowledge acquired in biotechnology in various fields including medicine, agriculture and industry in general.
- Design and conduct experiments, as well as to analyze and interpret data;
- Have a sense of chemical, biochemical analysis, synthetic approach to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability;
- Function on multi-disciplinary teams;
- To identify, formulate and solve problems in Biotechnology;
- Have an understanding of professional and ethical responsibility in the field of Biotechnology;
- To communicate effectively;
- To understand the impact of biotechnological solutions in a global, economic, environmental and societal context;
- Use the techniques, skills, and modern technological tools necessary for biotechnological practice;
- Have the knowledge of probability and statistics, including applications appropriate to the Biotechnology program and objectives; and knowledge of mathematics through calculus, basic sciences, Bio-statistics and analytical approach necessary to analyze and design experimental tools and analysis

E. General Entry Requirements

JSSAHERM 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 Biology 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 Biotechnology.

The following principles aim to guide excellence in learning and teaching practices, while recognizing 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) Emphasizing 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 andrecognizing 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.

JSSAHER 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:

a) Continuous assessment, and in
b) 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:

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

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:

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

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:

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

where C_1, C_2, $C_{n\ldots}$ is the total number of credits for semester I,II,…, n, and S_1,S_2, $S_{n\ldots}$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. Chandan

Email: chandans@jssuni.edu.in

O. Programme Structure

Programme Structure
B.Sc - (Hons.) Biotechnology – Full-Time

YEAR 1							
Semester 1				***Semester 2***			
Code	**Modules**	**Hrs/Wk**	**Credits**	**Code**	**Modules**	**Hrs/Wk**	**Credits**
BBT 101	Cell Biology	4	4	BBT 201	Microbiology	4	4
BBT 102	Classical Genetics	4	4	BBT 202	Molecular Biology	4	4
BBT 103	Principles of Biochemistry	4	4	BBT 203	Molecular Genetics	4	4
BBT 104	Basics in Computing and Statistical Applications	4	4	BBT 204	Environmental Microbiology	4	4
BBT 105	Cell Biology and Biochemistry Laboratory	4	4	BBT 205	Microbiology and Molecular Biology Laboratory	4	4
		Total	**20**			**Total**	**20**

YEAR 2							
Semester 3				***Semester 4***			
Code	**Modules**	**Hrs/Wk**	**Credits**	**Code**	**Modules**	**Hrs/Wk**	**Credits**
BBT 301	Bioinformatics	4	4	BBT 401	Industrial Biotechnology	4	4
BBT 302	Plant & Animal Biotechnology	4	4	BBT 402	Communication skills and Scientific Communication	4	4
BBT 303	Genomics and Proteomics	4	4	BBT 403	Recombinant DNA Technology & IPR	4	4
BBT 304	Agricultural Biotechnology	4	4	BBT 404	Environmental Biotechnology[#*]	4	4
BBT 305	Bioinformatics and Plant & Animal Biotechnology Laboratory	4	4	BBT 405	Recombinant DNA Technology Laboratory	4	4
		Total	**20**			**Total**	**20**

YEAR 3							
Semester 5				*Semester 6*			
Code	**Modules**	**Hrs/Wk**	**Credits**	**Code**	**Modules**	**Hrs/Wk**	**Credits**
BBT 501	Immunology	4	4	BBT 601	Elective-I*	4	4
BBT 502	Medical Biotechnology	4	4	BBT 602	Elective-II**	4	4
BBT 503	Immunology and Medical Biotechnology Laboratory	4	4	BBT603	Dissertation	10	10
BBT 504	Project work/Industrial Visit/Field work	8	8		Viva-voce	2	2
		Total	**20**			**Total**	**20**

*For Elective – I (One of the following paper)
BES601a-Disaster management
BES601b-Geoinformatic Science
BBT601a- Biotechnological Application in Waste Water Management
BBT601b- Fundamentals of Nanotechnology
BMB601a- Biopesticides and Biofertilizers
BMB601b- Fermentation Technology

****** For Elective – II (One of the following papers)
BES602a-Renewable Energy& Green Chemistry
BES602b-Integratedwater resource management
BBT602a- Tissue Culture
BBT602b- Food Preservation and Adulteration
BMB602a- IPR, Bioethics and Biosafety
BMB602b- Vermiculture Technology

Summary of Number of Credits

Total Number of Credits	
Semester	**No. of Credits**
I	20
II	20
III	20
IV	20
V	20
VI	20
TOTAL	**120**