

MSc Molecular and Cellular Biology - SC514

1. Objectives

It is now clear that we are well into the post genome sequencing era. New advances in Cellular and Molecular Biology have opened a new age of knowledge and technology that has become a major driving force in the Biosciences and other emerging fields such as bioinformatics. This Programme will give students an opportunity to equip their minds for further research both locally and overseas. They will also be able to participate in a scientific revolution and at the same time acquire training to meet the demands of an ever growing need for a highly skilled workforce in the pharmaceutical, biotechnology and health sectors.

2. General Entry Requirements

Successful completion of an undergraduate degree with

- at least a Second Class or 50%, whichever is applicable or
- a GPA not less than 2.5 out of 4 or equivalent, from a recognised higher education institution.

OR alternative qualifications acceptable to the University of Mauritius.

3. Programme Requirements

A degree in Biology **OR** equivalent qualifications acceptable to the University of Mauritius.

4. General and Programme Requirements – Special Cases

The following may be deemed to have satisfied the General and Programme requirements for admission:

- (i) Applicants who do not satisfy any of the requirements as per Regulations 2 and 3 above but who submit satisfactory evidence of having passed examinations which are deemed by the Senate to be equivalent to any of those listed.
- (ii) Applicants who do not satisfy any of the requirements as per Regulations 2 and 3 above but who in the opinion of Senate submit satisfactory evidence of the capacity and attainments requisite to enable them to pursue the programme proposed.
- (iii) Applicants who hold a full practising professional qualification obtained by examination.

5. Programme Duration

The duration of this Part-Time Postgraduate Programme should normally not exceed 4 years (8 semesters) and in any case (under Flexible Learning Programme) not exceed 7 years (14 semesters).

	Normal	Maximum
Master's Degree:	4 Semesters	8 Semesters
Postgraduate Diploma:	4 Semesters	8 Semesters
Postgraduate Certificate:	2 Semesters	4 Semesters

6. Credits per Semester

Minimum 3 credits subject to Regulation 5.

7. Minimum Credits Required for the Award

Master's Degree:	36
Postgraduate Diploma:	24
Postgraduate Certificate:	12

Breakdown as follows:

MSc Molecular and Cellular Biology: 36

Core modules:	24 credits
Project:	6 credits
+ Elective modules:	6 credits

Postgraduate Diploma in Molecular and Cellular Biology: 24

Core modules: 24 credits

Postgraduate Certificate in Molecular and Cellular Biology: 12

Any four core modules including BIOS 6008(1): 12 credits

8. Assessment

Each module will carry 100 marks and will be assessed as follows (unless otherwise specified):

Assessment will be based on a written examination of 3 hour duration and continuous assessment carrying a range of 10% to 30% of total marks except for a programme where the structure makes for other specific provision(s). Continuous assessment may be based on laboratory works, and/or assignments and should include at least 1 class test.

A minimum of at least 30% should be attained in each of Continuous Assessment and Written Examination, with an overall total of 40% for a candidate to pass a module.

Module BIOS 6008(1) will be assessed solely by Continuous Assessment including a *viva-voce*.

Modules will carry the weightings of 1. Weighting for a particular module is indicated within parentheses in the module code.

Students are expected to submit a dissertation of about ten thousand words.

9. Plan of Study

Students are required to submit at the end of Semester 1 a Plan of Study for their whole Programme of Studies, indicating the list of elective modules and in which semester each of them will be taken.

10. Reservation

The University reserves the right not to offer a given elective module if the critical number of students is not attained and/or for reasons of resource constraints.

11. Important Note

The rules as stipulated in this Programme Structure and Outline Syllabus will replace all other rules and regulations found in previous Programme Structures.

12. List of Modules

Code	Module Name	Hrs/Wk L+P	Credits
<u>CORE MODULES</u>			
BIOS 6001(1)	Cell Biology	3+0	3
BIOS 6002(1)	Molecular Biology	3+0	3
BIOS 6003(1)	Molecular Parasitology and Disease Vectors	3+0	3
BIOS 6004(1)	Immunology	3+0	3
BIOS 6005(1)	Developmental Biology	3+0	3
BIOS 6006(1)	Basic Bioinformatics	3+0	3
BIOS 6007(1)	Cell Signalling	3+0	3
BIOS 6008(1)	Techniques, Instrumentation and Imaging	0+9	3
<u>PROJECT</u>			
BIOS 6000(1)	Project	-	6
<u>ELECTIVES</u>			
BIOS 6009(1)	Bioethics	3+0	3
BIOS 6010(1)	Molecular Systematics	3+0	3
BIOS 6011(1)	Microbiology	3+0	3
BIOS 6012(1)	Biotechnology	3+0	3
BIOS 6013(1)	Genomics, Proteomics and Metabolomics	3+0	3

NOTE: The list of modules is by no means exhaustive. Elective modules offered will be subject to availability of staff and other resources.

13. Programme Plan - MSc Molecular and Cellular Biology

<u>YEAR 1</u>							
Semester 1				Semester 2			
Code	Module Name	Hrs/Wk L+P	Credits	Code	Module Name	Hrs/Wk L+P	Credits
CORE				CORE			
BIOS 6001(1)	Cell Biology	3+0	3	BIOS 6004(1)	Immunology	3+0	3
BIOS 6002(1)	Molecular Biology	3+0	3	BIOS 6005(1)	Developmental Biology	3+0	3
BIOS 6003(1)	Molecular Parasitology and Disease Vectors	3+0	3	BIOS 6008(1)	Techniques, Instrumentation and Imaging	0+9	3
<u>YEAR 2</u>							
Semester 1				Semester 2			
Code	Module Name	Hrs/Wk L+P	Credits	Code	Module Name	Hrs/Wk L+P	Credits
CORE				CORE			
BIOS 6000(1)	Project	-	-	BIOS 6000(1)	Project	-	6
BIOS 6006(1)	Basic Bioinformatics	3+0	3	BIOS 6007(1)	Cell Signalling	3+0	3
ELECTIVES CHOOSE ONE FROM				ELECTIVES CHOOSE ONE FROM			
BIOS 6009(1)	Bioethics	3+0	3	BIOS 6011(1)	Microbiology	3+0	3
BIOS 6010(1)	Molecular Systematics	3+0	3	BIOS 6012(1)	Biotechnology	3+0	3
				BIOS 6013(1)	Genomics, Proteomics and Metabolomics	3+0	3

14. Outline Syllabus

This outline syllabus is not prescriptive and is intended to serve as a guide only.

BIOS 6000(1) - PROJECT

Students are expected to submit a dissertation of about ten thousand words.

BIOS 6001(1) - CELL BIOLOGY

Current research topics in Cell Biology will be covered. The structural organisation of the cell will be explored and the molecular strategies in cellular processes will be visited. Some of the topics will include cytoskeleton, cell-cell interaction and protein targeting.

BIOS 6002(1) - MOLECULAR BIOLOGY

This course will provide a framework for students to acquire a comprehensive knowledge on structure and function of DNA, RNA and protein. Modern molecular biology techniques will be reviewed and selected original papers will be discussed.

BIOS 6003(1) - MOLECULAR PARASITOLOGY AND DISEASE VECTORS

Molecular biology and genomics has now given new impetus for research on important parasites and arthropods. This course will reinforce foundation knowledge and then focus on the current trends in molecular research in parasitology and vectors of medical and veterinary importance.

BIOS 6004(1) - IMMUNOLOGY

All the components of the immune systems will be explored. Special attention will be given to modern developments in immunogenetics, immunopharmacology and immunotoxicology. The practical aspects of immunological mechanisms as tool for diagnostic and therapeutic strategies will be emphasised.

BIOS 6005(1) - DEVELOPMENTAL BIOLOGY

This course will focus on the natural sequence of developmental stages from gametogenesis and fertilisation to histogenesis. It will also provide an overview of our current knowledge of the cellular and molecular mechanisms that underlie development.

BIOS 6006(1) - BASIC BIOINFORMATICS

This module is designed to provide an overview of bioinformatics. Relevant concepts in molecular biology will be reviewed with special emphasis on the experimental sources of biological data. Lectures will also focus on publicly available databases including intranets and internets.

BIOS 6007(1) - CELL SIGNALLING

This module will focus on our current understanding of the intricate pathways of the cell. The role of signalling in growth, differentiation and apoptosis will receive particular attention.

BIOS 6008(1) - TECHNIQUES, INSTRUMENTATION AND IMAGING

This module will cover the recent advances of techniques that have revolutionised the biological sciences. State of the art techniques used in modern biological Sciences will be discussed. Topics will include latest utilisation of fluorescence and probes to understand the cell and biological processes.

BIOS 6009(1) - BIOETHICS

After a historical perspective this module will address the major concerns of ethical questions relevant to modern biology in the post genomic era. Topics covered will include the role of bioethics in the environment, reproductive technologies and warfare.

BIOS 6010(1) - MOLECULAR SYSTEMATICS

This module will focus on the RNA, DNA and protein with a view to investigate phylogenetic relationships. The modern techniques used in systematics will be reviewed. The evolutionary relevance of the molecular data will be discussed.

BIOS 6011(1) - MICROBIOLOGY

This course will provide a framework for interactive lectures where current concepts and problems in the field of microbiology will be explored. Topics will also be chosen from medical, applied and environmental microbiology.

BIOS 6012(1) - BIOTECHNOLOGY

Specific topics will be identified and thoroughly discussed. Special attention will be given to the production of biologically active natural products and their exploitation.

BIOS 6013(1) - GENOMICS, PROTEOMICS AND METABONOMICS

Genome sequences will be examined at the structural and functional level. The synergistic areas among genomes, proteomes and metabonomics will be discussed. The important tools and strategies utilised in understanding the metabolic responses of living systems will be emphasised.