

MSc Physics with Specialisation in Forensic Science - SC535 (Subject to Approval)

1. Specific Titles

- 1) MSc Physics with Specialisation in Forensic Science
- 2) Postgraduate Diploma in Physics with Specialisation in Forensic Science
- 3) Postgraduate Certificate in Physics with Specialisation in Forensic Science

2. Objectives

The course provides a deep knowledge of all the key areas of Physics at an advanced level whilst at the same time there are modules appropriate to Forensic science.

Forensic analysis has traditionally been associated with a specialized knowledge of Chemistry and Biology. However there are certain areas such as ballistics of bullets, physics of explosions, collisions of vehicles, amongst others, where the tools of the physicist are essential.

This programme not only caters for the above need but also provides the physicist with new and interesting career opportunities.

3. General Entry Requirements

Successful completion of an undergraduate degree with

- at least a Second Class or CPA $\geq 50\%$, 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.

4. Programme Requirements

BSc (Hons) Physics or BSc (Joint Hons) Degree with Physics as one of the subjects or equivalent qualifications acceptable to the University of Mauritius.

5. 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 3 and 4 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 3 and 4 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.

6. Programme Duration

The Programme is offered either on a full-time (F/T) and/or a part-time (P/T) basis. The duration of the Postgraduate Programme should normally not exceed 2 years (4 semesters) for F/T and 4 years (8 semesters) for P/T.

7. Credits per Semester: Minimum 3 credits subject to Regulation 6.

8. Minimum Credits Required for Awards

Master's Degree:	39
Postgraduate Diploma:	24
Postgraduate Certificate:	12

Breakdown as follows:

	Core Taught modules	Project	Electives
Master's Degree	18	12	9
Postgraduate Diploma	18		6
Postgraduate Certificate	12		

9. Assessment

Each module can either be taught in semester 1 only or in semester 2 only or throughout the two semesters.

Modules wholly taught in one semester are termed semester modules whereas modules taught throughout the two semesters are termed yearly modules.

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 30% to 40% of total marks. Continuous assessment may be based on laboratory works and/or assignments and/or seminars and should include at least 1 class test.

Written examinations for semester modules will be held in the semester they are taught in. Yearly modules will be examined at the end of the year.

An overall total of 40% for combined Continuous Assessment and Written Examination components would be required to pass a module, without minimum thresholds within the individual Continuous Assessment and Written Examination.

10. 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.

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>			
PHYSI 6001(7)	Electromagnetic Phenomena	3 + 0	3
PHYSI 6002(7)	Quantum Mechanics II	3 + 0	3
PHYSI 6003(7)	Statistical Mechanics	3 + 0	3
PHYSI 6004(7)	Optics and Photonics	3 + 0	3
PHYFS 6001(7)	Ballistic, explosions, fire propagation	3 + 0	3
PHYFS 6002(7)	Vehicle collisions reconstruction	3 + 0	3
<u>PROJECT</u>			
PHYSI 6000Y(7)	Research Project	-	12
<u>ELECTIVES</u>			
PHYFS 6003(7)	Legal aspects of Forensic science	3 + 0	3
FRSC 2001Y(3)	Methods of Crime Detection I	2.5 + 1	3
FRSC 2002Y(3)	Methods of Crime Detection II	2.5 + 1	3
FRSC 3002Y(5)	Forensic Biology and DNA profiling	2.5 + 1	3
FRSC 3003Y(5)	Drugs of abuse and Forensic Toxicology	2.5 + 1	3

And/or other modules approved by the department.

Note: Not all electives may be on offer. The list of modules is not exhaustive.

13. Programme Plan - MSc Physics with Specialisation in Forensic Science**Full-Time****YEAR 1**

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYSI 6000Y(7)	Research Project	-	-
PHYSI 6001(7)	Electromagnetic Phenomena	3 + 0	3
PHYSI 6002(7)	Quantum Mechanics II	3 + 0	3
PHYSI 6003(7)	Statistical Mechanics	3 + 0	3
PHYSI 6004(7)	Optics and Photonics	3 + 0	3
PHYFS 6001(7)	Ballistic, explosions, fire propagation	3 + 0	3
PHYFS 6002(7)	Vehicle collisions reconstruction	3 + 0	3
ELECTIVES			
PHYFS 6003(7)	Legal aspects of Forensic science	3 + 0	3
FRSC 2001Y(3)	Methods of Crime Detection I	2.5 + 1	3
FRSC 2002Y(3)	Methods of Crime Detection II	2.5 + 1	3
FRSC 3002Y(5)	Forensic Biology and DNA profiling	2.5 + 1	3
FRSC 3003Y(5)	Drugs of abuse and Forensic Toxicology	2.5 + 1	3

And/or other modules approved by the department.

Note: Not all electives may be on offer. The list of modules is not exhaustive.

Part-Time

YEAR 1

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYSI 6001(7)	Electromagnetic Phenomena	3 + 0	3
PHYSI 6002(7)	Quantum Mechanics II	3 + 0	3
PHYSI 6003(7)	Statistical Mechanics	3 + 0	3
PHYSI 6004(7)	Optics and Photonics	3 + 0	3
PHYFS 6001(7)	Ballistic, explosions, fire propagation	3 + 0	3
PHYFS 6002(7)	Vehicle collisions reconstruction	3 + 0	3

YEAR 2

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
PHYSI 6000Y(7)	Research Project	-	-
ELECTIVES			
PHYFS 6003(7)	Legal aspects of Forensic science	3 + 0	3
FRSC 2001Y(3)	Methods of Crime Detection I	2.5 + 1	3
FRSC 2002Y(3)	Methods of Crime Detection II	2.5 + 1	3
FRSC 3002Y(5)	Forensic Biology and DNA profiling	2.5 + 1	3
FRSC 3003Y(5)	Drugs of abuse and Forensic Toxicology	2.5 + 1	3

And/or other modules approved by the department.

Note: Not all electives may be on offer. The list of modules is not exhaustive.

14. Outline Syllabus

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

CORE MODULES

PHYSI 6000Y(7) - RESEARCH PROJECT

The student must undertake a research project work on a topic approved by the department.

PHYSI 6001(7) - ELECTROMAGNETIC PHENOMENA

Electromagnetic wave equation. Electromagnetic wave propagation. Generation (and sources) of electromagnetic waves. Polarisation. Interference. Diffraction. Electromagnetic wave scattering. Electromagnetic fields. Electromagnetic radiation.

PHYSI 6002(7) - QUANTUM MECHANICS II

Introduction: concepts of quantum mechanics and conservation laws in quantum mechanics. Perturbation theory: time independent and time dependent. Spin. Identity of particles. Radiation from atoms. Some selected topics.

PHYSI 6003(7) - STATISTICAL MECHANICS

Thermodynamics. Statistical methods. Systems & particles. Statistical thermodynamics. Ensembles. Quantum statistics. Fluctuations. Phase transitions. Applications.

PHYSI 6004(7) - OPTICS AND PHOTONICS

Review of basic concepts. Geometrical optics. Coherence theory. Fourier optics. Optical systems. Lasers. Imaging. Holography. Guided optics and optical devices.

PHYFS 6001(7) - BALLISTICS, EXPLOSIONS, FIRES

Firearms. Flight of bullets. Propelled flight of missiles. Distance of firing. Physics of explosions. Explosion modelling. Fire propagation and analysis

PHYFS 6002(7) - VEHICLE COLLISIONS RECONSTRUCTION

Mechanics. Friction and braking. Driving hazards. Accident dynamics. Collision modelling and reconstruction.

ELECTIVE MODULES**PHYFS 6003(7) - LEGAL ASPECTS OF FORENSIC SCIENCE**

Mauritian legal framework. Jurisdiction of our courts. Laws of evidence and admissible evidence. Opinion and Expert evidence. Role of forensic science. Accident and Crime scene investigation.

FRSC 2001Y(3) - METHODS OF CRIME DETECTION I

Comparison, analysis and identification of fingerprints, footwear impressions and tool marks. Questioned documents and document analysis, analysis of paint, ink and glass.

FRSC 2002Y(3) - METHODS OF CRIME DETECTION II

Blood and blood pattern analysis, characterisation and comparison of hair and other fibres, firearms (cartridge cases, bullets, safety mechanisms, firing distance and gunshot residue)

FRSC 3002Y(5) - FORENSIC BIOLOGY AND DNA PROFILING

Examination of body fluids (blood, semen, saliva), Forensic DNA analysis and DNA profiling, forensic anthropology, the role and use of entomology in post mortem and/or any other topics.

FRSC 3003Y(5) - DRUGS OF ABUSE AND FORENSIC TOXICOLOGY

Drugs legislation, methods of detection and identification of drugs and poisons, toxicological principles and interpretation of toxicological data.

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