

MSc Chemistry - SC520

1. Specific Titles:

- (1) MSc Chemistry with specialisation in Analytical/ Environmental Chemistry
- (2) MSc Chemistry with specialisation in Applied Chemistry

2. Objectives

The main objective of this Programme is to cater for graduates who wish to have better career prospects, to enhance their knowledge in new spheres of Chemistry and also to acquire new skills and techniques.

Students will be educated to a level that will enable them to perform adequately in any area of Chemistry and also in one of the areas on offer, namely analytical/environmental or applied Chemistry. It is also expected that the candidates will be able to apply in practice the principles covered in the Programme and demonstrate awareness in all the main areas of Chemistry. Last but not least, students will enhance their opportunity for further studies.

3. 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.

4. Programme Requirements

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

5. Programme Duration

The programme will be offered on a part-time basis. The duration of the 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

6. Credits per Semester: Minimum 3 credits subject to regulation 4.

7. Minimum Credits Required for Award

Master's Degree:	36
Postgraduate Diploma:	24

Breakdown as follows:

(i) MSc Chemistry: 36

Core modules: 15 credits
+ Project/Dissertation: 9 credits
+ Elective modules: 12 credits

(ii) Postgraduate Diploma in Chemistry: 24

Core modules: 12 credits
+ Elective modules: 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. 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.

CHEM 6004(1) will be assessed solely by continuous assessment.

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.

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.

10. List of Modules

Code	Module Name	Hrs/Wk L+P	Credits
<u>CORE MODULES</u>			
CHEM 6001(1)	Inorganic Chemistry	4+0	4
CHEM 6002(1)	Physical Chemistry	4+0	4
CHEM 6003(1)	Organic Chemistry	4+0	4
CHEM 6004(1)	Advanced Practicals	0+9	3
<u>PROJECT/DISSERTATION</u>			
CHEM 6000(1)	Research Project/Dissertation	-	9
<u>ELECTIVES</u>			
Analytical/Environmental Chemistry			
CHEM 6005(1)	Analytical Chemistry I	2.5+1	3
CHEM 6006(1)	Analytical Chemistry II	2.5+1	3
CHEM 6007(1)	Environmental Chemistry	3+0	3
CHEM 6008(1)	Chemical Modelling and Bioinformatics	3+0	3

Applied Chemistry

CHEM 6008(1)	Chemical Modelling and Bioinformatics	3+0	3
CHEM 6009(1)	Polymer Materials	3+0	3
CHEM 6010(1)	Bioactive Molecules	3+0	3
CHEM 6011(1)	Applied Inorganic Chemistry	3+0	3

11. Programme Plan - MSc Chemistry

YEAR 1

CORE		Hrs/Wk	Credits
		L+P	
CHEM 6001(1)	Inorganic Chemistry	4+0	4
CHEM 6002(1)	Physical Chemistry	4+0	4
CHEM 6003(1)	Organic Chemistry	4+0	4
CHEM 6004(1)	Advanced Practicals	0+9	3

YEAR 2

CORE			
CHEM 6000(1)	Research Project/Dissertation	-	9

ELECTIVES

Analytical/Environmental Chemistry

CHEM 6005(1)	Analytical Chemistry I	2.5+1	3
CHEM 6006(1)	Analytical Chemistry II	2.5+1	3
CHEM 6007(1)	Environmental Chemistry	3+0	3
CHEM 6008(1)	Chemical Modelling and Bioinformatics	3+0	3

Applied Chemistry

CHEM 6008(1)	Chemical Modelling and Bioinformatics	3+0	3
CHEM 6009(1)	Polymer Materials	3+0	3
CHEM 6010(1)	Bioactive Molecules	3+0	3
CHEM 6011(1)	Applied Inorganic Chemistry	3+0	3

12. Outline Syllabus

CHEM 6000(1) - RESEARCH PROJECT/DISSERTATION

Students will normally undertake a research project of their choice under the guidance of a supervisor. Project work is to be viewed as an introduction to the exciting task of generating new knowledge. During the course of the project the student will learn standard and advanced experimental techniques, how to analyse data and write up scientific reports.

CHEM 6001(1) - INORGANIC CHEMISTRY

Review of coordination and organometallic chemistry, angular overlap model, bonding in cyclopentadienyl metallocenes and allyl complexes, use of organometallics in catalytic reactions, clusters, Electronic Absorption Spectroscopy.

CHEM 6002(1) - PHYSICAL CHEMISTRY

Advanced Kinetics, Spectroscopy (X-ray, NMR, ESR, Fluorescence). Equilibrium between phases and Irreversible Thermodynamics.

CHEM 6003(1) - ORGANIC CHEMISTRY

Aspects of organic synthesis methodology, Advanced organic synthesis, frontiers areas in Organic Chemistry (Physical, bio-organic).

CHEM 6004(1) - ADVANCED PRACTICALS

Further practicals in Inorganic, Organic, Physical and Analytical Chemistry.

CHEM 6005(1) - ANALYTICAL CHEMISTRY I

Review of main techniques for trace analysis including spectrophotometry, fluorometry, atomic spectrometry, chromatography (GC, GC/MS, HPLC, ion-exchange, etc.), electroanalytical techniques, thermal and others. Application of these selected methods for the analysis of atmospheric, water and soil samples for the determination of trace amounts of pollutants.

CHEM 6006(1) - ANALYTICAL CHEMISTRY II

Review of methods for chemical analysis of foodstuffs and agricultural products with special reference to metals in food, chemical food poisoning, oil and fat content of food, sugar and carbohydrate determination, detection of selected chemicals in fish and meat, pesticides in fruits and vegetables, drug analysis and other topics.

CHEM 6007(1) - ENVIRONMENTAL CHEMISTRY

Environmental Assessment. Nutrients and metals in coastal and aquatic systems. Non Living Resources. Urbanisation and Pollution. Global Environmental Change. Land Use and Climatic Change. Ecotoxicity.

CHEM 6008(1) - CHEMICAL MODELLING AND BIOINFORMATICS

Introduction, Molecular mechanics, Force fields, Hartree Fock and beyond, Basis set, Semi-empirical methods, Density functional theory, Applications. Introduction to DNA. Introduction to bioinformatics – Internet and biological databases: sequence database, macromolecular structure databases (PDB files), interrogating databases. Sequence analysis: alignment, phylogeny, homology search.

Study and analysis of macromolecular structures: basic manipulation of macromolecular structures.

CHEM 6009(1) - POLYMER MATERIALS

Recent advances in Polymer synthesis: living technique (free radical, cationic, anionic); spectroscopic techniques for polymer characterisation; composite materials; biopolymers, metallocene polymerisation.

CHEM 6010(1) - BIOACTIVE MOLECULES

Bioactive molecules derived from flora and fauna of Mauritius and elsewhere. Synthetic aspects of biomacromolecules and their applications.

CHEM 6011(1) - APPLIED INORGANIC CHEMISTRY

Metal ions in biological systems, Inorganic Medicinal compounds, Recent trends in Inorganic research or other selected topics.