

BSc (Hons) Chemistry (Optional Minor: Forensic Science)/MSc Chemistry – SC521

(Under Review)

1. Mission, Aims and Objectives

Chemistry is considered as the "central" science because it involves all of the other sciences. Chemistry seeks to understand the nature of matter in terms of atoms and molecules and the changes it undergoes.

The mission of the Department of Chemistry is to provide students with the appropriate level of modern and comprehensive chemical education required for life and work in our technologically advanced society. To accomplish this, the Department offers a four year full time MSc chemistry programme with possibility to exit at BSc (Hons) in line with current trends for other universities. This MSc programme is suitable for a wide range of career goals at both national and international levels: industrial and academic careers, in medicine, marine sciences, forensics, instrumentation, environment, quality control, business, safety and law.

The Department of Chemistry is committed to excellence in undergraduate and postgraduate training. The courses offered at undergraduate level emphasise the fundamental principles of chemistry while developing experimental skills. The aims are to train scientists develop their critical thinking and problem-solving skills to enable them tackle problems in the real world using their chemical knowledge. In an attempt to bring more applied knowledge to this course, the Department of Chemistry is innovating by offering a number of forensic science electives. These elective modules are meant to fall within a triad namely investigation, analysis and reporting. At postgraduate level, students follow advanced courses offered in the main areas of chemistry –organic, physical, inorganic, analytical and can select electives from marine sciences, food science, chemical modelling and bioinformatics and polymer science.

The Department encourages a variety of research interests in a broad spectrum of the chemical field addressing both pure and applied chemistry aiming at advancing the frontiers of knowledge and solving issues of national importance. It offers MPhil/PhD programmes in these areas and also encourages student involvement in research projects.

The Department also endeavours to promote capacity building in the chemical field and to provide consultancy services as well as to act as an advisory organ to public and private sectors.

2. General Entry Requirements for Admission to the University

As per General Entry Requirements for admission to the University for undergraduate degrees.

3. Programme Requirements

Credit at GCE 'O' level including Mathematics.
Pass at GCE 'A' Level in Chemistry.

To enroll for the MSc programme, i.e. Year 4, the student should satisfy all the requirements for the award of BSc (Hons) Chemistry/BSc (Hons) Chemistry (Minor: Forensic Science) and should have a CPA of at least 50%.

Note: Students will have to indicate if they wish to proceed to the MSc Programme at the end of their second year of study. Students enrolled for the MSc programme will be charged tuition fees.

4. Programme Duration

	Normal	Maximum
BSc (Hons) Chemistry	6 Semesters	10 Semesters
BSc (Hons) Chemistry (Minor: Forensic Science)	6 Semesters	10 Semesters
MSc Chemistry	8½ semesters	12½ semesters
Postgraduate Diploma in Chemistry	8 semesters	12 semesters

5. Credit System

15 Hours Lectures and/or Tutorials - 1 Credit

15 Hours of Practical Work – 0.5 Credit

6. Credits per Year

Minimum 18 credits; Maximum (including retake modules): 48 credits

7. Minimum Credits Required for Awards

MSc Degree: 137 (101 + 36)

Postgraduate Diploma: 127 (101 + 26)

BSc (Hons) Degree: 101

Breakdown as follows:

Degree	Credits from		
	Core Taught Modules	Project(s)	Electives/GEMs ^d
MSc Chemistry	95	15	27 ^c
Postgraduate Diploma	95	5	27 ^c
BSc (Hons) Chemistry	75	5	21 ^a
BSc (Hons) Chemistry (Minor: Forensic Science)	75	5	21 ^b

^a For BSc (Hons) Chemistry: at least 15 credits from Chemistry or Forensic Science electives with at least 6 credits (two electives) from year 2 and at least 6 credits (two electives) from year 3.

^b For BSc (Hons) Chemistry (Minor: Forensic Science): 15 credits from Forensic Science electives.

^c For MSc and Postgraduate Diploma: at least 21 credits from Chemistry or forensic science electives with at least 6 credits (two electives) from year 2, at least 6 credits (two electives) from year 3 and at least 6 credits (two electives) from Year 4.

^d GEMs: 0-6 credits to be taken normally within years 1 & 2.

8. Assessment

Each module will carry 100 marks (i.e. expressed as %) and will be assessed as follows (unless otherwise specified):

Assessment will be based on a written examination of 3-hour duration for 5/6 credit modules and 2-h for 3 credit modules and on continuous assessment carrying 30% of total marks, except for a programme where the structure makes for other specific provision(s). Continuous assessment may be based on laboratory work, and/or assignments and should include at least 1 class test for 3 credit modules and 2 class tests for 5/6 credit modules.

An overall total of 40% for combined continuous assessment and written examination components would be required to pass the module, without minimum thresholds within the individual continuous assessment and written examination.

CHEM 1051Y(1) and CHEM 2051Y(3) will be assessed solely by continuous assessment.

Modules will carry the weightings of 1, 3 or 5 depending on their status (Introductory, Intermediate or Advanced). Weighting for a particular module is indicated within parentheses in the module code.

9. Important Note

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

10. List of Modules

A. CHEMISTRY CORE MODULES (95 + 15 credits)

Code	Module Name	Hrs L+P	Credits
CHEM 1011Y(1)	Organic Chemistry I	75+0	5
CHEM 1021Y(1)	Physical Chemistry I	75+0	5
CHEM 1031Y(1)	Inorganic Chemistry I	75+0	5
CHEM 1041Y(1)	Analytical & Environmental Chemistry I	75+0	5
CHEM 1051Y(1)	Practical Chemistry I	0+150	5
CHEM 1061Y(1)	Maths for Chemists	45+0	3
CSE 1010e(1)	Introduction to IT	O.E.	3
CHEM 2011Y(3)	Organic Chemistry II	90+0	6
CHEM 2021Y(3)	Physical Chemistry II and Polymer Chemistry I	90+0	6
CHEM 2031Y(3)	Inorganic Chemistry II	90+0	6
CHEM 2041Y(3)	Analytical Chemistry II	45+0	3
CHEM 2051Y(3)	Practical Chemistry II	0+150	5
CHEM 3000(5)	Project	-	5
CHEM 3011Y(5)	Organic Chemistry III	90+0	6
CHEM 3021Y(5)	Physical Chemistry III	90+0	6
CHEM 3031Y(5)	Inorganic Chemistry III	90+0	6
CHEM 4000Y(5)	Research Project/Dissertation	-	10
CHEM 4011Y(5)	Advanced Organic Chemistry	75+0	5
CHEM 4021Y(5)	Advanced Physical Chemistry	75+0	5
CHEM 4031Y(5)	Advanced Inorganic Chemistry	75+0	5
CHEM 4041Y(5)	Advanced Analytical Chemistry	75+0	5

B. CHEMISTRY ELECTIVES (Not all modules may be on offer)

CHEM 2064Y(3)	Topics in Biochemistry	45+0	3
CHEM 2065Y(3)	Industrial Chemistry	45+0	3
CHEM 2066Y(3)	Computational Chemistry	45+0	3
CHEM 2067Y(3)	Environmental Chemistry II	45+0	3
CHEM 3064Y(5)	Polymer Chemistry II	45+0	3
CHEM 3065Y(5)	Selected Topics in Environmental and Analytical Chemistry	45+0	3
CHEM 3066Y(5)	Quality Control and Quality Management	45+0	3
CHEM 3067Y(5)	Supramolecular Chemistry	45+0	3
CHEM 4064Y(5)	Marine Sciences	45+0	3
CHEM 4066Y(5)	Food Science	45+0	3
CHEM 4067Y(5)	Chemical Modelling and Bioinformatics	45+0	3
CHEM 4068Y(5)	Advanced Polymer Science	45+0	3

C. FORENSIC SCIENCE ELECTIVES

FRSC 1001Y(1)	Introduction to Forensic Science and Crime Scene Investigation	40+10	3
FRSC 2001Y(3)	Methods of Crime Detection I	35+20	3
FRSC 2002Y(3)	Methods of Crime Detection II	35+20	3
FRSC 3001Y(5)	Explosions, Fires and Forensic Science in Court	45+0	3
FRSC 3002Y(5)	Forensic Biology and DNA profiling	37.5+15	3
FRSC 3003Y(5)	Drugs of Abuse and Forensic Toxicology	37.5+15	3

and modules offered by any other units/departments.

The Department reserves the right to offer additional electives.

Note: For the award of BSc (Hons) Chemistry, students are required to choose at least two electives offered in Year 2 and at least two electives offered in Year 3 from chemistry or Forensic Science electives. For the award BSc (Hons) Chemistry (Minor: Forensic Science), students are required to do 15 credits from Forensic Science electives.

For the award of MSc Chemistry, students are required to choose at least two electives offered in Year 2, at least two electives offered in Year 3 and at least two electives offered in Year 4 from chemistry or forensic Science electives.

11. Programme Plan – BSc (Hons) Chemistry/BSc (Hons) Chemistry (Minor: Forensic Science) /MSc Chemistry

YEAR 1

Code	Module Name	Hrs L+P	Credits
CORE			
CHEM 1011Y(1)	Organic Chemistry I	75+0	5
CHEM 1021Y(1)	Physical Chemistry I	75+0	5
CHEM 1031Y(1)	Inorganic Chemistry I	75+0	5
CHEM 1041Y(1)	Analytical & Environmental Chemistry I	75+0	5
CHEM 1051Y(1)	Practical Chemistry I	0+150	5
CHEM 1061Y(1)	Maths for Chemists	45+0	3
CSE 1010e(1)	Introduction to Information Technology	O.E.	3

ELECTIVE

FRSC 1001Y(1)	Introduction to Forensic Science and Crime Scene Investigation	40+10	3
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and/or modules to be chosen from any other units/departments or any new modules offered by the Department

YEAR 2

Code	Module Name	Hrs L+P	Credits
CORE			
CHEM 2011Y(3)	Organic Chemistry II	90+0	6
CHEM 2021Y(3)	Physical Chemistry II and Polymer Chemistry I	90+0	6
CHEM 2031Y(3)	Inorganic Chemistry II	90+0	6
CHEM 2041Y(3)	Analytical Chemistry II	45+0	3
CHEM 2051Y(3)	Practical Chemistry II	0+150	5

ELECTIVES

CHEM 2064Y(3)	Topics in Biochemistry	45+0	3
CHEM 2065Y(3)	Industrial Chemistry	45+0	3
CHEM 2066Y(3)	Computational Chemistry	45+0	3
CHEM 2067Y(3)	Environmental Chemistry II	45+0	3
FRSC 2001Y(3)	Methods of Crime Detection I	35+20	3
FRSC 2002Y(3)	Methods of Crime Detection II	35+20	3

and/or modules to be chosen from any other units/departments or any new modules offered by the Department

YEAR 3

Code	Module Name	Hrs L+P	Credits
CORE			
CHEM 3000Y(5)	Project	-	5
CHEM 3011Y(5)	Organic Chemistry III	90+0	6
CHEM 3021Y(5)	Physical Chemistry III	90+0	6
CHEM 3031Y(5)	Inorganic Chemistry III	90+0	6
ELECTIVES			
CHEM 3064Y(5)	Polymer Chemistry II	45+0	3
CHEM 3065Y(5)	Selected Topics in Environmental and Analytical Chemistry	45+0	3
CHEM 3066Y(5)	Quality Control and Quality Management	45+0	3
CHEM 3067Y(5)	Supramolecular Chemistry	45+0	3
FRSC 3001Y(5)	Explosions, Fires and Forensic Science in Court	45+0	3
FRSC 3003Y(5)	Drugs of Abuse and Forensic Toxicology	37.5+15	3

and/or modules to be chosen from any other units/departments or any new modules offered by the Department

YEAR 4

Code	Module Name	Hrs/Wk L+P	Credits
CORE			
CHEM 4000Y(5)	Project	-	10
CHEM 4011Y(5)	Advanced Organic Chemistry	75+0	5
CHEM 4021Y(5)	Advanced Physical Chemistry	75+0	5
CHEM 4031Y(5)	Advanced Inorganic Chemistry	75+0	5
CHEM 4041Y(5)	Advanced Analytical Chemistry	75+0	5
ELECTIVES			
CHEM 4064Y(5)	Marine Sciences	45+0	3
FRSC 3002Y(5)	Forensic Biology and DNA Profiling	37.5+15	3
CHEM 4066Y(5)	Food Science	45+0	3
CHEM 4067Y(5)	Chemical Modelling and Bioinformatics	45+0	3
CHEM 4068Y(5)	Advanced Polymer Science	45+0	3

and/or modules to be chosen from any other units/departments or any new modules offered by the Department

NOTE: NOT ALL ELECTIVES MAY BE ON OFFER

Students opting for BSc (Hons) Chemistry are required to choose any two electives offered in Year 2 and any two electives in Year 3

Students opting For BSc (Hons) Chemistry (Minor: Forensic Science) are required to take 15 credits from Forensic Science

Students opting for MSc Chemistry are required to choose any two electives offered in Year 2, any two electives in Year 3 and any two electives in Year 4

12. Outline Syllabus

CHEM 1011Y(1) - ORGANIC CHEMISTRY I

Structure and bonding (molecular orbitals, hybridisation, dipoles, resonance); nomenclature of organic compounds; reaction mechanisms using curly arrows, stereochemistry of open chain organic compounds, chemistry of main functional groups (aliphatic and aromatic) with emphasis on synthesis and reactivity, reactions of naphthalene and its derivatives, an introduction to spectroscopic techniques in organic chemistry (UV-Visible, IR).

CHEM 1021Y(1) - PHYSICAL CHEMISTRY I

Chemical Thermodynamics I: kinetic theory of gases, 1st, 2nd & 3rd laws of thermodynamics, thermochemistry, ionic equilibria, acid/base reactions, gravimetry, redox reactions, solubility product.

Quantum Chemistry I: wave-particle behaviour of the electron, Bohr's theory of the H-atom, Schrödinger's equation and application to simple systems (1-D box), symmetry, symmetry elements and operations, classification into groups, kinetics, reaction orders, rate laws, elementary reactions, steady state approximation, reaction mechanisms.

CHEM 1031Y(1) - INORGANIC CHEMISTRY I

Acids and bases, non-aqueous solvents, oxidation-reduction, basic solid state chemistry, shapes of molecules, molecular orbital theory, chemistry of main group elements.

CHEM 1041Y(1) - ANALYTICAL & ENVIRONMENTAL CHEMISTRY I

Analytical process, precision glassware, calibration methods, fundamentals of spectrophotometry, application of spectrophotometry, spectrophotometers, atomic spectroscopy (absorption; emission; fluorescence), introduction to analytical separations; Gas Chromatography.

Biogeochemistry of major elements (carbon, nitrogen, phosphorus), sediment chemistry, ecotoxicity (Pb, Cr, Cu, Zn, Cd), hydrogeochemistry, coastal and aquatic pollution, contamination, conservation, environmental and risk management, environmental assessment, air pollution and chemical cycles.

CHEM 1051Y(1) - PRACTICAL CHEMISTRY I

Practicals drawn mainly from modules CHEM 1011Y(1), CHEM 1021Y(1), CHEM 1031Y(1) and CHEM 1041Y(1), covering topics in inorganic, organic, physical and analytical/environmental chemistry.

CHEM 1061Y(1) - MATHS FOR CHEMISTS

Factorising, solving quadratic equations, solving linear systems of equation, partial fractions, inequalities, sigma and pi notation, functions, trigonometric, exponential, logarithmic, inverse functions, essential co-ordinate geometry; complex numbers, series, differentiation, differentiation of basic functions, product rule, quotient rule, minima and maxima, chain rule, curve sketching and essential coordinate geometry, complex numbers, Maclaurin and Taylor Series, integration, integration of basic functions, integration by substitution, integration by parts, finite integration, numerical integration, functions of several variables and partial differentiation, differential equations, first and second order differential equations, boundary conditions, matrix notation, elementary matrix operations, properties, determinants, invertible matrices, Eigenvalues and eigenvectors, probability and statistics: permutations and combinations; introduction to statistics, regression analysis, plotting of curves, data analysis.

CHEM 2011Y(3) - ORGANIC CHEMISTRY II PQ: CHEM 1011Y(1)

Chemistry of the carbonyl group, Diels-Alder reactions, basic heterocyclic chemistry (synthesis and reactivity of pyridine, pyrrole, furan and thiophene), oxidation and reduction methods in synthesis, spectroscopy (¹H NMR, ¹³C NMR and mass spectrometry) and structure elucidation, stereochemistry and stereochemical aspects of reactivity of selected alicyclic compounds (cyclohexane derivatives and decalins), aromaticity, chemistry of selected heteroelements.

CHEM 2021Y(3) - PHYSICAL CHEMISTRY II AND POLYMER CHEMISTRY I PQ: CHEM 1021Y(1)

Chemical Thermodynamics II: Helmholtz and Gibbs free energy, chemical potential, chemical equilibrium and Le Chatelier's principle, phase equilibria, thermodynamics of electrochemical cells, potential v/s pH diagrams,

Quantum Chemistry II: Particle moving in 2-D and 3-D boxes, particle moving in a ring, 1-D and 3-D harmonic oscillators, hydrogen and hydrogen like atoms, operators, perturbation theory and variation method with applications, vector model of atom, introduction to computational methods to solve Schrödinger's equation, polymer structure and characterization: polymer nomenclature, stereochemistry, isomerism, molar masses and size, size-exclusion chromatography, viscometry, light scattering, thermal analysis, polymer morphology, polymer solubility and thermodynamics of polymer solutions.

CHEM 2031Y(3) - INORGANIC CHEMISTRY II PQ: CHEM 1031Y(1)

Coordination chemistry (nomenclature, coordination numbers and geometries, isomerism in complexes, crystal and ligand field theory, spectrochemical series, molecular orbital theory); further solid-state chemistry, stability of complexes; electronic absorption spectra and chemistry of selected transition metals.

CHEM 2041Y(3) - ANALYTICAL CHEMISTRY II PQ: CHEM 1041Y(1)

Sampling and sample preparation, High Performance Liquid Chromatography, chromatographic methods and capillary electrophoresis, electrogravimetric and coulometric analysis, voltammetry, chemometrics: Basic statistics, signal processing and time-series analysis, optimisation and experimental design, pattern recognition and classification, modeling, quality assurance, legal aspects of chemicals and good laboratory practice.

CHEM 2051Y(3) - PRACTICAL CHEMISTRY II PR: CHEM 1051Y(1)

Practicals drawn from modules CHEM 2011Y(3), CHEM 2021Y(3), CHEM 2031Y(3) and CHEM 2041Y(3) covering topics in inorganic, organic, physical and analytical chemistry.

CHEM 2064Y(3) - TOPICS IN BIOCHEMISTRY PQ: CHEM 1011Y(1)

Biochemistry of amino acids and proteins, bioenergetics, enzymes (structure and kinetics), lipids, DNA, RNA, ATP, carbohydrate metabolism.

CHEM 2065Y(3) - INDUSTRIAL CHEMISTRY PQ: CHEM 1021Y(1)

Topics to be included from the topics: industrial metallurgy, inorganic commodity chemicals, synthetic gas processes, textile processing, textile fibres, environmental impacts of chemicals used, enzymatic and non enzymatic browning in foods, pigments in plants and animals and food colloids.

CHEM 2066Y(3) - COMPUTATIONAL CHEMISTRY PQ: CHEM 1021Y(1)

Computational chemistry: its origin, development, future challenges and limitations, force fields and molecular mechanics, *ab initio* method, semi empirical theory, density functional theory, condensed phase calculations, molecular dynamics, applications.

CHEM 2067Y(3) - ENVIRONMENTAL CHEMISTRY II PQ: CHEM 1041Y(1)

Green Chemistry, environmental Impact Assessment, environmental hazards, ecotoxicity, nutrient cycling, oil spills, mercury contamination, natural and anthropogenic inputs in the coastal zone, ocean resources and seafood, urban smog, ozone kinetics, CFCs, greenhouse effects, air pollution control and monitoring, conventions, organic and chlorinated organic pollutants, chemicals prohibited and other selected topics.

CHEM 3000Y(5) - PROJECT

Research project approved by the Department and conducted under the supervision of academic(s) from the Dept or jointly with other Depts. of the University.

CHEM 3011Y(5) - ORGANIC CHEMISTRY III PQ: CHEM 2011Y(3)

Modern organic synthesis (functional group protection, retrosynthetic analysis, rearrangement reactions, chemistry of selected reactive intermediates: carbenes, nitrenes and benzynes, chemistry of advanced heterocycles: quinoline, isoquinoline, indole), introduction to biosynthetic pathways, introduction to physical organic chemistry (nucleophilic substitution).

CHEM 3021Y(5) - PHYSICAL CHEMISTRY III PQ: CHEM 2021Y(3)

Statistical thermodynamics, advanced kinetics, adsorption theories, catalysis, surface chemistry.

Phase equilibria: thermodynamic conditions for phase equilibria, phase rule and its applications to phase diagram, characteristics of phase diagrams involving one, two and three-component systems, Quantum Chemistry III: Hückel molecular orbital method, Group theory and applications to IR and Raman Spectroscopy,

Spectroscopy: rotational spectroscopy, vibrational spectroscopy, vibrational-rotational spectroscopy and Raman spectroscopy; their fundamentals and applications, introduction to nanotechnology.

CHEM 3031Y(5) - INORGANIC CHEMISTRY III PQ: CHEM 2031Y(3)

Organometallic chemistry (synthesis, structure and reactivity), magnetochemistry, fluxional molecules, bioinorganic chemistry, reaction mechanisms, chemistry of lanthanides and actinides, descriptive chemistry of some selected transition metals.

CHEM 3064Y(5) - POLYMER CHEMISTRY II PQ: CHEM 2021Y(3)

Polymer chemistry: methods and techniques for polymer synthesis, polycondensation and step-wise addition polymerization, free-radical, ionic, coordination, metathesis, ring-opening polymerizations, copolymerization, structure property relationships, commercial and specialty polymers.

CHEM 3065Y(5) - SELECTED TOPICS IN ENVIRONMENTAL AND ANALYTICAL CHEMISTRY

PQ: CHEM 1041Y(1)

Anthropogenic and natural impacts from extractive and petrochemical industries, aquatic chemistry (redox processes, pH and carbonates), coastal and terrestrial pollutants, humic substances and PAHs in the environment; radioactivity, land contamination and remediation, alternate fuel sources, pollutant transport, transformation and pathways, coastal zone management, natural and human induced hazards, environmental diagnosis.

CHEM 3066Y(5) - QUALITY CONTROL AND QUALITY MANAGEMENT

Laboratory control, ISO, HACCP, GLP, accreditation, certification.

CHEM 3067Y(5) - SUPRAMOLECULAR CHEMISTRY

Introduction to supramolecular chemistry, molecular forces, common supramolecules, experimental techniques in supramolecular chemistry, host / guest chemistry, molecular recognition, amphiphile organization, supramolecular design strategy & nanotechnology.

CHEM 4000Y(5) - 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 4011Y(5) - ADVANCED ORGANIC CHEMISTRY

Chemical aspects of biosynthetic pathways of secondary metabolites from the shikimate, polyketide and alkaloid families as well as of mixed origins, total synthesis approach of some organic natural products e.g terpenes and prostaglandins, introduction to medicinal chemistry (chemistry of pharmaceutical drugs, drug metabolisms, drug targeting) photochemistry (free radical chemistry, electronic excitation and de-excitation of organic molecules, state energy diagrams, reaction mechanisms, applications of photochemistry definition, derivation and use of the Stern-Volmer equation.

CHEM 4021Y(5) - ADVANCED PHYSICAL CHEMISTRY

Advanced Kinetics, Spectroscopy (X-ray, NMR, ESR, Fluorescence), equilibrium between phases and irreversible thermodynamics, their fundamentals and applications.

CHEM 4031Y(5) - ADVANCED INORGANIC CHEMISTRY

Advanced organometallics and catalysis, clusters, advanced coordination chemistry, inorganic spectroscopy, metals in medicine.

CHEM 4041Y(5) - ADVANCED ANALYTICAL CHEMISTRY

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.

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, integrated chemical management and other topics.

CHEM 4064Y(5) - MARINE SCIENCES

Chemical processes in the marine environment, ocean circulation and water dynamics, estuarine and coastal processes, marine resources, ocean productivity, marine ecosystems, toxicity, marine pollution and pathways, marine protected areas, integrated coastal zone management, hazards and risk management, land based oceanic and seafood industry.

CHEM 4066Y(5) - FOOD SCIENCE

Classification, chemical structure and properties of food constituents, chemical composition, properties and nutritional value of food commodities, primary sensory attributes of foods and perception of food quality, types of nutrients and their role in health promotion and disease prevention, dietary guidelines and healthy eating, microbial food spoilage, microbial food-borne diseases, useful micro-organisms, factors which affect food quality and safety, food hazards, food hygiene, codes of practice/guidelines to ensure food quality and safety, traceability, importance of food safety management throughout the food chain. principles and methods of food preservation including high-temperature processing, low-temperature processing, moisture removal and irradiation, food packaging.

CHEM 4067Y(5) - 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 4068Y(5) - ADVANCED POLYMER SCIENCE

Living polymerization: free-radical, cationic and ionic, ROMP; metallocene polymerization; liquid crystals; high performance polymers; biopolymers and polysaccharides; advanced characterization techniques (TEM, AFM, DLS/FFF, MALDI-TOF), polymer rheology and processing.

CSE 1010e(1) - INTRODUCTION TO INFORMATION TECHNOLOGY

IT and computers, stepping in the computer; input and output devices, secondary storage, programming, systems software, applications software, systems development, computer networks, the Internet, computer security, software utilities, issues and trends in IT.

FORENSIC SCIENCE ELECTIVES

FRSC 1001Y(1) - INTRODUCTION TO FORENSIC SCIENCE AND CRIME SCENE INVESTIGATION

Historical developments of forensic science, role of forensic science, introduction to crime scene investigation, crime scene preservation, and documentation, an overview of crime scene processing, identifying and labelling of exhibits, recovery and packaging of physical evidences, continuity and integrity, quality assurance in laboratories.

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 3001Y(5) - EXPLOSIONS, FIRES AND FORENSIC SCIENCE IN COURT

The physics of fire and fire scene investigation classification of explosives and analysis; Introduction to Mauritian legal framework and role of expert witness.

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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