School of Chemistry

Head of School

Professor P G Bruce

Degree Programmes

Single Honours Degrees (BSc):

Biomolecular Science
Chemistry
Chemistry with Applied Chemistry
Chemistry with Biological Chemistry
Chemistry with Catalysis
Chemistry with French[w]
Chemistry with German[w]
Chemistry with Industrial Placement
Chemistry with Materials Chemistry
Chemistry with Pharmacology
Geochemistry†

Single Honours Degree (M Chem):

Chemistry (Advanced) with Industrial Year[c]

Joint Honours Degrees:

Chemistry and
Biochemistry, Computer Science, Geoscience, Mathematics, Physics.

[w] also available 'With Integrated Year Abroad'
† available only to students already enrolled in the course.
[c] Changing from 4 year to 5 year degree.

Programme Prerequisites

Biomolecular Science

Passes at 11 or better in BI2201, BI2202, CH2101 and CH2103

Chemistry, Chemistry with: Industrial Placement, Applied Chemistry, Biological Chemistry, Catalysis, or Materials Chemistry

Passes at 11 or better in CH2101 and either CH2102 and CH2103 or one of CH2102 and CH2103, together with an approved module from another School

Geochemistry†(available only to students already enrolled in the course.)

Passes at 11 or better in CH2001, one of CH2003, CH2004, CH2005, GL2001 and GL2002

Chemistry with Pharmacology

Passes at 11 or better in CH2101, CH2103, BI2002 and BI2006

Chemistry (Advanced) with Industrial Year (M Chem)

Passes at 11 or better in CH2101 and either CH2102 and CH2103 or one of CH2102 and CH2103, together with an approved module from another School

Chemistry with French

Passes at 11 or better in CH2101, either CH2102 or CH2103, FR2015 and FR2016

Chemistry with German

Passes at 11 or better in CH2101, either CH2102 or CH2103, GM2005 and GM2006

Chemistry and Biochemistry

Passes at 11 or better in BI2201, BI2202, CH2101 and CH2103

Chemistry and Computer Science

Passes at 11 or better in CH2101, either CH2102 or CH2103, CS2001 and CS2002

Chemistry and Geoscience

Passes at 11 or better in CH2101, CH2102, GL2001 and GL2002

(c) CH3003, CH3006, CH3013

and 15 credits from the group CH3004, CH3005, CH3007 and CH3008 (except in the case of Chemistry and Computer Science where it will be 15 credits from CH3007 and CH3008 only)

* The Single Honours course is recognised by the Royal Society of Chemistry (RSC) for professional membership. Students may replace both of CH3009, CH3010 or two of CH3014 - CH3016 by 30 credits offered by another School but the degree may not be recognised by RSC.

In the case of students who spend part of the Honours Programme abroad on a recognised Exchange Scheme, the Programme Requirements will be amended to take into account courses taken while abroad.

Modules

CH1001 Chemistry I : Foundation

Credits: 20.0 Semester: 1

Prerequisites: Higher Chemistry or A-level Chemistry.

Description: This module provides a sound foundation in the basic principles of chemistry. Lectures will deal with a range of topics including atomic structure, ionic and covalent bonding, determination of molecular structure, metals and non-metals and their simple compounds, states of matter, and energy changes during reactions. The laboratory work involves some basic chemical techniques and includes examples of synthesis and measurement.

Class Hour: 11.00 am and 2.00 - 5.00 pm on one afternoon

Teaching: Five lectures and one 3 hour practical

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH1002 Chemistry II : Chemistry, People and the Environment

Credits: 20.0 Semester: 1

Prerequisites: Higher Chemistry or A-level Chemistry

Description: This module aims to show the tremendous impact that chemistry has on everyone's life. The aim is to make students aware of the importance of chemicals and the consequences for society of environmental changes, the effect on the earth's resources etc. It is a general course of interest to all students. Topics such as organic raw materials, energy and fuels, chemistry in food production and in medicine, case studies of selected elements, environmental chemistry, forensic chemistry and the chemistry of colour are discussed. The laboratory work involves some basic chemical techniques and includes examples of synthesis and measurement.

Class Hour: 12.00 noon and 2.00 - 5.00 pm on one afternoon

Teaching: Five lectures and one 3 hour practical

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH1004 Chemistry IV : Organic and Biological Chemistry

Credits: 20.0 Semester: 2

Prerequisites: Higher Chemistry or A-level Chemistry

Description: This module provides the groundwork of basic organic chemistry and biological chemistry. The organic chemistry course covers the synthesis, properties and reactions of simple organic compunds. Chirality and stereochemistry along with NMR, IR and mass spectrometry are covered at an elementary level. The chemistry of carbohydrates, lipids, amino acids, peptides and proteins is discussed along with topics such as co-ordination chemistry, transition metals and metalloproteins. The pH of acids, bases, salts and buffer solutions is discussed. Laboratory work covers organic synthesis, spectroscopic and chromatographic methods of analysis along with some physicochemical measurements.

Class Hour: 11.00 am and 2.00 - 5.00 pm on one afternoon

Teaching: Five lectures and one 3 hour practical

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

Chemistry and Mathematics

Passes at 11 or better in CH2101, either CH2102 or CH2103, either MT2001 or MT2102, and one of MT2002 and MT2003

Chemistry and Physics

Passes at 11 or better in CH2101, CH2102, PH2001, PH2002, and MT2101 or (MT2001 and MT2003)

Programme Requirements

Biomolecular Science

Chemistry Component: CH3002, CH3004, CH3014, CH3106, CH3107, CH3109, CH3110, CH4022, CH4026 and CH4029

*** Chemistry** Single Honours (BSc) ***available only to those admitted to the University in September 1999 or earlier :*** CH3001 - CH3008, CH3011 - CH3013, CH3017, CH3018, and two of CH3014 - CH3016 and either CH3019 or both CH3009 and CH3010

*** Chemistry** Single Honours (BSc) ***available only to those admitted to the University in September 2000 or later :*** CH3001 - CH3013, CH3017, CH3018, and two of CH3014 - CH3016.

Chemistry (Advanced) with Industrial Year (M Chem) (4 year degree) ***available only to those admitted to the University in September 1999 or earlier:*** CH3001 - CH3006, CH3008, CH3019, CH4001 - CH4003, CH4107, CH4111, CH4112, CH4113, CH4117, CH4118, and two of CH3014 - CH3016.

Chemistry (Advanced) with Industrial Year (M Chem) (5 year degree) ***available only to those admitted to the University in September 2000 or later:*** CH3001 - CH3010, CH3017, CH3119, CH4111 - CH4113, CH4118, and two of CH4114 - CH4116.

Chemistry with Applied Chemistry: CH3001 - CH3013, CH3017, CH3018, and two of CH3014 - CH3016

Chemistry with Biological Chemistry: CH3001 - CH3008, CH3011 - CH3014, CH3017, CH3018, either CH3015 or CH3016 and either CH3019 or both CH3009 and CH3010.

Chemistry with Catalysis: CH3001 - CH3008, CH3011 - CH3013, CH3015, CH3017, CH3018, either CH3014 or CH3016 and either CH3019 or both CH3009 and CH3010.

Chemistry with French, Chemistry with German: CH3001 or CH3003, CH3002, CH3004, CH3005, CH3007, CH3008, CH3011 - CH3013, one of CH3014 - CH3016, CH3017 and either CH3019 or both CH3009 and CH3010.

Chemistry with Industrial Placement: CH3001 - CH3008, CH3011 - CH3013, CH3017, CH3018, two of CH3014 - CH3016 and CH3019

Chemistry with Materials Chemistry: CH3001 - CH3008, CH3011 - CH3013, CH3016 - CH3017, either CH3014 or CH3015 and either CH3019 or both CH3009 and CH3010.

Chemistry with Pharmacology: CH3001 - CH3005, CH3007, CH3011 - CH3014, CH3017, CH3018, CH3021, CH3981

Geochemistry† (Chemistry Component): **Either** CH3002 - CH3005, CH3007, CH3008, CH3010, CH3011, CH3020 and either CH3013 or CH3016 **Or** CH3003, CH3007, CH3008, CH3010, CH3011, CH3020, CH3022 - CH3024 and two of CH3002, CH3013 and CH3016 (available only to students already enrolled in the course).

Joint Honours Degree: 100 credits from CH3001-20, including 15 credits from each of the following groups of modules:-

(a) CH3001, CH3011

(b) CH3002, CH3012

The prerequisite for each of the following Honours modules is entry to the Honours Programme(s) for which they are specified, save where a specific prerequisite is given.

CH3001 Inorganic Chemistry I

Credits: 15.0 Semester: 1

Description: The module includes descriptive chemistry of elements in groups 2, 12, 13, 15 and 17, and selected compounds of these elements; organometallic compounds of groups 1,2, and 14; and organometallic compounds of the 3d transition elements. In all cases, emphasis will be placed on linking fundamental chemistry to practical applications.

Class Hour: 9.00 am on two mornings or 1 hour on each of two afternoons.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH3002 Organic Chemistry I

Credits: 15.0 Semester: 1

Description: This organic chemistry module builds and expands on concepts presented in CH2001 and the core element of CH2003 - CH2005. Topics covered include heteroaromatic chemistry such as pyridine, furan, pyrrole and thiophen as well as selected systems with two or more heteroatoms; biosynthesis; organic synthesis, emphasising aspects of design and strategy; orbitals and bonding with application to cycloaddition, cycloreversion and electrocyclic reactions and to sigmatropic rearrangements.

Class Hour: 9.00 am on two mornings or 1 hour on each of two afternoons.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH3003 Physical Chemistry I

Credits: 15.0 Semester: 1

Description: This module, along with CH3013, constitute the physical chemistry component of the honours course. It has three components (i) solid state chemistry which provides a basic understanding of crystal structures of inorganic solids, their bonding, and electrical and magnetic properties, (ii) spectroscopic techniques for the determination of the structure and dynamics of molecules covering techniques such as IR, UV / visible, NMR and ESR, and (iii) advanced thermodynamics.

Class Hour: 9.00 am on two mornings or 1 hour on each of two afternoons.

Teaching:Two lectures.

Assessment: 2 Hour Examination = 100%

CH3004 Organic Chemistry Laboratory

Credits:7.5Semester: 2

Description: The objective of this module is to train undergraduate chemists in practical laboratory techniques. The course will highlight a wide range of skill requirements in tackling small-scale and moderately large-scale organic synthesis. A range of single and multistep synthesis will be carried out to illustrate the use of a range of reagents and of reaction conditions. In the experiments, a range of analytical methods, mainly chromatographic and spectroscopic will be employed.

Class Hour: Mornings.

Teaching:90 hours of laboratory work over a five week period.

Assessment: Laboratory work = 100%

CH3005 Inorganic Chemistry Laboratory

Credits:7.5Semester: 1

Description: This module provides a range of experiments designed to illustrate advanced practical techniques of value in inorganic chemistry. In the characterisation of materials synthesized, particular emphasis will be placed on spectroscopic methods; in the characterisation of reactivity, attention will be given to methods for elucidation of reaction mechanisms.

Class Hour: Mornings.

Teaching:90 hours of laboratory work over a five week period.

Re-Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH1005 Chemistry V : Modern Materials

Credits: 20.0 Semester: 2

Prerequisites: Higher Chemistry or A-level Chemistry.

Description: This module introduces students to the wide range of materials used today. Students will learn how structure and properties are related for materials such as metals, alloys, ceramics, semiconductors, polymers, composites etc. The module will be of particular interest to students of Physics and Geology as well as to Chemists. The laboratory work incorporates studies of materials and measurements of properties of materials met in lecture courses.

Class Hour: 10.00 am and 2.00 - 5.00 pm on one afternoon

Teaching: Five lectures and one 3 hour practical

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH2101 Chemistry & Environmental Chemistry

Credits: 30.0 Semester: 1

Prerequisites: CH1001, CH1004

Anti-requisites: CH2001, CH2003, CH2004, CH2005

Description: The module includes lectures on transition-metal chemistry, atmospheric chemistry, kinetics of reactions in the gas phase and in solution, molecular spectroscopy and selected topics in organic chemistry. The laboratory component includes practical training in both analytical and environmental chemistry.

Class Hour: To be arranged

Teaching: 4 hours of lectures, 6 hours of laboratories, tutorials and workshops

Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

CH2102 Chemistry & Materials Chemistry

Credits: 30.0 Semester: 2

Prerequisites: CH1001, CH1004

Anti-requisites: CH2001, CH2003, CH2004, CH2005

Description: The module includes lectures on structural chemistry, main-group chemistry, organic materials chemistry, and zeolites and microporous solids. The laboratory component includes practical training in both chemical measurements and materials chemistry.

Class Hour: To be arranged

Teaching: 4 hours of lectures, 6 hours of laboratories, tutorials and workshops

Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

CH2103 Chemistry & Medicinal Chemistry

Credits: 30.0 Semester: 2

Prerequisites: CH1001, CH1004

Anti-requisites: CH2001, CH2003, CH2004, CH2005

Description: The module includes lectures on organic chemistry, chemical equilibria and thermodynamics, metals in biology, natural product chemistry, medicinal chemistry, and drug design. The laboratory component includes practical training in both synthetic and medicinal chemistry.

Class Hour: To be arranged

Teaching: 4 hours of lectures, 6 hours of laboratories, tutorials and workshops

Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

Re-Assessment: Continuous Assessment = 40%, 3 Hour Examination = 60%

supervised work on topics of an applied nature and will normally focus on applications of analytical methods. Activities will involve group work.

Teaching:Full-time during three weeks in the second part of the semester.

Assessment: Continuous Assessment = 25%, Final Report = 75%

CH3011 Inorganic Chemistry II

Credits:15.0Semester: 1

Co-requisite:CH3007

Anti-requisite:CH4111

Description: This module includes both the descriptive chemistry of the 4d, 5d, 4f and 5f transition metal series and advanced aspects of the general co-ordination chemistry of transition metals including molecular orbital theory of metal complexes, electronic spectroscopy and magnetic properties and thermodynamics of complex formation in solution.

Class Hour: To be arranged.

Teaching:Two lectures.

Assessment: 2 Hour Examination = 100%

CH3012 Organic Chemistry II

Credits:15.0Semester: 1

Anti-requisite:CH4112

Description: This organic chemistry module provides a detailed study of topics complementary to those studied in CH3002. Topics covered are as follows: non-benzenoid aromatic compounds including discussion of Huckel's rules, cyclopentadienide and tropylium ions, annulenes; organic synthesis including the use of protective groups; alicyclic chemistry including discussion of conformational analysis and the chemistry of small and medium sized rings; reactive intermediates including discussion of free radicals, carbenes, nitrenes and arynes.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH3013 Physical Chemistry II

Credits: 15.0 Semester: 1

Anti-requisite: CH4113

Description: This module, along with CH3003, constitutes the physical chemistry component of the honours course. It has three major themes (i) electrochemistry, (ii) surface chemistry, and (iii) concepts in physical chemistry including the use of lasers and molecular beams, and applications of quantum chemistry.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH3014 Biological Chemistry

Credits: 15.0 Semester: 1

Prerequisites: CH3001, CH3002, CH3003

Description: The module, which has a strong mechanistic bias, provides a background to modern biological chemistry, dealing with bioorganic chemistry and the application of molecular modelling to biological problems. Topics will include protein structure, enzymes, cofactors, mechanisms, biosynthesis and medicinal chemistry with an emphasis on inhibitor design. In the bioinorganic area the role of metals and non-metals in biology will be discussed and particular topics such as biological oxygen carriers (hemoglobin, hemocyanin, hemerythrin), metalloenzymes, nitrogen fixation, vitamin B_{12}, non-heme iron proteins etc are introduced. The course will conclude with a discussion of the application of molecular modelling to biological problems with illustrated video real-time problem solving.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

Assessment: Laboratory work = 100%

CH3006 Reaction Mechanisms

Credits:15.0Semester: 2

Anti-requisite:CH3106

Description: This module discusses the value of kinetic studies in elucidating the mechanisms of reactions in the gas phase and of inorganic and organic reactions in solution. Reaction rates, integrated rate equations, transition state theory, relevant thermodynamics, mechanisms of ligand replacement and electron transfer on metal complexes. reactions of co-ordinated ligands and main group elements, S_N1 and S_N2 reactions, kinetic isotope effects, isotopes and tracers, electrophilic aromatic substitution, nucleophilic aromatic substitution, general and specific acid/base catalysis will be covered.

Class Hour: To be arranged.

Teaching:Six lectures each week over a four week period.

Assessment: 2 Hour Examination = 100%

CH3007 Chemistry Workshop

Credits:7.5Semester: Whole Year

Anti-requisites:CH3107, CH4107

Description: This module is intended to provide material relevant to other lecture and laboratory modules in the honours course in chemistry. Topics covered will include NMR, mass spectrometry, ESR, IR, UV, symmetry, applicable mathematics and molecular graphics techniques for the study of bonding in small molecules and for conformational studies.

Class Hour: Two hours during each of two afternoons.

Teaching:A total of 60 hours of lecture, tutorial and workshop teaching.

Assessment: Continuous Assessment = 100%

CH3008 Physical Chemistry Laboratory

Credits:7.5Semester: 1

Description: This module gives training and understanding of techniques and methods in physical chemistry. Topics include solution kinetics, spectroscopy, thermodynamics including non-ideal cases, surface chemistry and theoretical chemistry studies. Data handling and the use of computer packages for error analysis are also included.

Class Hour: Mornings.

Teaching:90 hours of laboratory work over a four week period.

Assessment: Laboratory work = 100%

CH3009 Applied Chemistry I

Credits:15.0Semester: 2

Anti-requisites: CH3019, CH3109

Description: This module, offered with CH3010 as an alternative to Industrial Placement, provides an insight into aspects of industrial and pharmaceutical chemistry. In pharmaceutical chemistry, topics covered will include mechanisms of drug action - occupation theory, drug receptor interactions and structure reactivity relationships; quantum pharmacology; and a range of drug types such as opiates, steroids and those acting as enzyme inhibitors. In industrial chemistry, case studies illustrating differences between laboratory reactions and those on a production scale will be undertaken. Students will make a presentation on an aspect of the topics studied.

Teaching:Full-time during three weeks in the second part of the semester.

Assessment: Continuous Assessment = 25%, 2 Hour Examination = 75%

CH3010 Applied Chemistry II

Credits:15.0Semester: 2

Anti-requisites: CH3019

Description: This module, offered with CH3009 as an alternative to Industrial Placement, will involve students in

Chemistry - 3000 Level modules

CH3015 Catalysis

Credits: 15.0 Semester: 1

Prerequisites: CH3001, CH3002, CH3003

Description: The module covers aspects of homogeneous, heterogeneous, and enzyme catalysis. Thermodynamic and mechanistic aspects will be emphasised and in the areas of homogeneous and heterogeneous catalysis a range of reactions and industrial applications will be discussed in detail. Their interactions with small molecules will be examined and related to mechanisms of enzyme catalysis. Inhibitor deasign will be discussed and examples used will illustrate the importance of this aspect to pharmaceutical and agrochemical research.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH3016 Materials Science

Credits: 15.0 Semester: 1

Prerequisite: CH3003

Description: This module seeks to address, in a largely descriptive way, the nature and applications of present day materials. It will thus combine aspects of chemistry, physics and engineering. The discussion will focus upon theoretical aspects covering crystal structures and defects, microstructure and effect on properties, and thermal, mechanical, electrical/magnetic effects. The nature and applications of ceramics and polymers, semi-conductors, magnetic materials, dielectrics and optical materials will also receive attention.

Class Hour: To be arranged.

Teaching:Two lectures.

Assessment: 2 Hour Examination = 100%

CH3017 Chemistry Project

Credits:30.0Semester: 2

Prerequisites: Two of CH3004, CH3005, CH3007, CH3008.

Anti-requisite:CH4117

Description: The project aims to develop skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical and team work; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Teaching:Full-time during whole semester.

Assessment: Assessed according to a range of criteria.

CH3018 Chemistry

Credits:15.0Semester: 2

Prerequisites: CH3001, CH3002, CH3003

Anti-requisite:CH4118

Description: This module aims firstly to develop a deeper understanding of chemical fundamentals by means of the critical scrutiny of basic observations and ideas; and secondly to develop skills in the retrieval, synthesis and use of experimental evidence for the solution of chemical problems.

Class Hour: To be arranged.

Teaching:This module consists of a small number of tutorial classes but much of the work will be literature and problem-solving based.

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH3019 Industrial Placement

Credits:30.0Semester: 2

Prerequisites: CH3001 - CH3008.

Anti-requisites: CH3009, CH3010, CH3119

Description: This double module is intended to provide each individual student with direct experience of work in an industrial (or similar) laboratory. Activities are very variable, according to the nature of the particular company or organisation's area of business. Some students will be involved in synthetic work and some in analytical/measurement activities. Some will be based exclusively in a laboratory, while others will be also involved in liaison with the company's plant operators or with its customers.

Teaching: Full-time from the second part of the semester, plus the subsequent vacation.

Assessment: Assessed according to a number of criteria.

CH3020 Chemistry Project (Half-Time Project)

Credits:15.0Semester: Either

Prerequisites: This module is only available to Joint Honours and to Geochemistry students.

Description: This project aims to develop skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical and team work; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Teaching: Normally full-time for half of the semester.

Assessment: Assessed according to a number of criteria.

CH3021 Pharmaceutical Chemistry

Credits:7.5Semester1

Availability:Available only to those admitted to the Chemistry with Pharmacology Programme.

Description:This module aims by directed reading and seminars to undertake a detailed study of the development and synthesis of a class of pharmaceutical compounds.

Class Hour:To be arranged.

Assessment:Continuous Assessment = 25%, Essay (1500 words) = 75%

CH3022 Organic Chemistry Laboratory

Credits:5.0Semester:2

Availability:Available only to Geochemistry students

Anti-requisite:CH3004

Description:The objective of this module is to train undergraduate chemists in practical laboratory techniques. The module will highlight a wide range of skill requirements in tackling small-scale and moderately large-scale organic synthesis. A range of single and multistep synthesis will be carried out to illustrate the use of reagents and of reaction conditions. In the experiments, a range of analytical methods, mainly chromatographic and spectroscopic will be employed.

Class Hour:Mornings.

Teaching:60 hours of laboratory work over a five week period.

Assessment:Laboratory Work = 100%

Chemistry - 3000 Level modules

CH3023 Inorganic Chemistry Laboratory

Credits:5.0Semester:1

Availability:Available only to Geochemistry students.

Anti-requisite:CH3005

Description:This module provides a range of experiments designed to illustrate advanced practical techniques of value in inorganic chemistry. In the characterisation of materials synthesised, particular emphasis will be placed on spectroscopic methods; in the characterisation of reactivity, attention will be given to methods for elucidation of reaction mechanisms.

Class Hour:Mornings.

Teaching:60 hours of laboratory work over a five week period.

Assessment:Laboratory Work = 100%

CH3024 Chemistry of the Natural Environment

Credits:10.0Semester:1

Prerequisites:CH2001, CH2003, CH2004 or CH2005

Description:Designed to be complementary to the two Senior Honours geochemical modules GL3017 and GL3018, this module will describe the behaviour of ions and molecules at the earth's surface and details of the organic biogeochemistry of naturally-occurring hydrocarbons from the viewpoint of the underlying organic, inorganic and physical chemical principles.

Class Hour:To be arranged.

Teaching:16 hours of lectures and seminars

Assessment:One-and-a-half Hour Examination = 100%

CH3099 Applied Chemistry Project

Credits:30.0Semester :2

Availability:Available only to those admitted to the M.Chem. programme.

Anti-requisites:CH3009, CH3010 and CH3019

Description: The module will cover, in lectures and seminars, topics in pharmaceutical chemistry including mechanisms of drug action, quantum pharmacology and a discussion of a range of drug types, case studies in industrial chemistry illustrating differences between laboratory reactions and those on a production scale and a range of techniques in analytical chemistry, especially chromatographic, spectroscopic and electroanalytical. The project will be based on an aspect of the lecture/seminar programme.

Class Hour: To be arranged.

Assessment: Continuous Assessment = 20%, Project = 40%, 2 Hour Examination = 40%

CH3106 Solution Mechanisms

Credits:10.0Semester: 2

Prerequisite:Entry to the BSc programme in Biomolecular Science

Anti-requisite:CH3006

Description:The module discusses the reactions of organic and inorganic reactions in solution. Coverage will include mechanisms of ligand replacement and electron transfer at metal centres, reactions of coordinated ligands, S_N1 and S_N2 reactions, kinetic isotope effects, isotopes as tracers, electrophilic aromatic substitution, neucleophilic aromatic substitution, general and specific acid/base catalysis.

Class Hour:To be arranged.

Teaching:4 hours per week of lectures and workshops

Assessment:1 Hour and 20 minute Examination = 100%

CH3107 Spectroscopic Workshop

Credits:7.5Semester: 1

Prerequisite:Entry to the BSc programme in Biomolecular Science

Anti-requisites:CH3007, CH4107

Description:The module aims to consolidate and extend the basic principles of structure determination using spectroscopic techniques, particularly NMR spectroscopy and mass spectrometry, introduced in level 1000 and level 2000 modules.

Class Hour:To be arranged.

Teaching:4 hours per week of lectures and workshops

Assessment:Continuous Assessment = 40%, 1 Hour Examination = 60%

CH3109 Medicinal and Pharmaceutical Chemistry

Credits:10.0Semester: 2 (3 weeks)

Prerequisite:Entry to the BSc programme in Biomolecular Science

Anti-requisite:CH3009

Description:The module discusses mechanisms of drug action - occupation theory, drug-receptor interactions and structure-reactivity relationships; quantum pharmacology; and a range of drug types such as opiates, steroids and those acting as enzyme inhibitors. Students will make a presentation on aspects of the topics studied.

Teaching:Full-time during three weeks in the second part of the semester.

Assessment: Continuous Assessment = 25%, 1 Hour Examination = 75%

CH3110 Review Essay in Biomolecular Science

Credits: 5.0 Semester: 2

Prerequisite: Entry to the BSc programme in Biomolecular Science

Description: The module provides students with the challenge of producing a current awareness review essay, not normally exceeding 2500 words, on a topic of contemporary importance in Biomolecular Science.

Teaching: Students work on the essay in private study time.

Assessment: Essay = 100%

CH3119 External Placement (Whole Year)

Credits: 60.0 Semester: Whole Year

Prerequisites: CH3001 - CH3008

Anti-requisite: CH3019

Description: The module is intended to provide each individual student with direct experience of work in an industrial (or similar) laboratory. Activities are very varied, according to the nature of the particular company's or organisation's area of business. Some students will be engaged in synthetic work and some in analytical/measurement activities. Some will be based exclusively in a laboratory, while others will also be involved in liaison with the company's plant operators or with its customers.

Class Hour: Full-time for an entire academic year

Assessment: Assessed according to a number of criteria

CH3900 Chemistry Project

Credits: 45.0 Semester: Either

Prerequisites: Available only to non-graduating students

Description: The project aims to develop the students' skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical skills and teamwork; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Assessment: Project = 100%

CH3901 Chemistry Project

Credits: 60.0 Semester: Whole Year

Prerequisites: Available only to non-graduating students

Description: The project aims to develop the students' skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical skills and teamwork; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Assessment: Project = 100%

CH3902 Chemistry Project

Credits: 90.0 Semester: Whole Year

Prerequisites: Available only to non-graduating students

Description: The project aims to develop the students' skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical skills and teamwork; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Assessment: Project = 100%

CH3903 Chemistry Project

Credits: 120.0 Semester: Whole Year

Prerequisites: Available only to non-graduating students

Description: The project aims to develop the students' skills in the following areas: experimental design and problem solving; abstraction, evaluation and interpretation of data in the chemical literature; practical skills and teamwork; communication of results orally and in a dissertation. The project will be selected and supervised by a member of the academic staff.

Assessment: Project = 100%

CH3981 Chemistry with Pharmacology Semester in Dundee

Credits: 60.0 Semester: 2

Prerequisites: Available only to those admitted to the Chemistry with Pharmacology programme.

Description: Appropriate courses in Pharmacology taught in the University of Dundee are taken. Details are available from the School.

CH4001 Physical Chemistry

Credits: 15.0 Semester 1

Prerequisite: CH3003

Description: The module provides an in-depth treatment of quantum mechanics, thermodynamics, statistical mechanics and molecular spectroscopy.

Class Hour: 10.00 am Tuesday and 10.00 am Thursday.

Assessment: 2 Hour Examination = 100%

CH4002 Organic Chemistry

Credits: 15.0 Semester 1

Prerequisite: CH3002

Description: This module provides an in-depth study of synthetic organic chemistry and synthetic strategy.

Class Hour: To be arranged.

Assessment: 2 Hour Examination = 100%

CH4003 Inorganic Chemistry

Credits: 15.0 Semester 1

Co-requisite: CH3001

Description: The module provides an in-depth study of ligand design, synthesis, complexation and reactivity.

Class Hour: 10.00 am Tuesday and 10.00 am Thursday.

Assessment: 2 Hour Examination = 100%

CH4004 Literature Survey

Credits: 15.0 Semester 2

Description: The module provides the student with the challenge of undertaking a detailed survey of a topic of current interest.

Assessment: Survey of 8,000 - 10,000 words = 100%

CH4022 Medicinal Chemistry

Credits: 5.0 Semester: 1

Description: The module aims to introduce the area of Medicinal Chemistry discussing the important techniques employed. This includes methods of drug discovery and lead modification, followed by a discussion of the case histories of important drugs.

Teaching: 6 lectures

Assessment: 40 minute Examination plus project = 100%

CH4026 New Topics in Medicinal Chemistry

Credits: 10.0 Semester: 2

Description: The module aims to make the students aware of important new developments in medicinal chemistry, such as combinatorial chemistry, NO donor drugs and aspects of carbohydrate chemistry, and have an understanding of the areas in which new breakthroughs are likely in the future.

Teaching: 10 lectures

Assessment: 80 minute Examination = 100%

CH4029 Medicinal Selectivity and Targeting

Credits: 10.0 Semester: 2

Description: The reasons why drugs such as anti-viral agents are selective in their action will be explored through lectures, directed reading and discussion.

Teaching: 10 lectures with associated directed reading and discussion.

Assessment: Continuous Assessment = 50%, 40 minute Examination = 50%

CH4107 Chemistry Advanced Workshop

Credits: 12.5 Semester: 1

Prerequisite: Entry to the MChem programme

Anti-requisite: CH3007

Description: The module aims to consolidate and extend the basic principles of structure determination using spectroscopic techniques, particularly NMR spectroscopy and mass spectrometry, introduced in level 1000 and level 2000 modules, to develop the concept of symmetry, to develop aspects of applicable mathematics, and to develop communication and information retrieval skills.

Class Hour: To be arranged.

Teaching: 4 hours per week of lectures and workshops

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%

CH4111 Advanced Inorganic Chemistry

Credits: 15.0 Semester: 1

Prerequisite: Entry to the MChem programme

Anti-requisite: CH3011

Description: The lecture programme will be that of CH3011, augmented by tutorials and directed reading on more advnace topics. The module includes both the descriptive chemistry of the 4d, 5d, 4f and 5f transition metal series and advanced aspects of the general co-ordination chemistry of transition metals, including molecular orbital theory of metal complexes, electronic spectroscopy and magnetic properties, and thermodynamics of complex formation in solution.

Class Hour: To be arranged.

Teaching: Two lectures

Assessment: 2 Hour Examination = 100%

CH4112 Advanced Organic Chemistry

Credits: 15.0 Semester: 1

Prerequisite: Entry to the MChem programme

Anti-requisite: CH3012

Description: The lecture programme will be that of CH3011, augmented by tutorials and directed reading on more advanced topics. The module provides a detailed study of topics complementary to those studied in CH3002. It covers advanced aspects of organic synthesis, including the use of protecting groups; synthetic strategy; and alicyclic chemistry, including discussion of conformational analysis and the chemistry of small and medium sized rings.

Class Hour: To be arranged.

Teaching: Two lectures

Assessment: 2 Hour Examination= 100%

CH4113 Advanced Physical Chemistry

Credits: 15.0 Semester: 1

Prerequisite: Entry to the MChem programme

Anti-requisite: CH3013

Description: The lecture programme will be that of CH3011, augmented by tutorials and directed reading on more advanced topics. This module provides a detailed study of topics complementary to those studied in CH3003. It has three major themes: (I) electrochemistry (ii) surface and polymer chemistry, and (iii) concepts in physical chemistry applied to NMR, especially in solid-state applications.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH4114 Advanced Biological Chemistry

Credits: 15.0 Semester: 1

Prerequisites: Entry to the MChem programme

Anti-requisite: CH3014

Description: The lecture programme will be that of CH3014, augmented by tutorials and directed reading on more advanced topics. The module covers mechanistic enzyme-mediated reactions, and bio-inorganic chemistry.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH4115 Advanced Catalysis

Credits: 15.0 Semester: 1

Prerequisites: Entry to the MChem programme

Anti-requisite: CH3015

Description: The lecture programme will be that of CH3015, augmented by tutorials and directed reading on more advanced topics. The module covers thermodynamic and mechanistic aspects of homogeneous, heterogeneous and enzymic catalysis.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH4116 Advanced Materials Science

Credits: 15.0 Semester: 1

Prerequisites: Entry to the MChem programme

Anti-requisite: CH3016

Description: The lecture programme will be that of CH3016, augmented by tutorials and directed reading on more advanced topics. The module covers structural, thermal, mechanical, electrical and magnetic properties of modern materials.

Class Hour: To be arranged.

Teaching: Two lectures.

Assessment: 2 Hour Examination = 100%

CH4117 Advanced Chemistry Project

Credits: 40.0 Semester: Whole Year

Prerequisite: Entry to the MChem Programme

Anti-requisite: CH3017

Description: The module aims to develop skills in the following areas: retrieval, selection and organisation of material from published literature; experimental design and problem solving; experimental and/or computational skills; teamwork; oral and written communication. The project will be selected and supervised by a member of the academic staff.

Teaching: Self-study during Semester 1; full-time during Semester 2

Assessment: Assessed according to a range of criteria

CH4118 Advanced Chemistry

Credits: 15.0 Semester: Whole Year

Prerequisites: Entry to the MChem programme

Anti-requisite: CH3018

Description: The module aims to evelop a deeper understanding of chemical fundamentals by means of critical scrutiny of evidence, and the integration of chemical ideas based upon the widest range of experimental phenomena, along with the development of skills in the retrieval, synthesis and use of experimental evidence in problem solving.

Teaching: Primarily tutorial-based, but part of the work will be literature and problem based.

Assessment: Continuous Assessment = 40%, 2 Hour Examination = 60%