School of Chemistry

Important Degree Information:

B.Sc./M.A. Honours
The general requirements are 480 credits over a period of normally 4 years (and not more than 5 years) or part-time equivalent; the final two years being an approved honours programme of 240 credits, of which 90 credits are at 4000 level and at least a further 120 credits at 3000 and/or 4000 levels. Refer to the appropriate Faculty regulations for lists of subjects recognised as qualifying towards either a B.Sc. or M.A. degree.

For the degree of B.Sc. Chemical Sciences (Honours) the approved honours programme of 240 credits, requires 90 credits at 4000 level and a further 110 credits (minimum) at 3000 and 4000 levels.

B.Sc./M.A. Honours with Integrated Year Abroad
The general requirements are 540 credits over a period of normally 5 years (and not more than 6 years) or part-time equivalent; the final three years being an approved honours programme of 300 credits, of which 60 credits are gained during the integrated year abroad, 90 credits are at 4000 level and at least a further 120 credits at 3000 and/or 4000 levels. Refer to the appropriate Faculty regulations for lists of subjects recognised as qualifying towards either a B.Sc. or M.A. degree.

M.Chem. Honours
General requirements are 600 credits over a period of normally 5 years (and not more than 6 years) or part-time equivalent; the final three years being an approved honours programme of 360 credits, of which 120 credits are at 5000 level and at least a further 210 credits at 3000 and 4000 levels.

M.Sci. Honours
General requirements are 600 credits over a period of normally 5 years (and not more than 6 years) or part-time equivalent; the final three years being an approved honours programme of 360 credits, of which 120 credits are at 5000 level and at least a further 210 credits at 3000 and 4000 levels.

Other Information: Direct entry into Level 2000 is possible, in which case credit of 120 credits at level 1000 is given on the basis of school examinations. 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.

Degree Programmes	Programme Requirements at:
(B.Sc. Honours): **Biomolecular Science**	**Biomolecular Science (B.Sc. Honours):** **Level 1:** Biology Element: 40 credits including passes in BL1001 and BL1201. Chemistry Element: 20 – 40 credits comprising pass or bypass for CH1001, pass in CH1004 **Level 2:** (120 credits including BL2101, BL2104 and CH2101 and CH2103) or (125 credits comprising BL2007 and passes at 11 or better in BI2201, BI2202, CH2101 and CH2103) **Level 3:** 120 credits comprising Biology Element: BL3301 or BL3302, BL3310 and BL3312 Chemistry Element: CH3611, CH3612, CH3613, CH3621, CH3432, CH4613 **Level 4:** 120 credits comprising two of (BL4101, BL4102, BL4103), two of (CH4511, CH4611, CH4612) and either (BL4200 and BL4300) or [BL4200, CH5614 and one of (CH5411, CH5511, CH5612)] or [CH4442, CH5614 and one of (CH5411, CH5513, CH5612)] Chemistry: Direct entry into Level 2000 is possible, in which case 120 advanced standing credits at level 1000 are given. 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.
(B.Sc. Honours): **Chemical Sciences**	**Chemical Sciences (B.Sc. Honours Degree):** **Level 1:** 40 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 60 credits comprising passes at 11 or better in CH2101 and CH2102 or CH2103 **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721 **Level 4:** 120 credits comprising CH4442, 4 from (CH4511, CH4611, CH4612, CH4711, CH4712), CH5411 and 3 from (CH4512, CH4613, CH4713, CH5512-5, CH5612-4, CH5712-5) **Other Information:** This course is aimed at those who like Chemistry and were good at it at school, who want the varied training that a Chemistry Degree gives, but who do not wish to be professional Chemists. Up to 40 credits from the Level 3000 and Level 4000 modules listed above can be replaced with modules from other Schools.

Degree Programmes	Programme Requirements at:
(B.Sc. Honours): **Chemistry**	**Chemistry (B.Sc. Honours):** **Level 1:** 40 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules. **Level 2:** 90 credits comprising passes at 11 or better in CH2101, CH2102 and CH2103 Students may be allowed to enter this Honours programme with CH2101 and one of CH2102 and CH2103, but some extra work may be required. **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721. **Level 4:** 120 credits comprising CH4442, CH4461, CH5411, 2 from (CH4511, CH4611, CH4711), 2 from (CH4512, CH4613, CH4713), either CH4612 or CH4712, 1 from (CH5512-5, CH5612-4, CH5712-5). **Other Information:** The Single Honours course is recognised by the Royal Society of Chemistry (RSC) for professional membership
(B.Sc. Honours): **Chemistry and Computer Science, Internet Computer Science, Mathematics**	**Chemistry element of Joint Honours Degree (B.Sc. Honours):** **Level 1:** 40 credits comprising pass or bypass for CH1001, pass in CH1004 **Level 2:** 60 credits comprising passes at 11 or better in CH2101, either CH2102 or CH2103 **Level 3:** 60 credits comprising 3 from (CH3431, CH3512, CH3612, CH3621, CH3711, CH3721), 30 credits from (CH3441, CH3511, CH3521, CH3611, CH3712) **Level 4:** 60 credits comprising CH4442, 1 or 2 from (CH4511, CH4611, CH4612, CH4711, CH4712), 1 or 2 from (CH4512, CH4613, CH4713)
(B.Sc. Honours): **Chemistry and Geoscience**	**Chemistry - Geoscience Joint Degree:** **Level 1:** 40 credits comprising Pass or bypass for CH1001, pass in CH1004 and 40 credits comprising passes in GS1001 and GS1002 **Level 2:** 60 credits comprising passes at 11 or better in CH2101, either CH 2102 or CH2103 and 60 credits comprising passes at 11 or better in (GG2003, GG2004, GS2001, and GS2002) or (GS2011 and GS2012) **Level 3:** 120 credits comprising CH3431, CH3521, CH3711, CH3511, CH3721, CH4512, and GS3004, normally GS3081* and 1 from (GS4083 or GS4084). **Level 4:** 120 credits comprising 3 from (CH4511, CH4611, CH4711, CH4712 and CH5711), CH4448§, CH5515, normally GS4083 or GS4084**, GS4005, GS4010, GS4009, 1 from (GS4088, GG3067, GG3068, GG3069 and GG3082) * With the approval of the Geoscience Adviser of Studies, a student may replace GS3081 and (GS4083 or GS4084) by 2 from GG3067, GG3068, GG3069, GG3082 in semester 2. ** With the approval of the Geoscience Adviser of Studies, a student may replace GS4083 or GS4084 by a second module from the list GS4088, GG3067, GG3068, GG3069 and GG3082 §With the approval of the Directors of Teaching, under some circumstances, students might conduct an integrated 35 credit project, ID4441, combining CH4448 with GS4009 and presenting a single, extended report.

Degree Programmes	Programme Requirements at:
(B.Sc. Honours): **Chemistry with Catalysis**	**Chemistry with Catalysis (B.Sc. Honours):** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules. **Level 2:** 60-90 credits comprising Passes at 11 or better in CH2101 and either or both of CH2102 and CH2103 **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721. **Level 4:** 120 credits comprising CH4442, CH4461, CH5411, CH5511, CH5512, 2 from (CH4512, CH4613, CH4713),1 from (CH4511, CH4611, CH4711), either CH4612 or CH4712. **Other Information:** The Single Honours course is recognised by the Royal Society of Chemistry (RSC) for professional membership.
(B.Sc. Honours): **Chemistry with Materials Chemistry**	**Chemistry with Materials Chemistry (B.Sc. Honours):** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004, CH1005, PH1011, PH1012 and MT1002. **Level 2:** 120 credits comprising passes at 11 or better in CH2101, CH2102, CH2104 and either PH2011 or Mt2001. **Level 3:** 120 credits comprising CH3513, CH3711, CH3712, CH3713, CH3714, CH3715, CH3722, PH3002, PH3074 and two other 3000 level modules. **Level 4:** 120 credits comprising CH4442, CH4711, CH4712, CH4452 and a further three 10 credit 4000 or 5000 level modules. .
(B.Sc. Honours): **Chemistry with Medicinal Chemistry**	**Chemistry with Medicinal Chemistry:** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules. **Level 2:** 60-90 credits comprising passes at 11 or better in CH2101 and either or both of CH2102 and CH2103 **Level 3:** 120 credits comprising CH3433, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3613, CH3621, CH3721, CH4613. **Level 4:** 120 credits comprising CH4462, CH4511, CH4611, CH4612, CH5411, CH5611, 2 from (CH5612-4). CH4442. **Other Information:**The Single Honours course is recognised by the Royal Society of Chemistry (RSC) for professional membership.

Degree Programmes	Programme Requirements at:
(B.Sc. Honours): **Chemistry with French^ or German^ or Spanish^** ^also available as 'With Integrated Year Abroad Degrees'	**Chemistry element of Major Degree with French or German (B.Sc. Honours):** **Level 1:** 40 credits comprising pass or bypass for CH1001, pass in CH1004 **Level 2:** 60 credits comprising passes at 11 or better in CH2101 and either CH2102 or CH2103 **Level 3:** 90 credits comprising CH3441, and 70 credits from (CH3431, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721) **Level 4:** 90 credits comprising CH4442, 5 from (CH4461, CH4511, CH4512, CH5411, CH4611, CH4613, CH4711, CH4713,) **Other Information:**The BSc.degree is recognised by the Royal Society of Chemistry (RSC) for professional membership.
(B.Sc. Honours): **Chemistry with Pharmacology**	**Chemistry with Pharmacology (B.Sc. Honours):** **Level 1: Chemistry element:** 40 credits comprising a pass or bypass for CH1001, pass in CH1004 and 2 other level 1000 modules. Biology element**:** Passes in or exemption from BL1001, BL1201. Passes in or exemption from BL1003 and BL2007 are also required for entry to all Honours courses in the School of Biology **Level 2:** Chemistry element: 60 credits comprising passes at 11 or better in CH2101, CH2103 Biology element: 60 credits comprising BL2101 and BL2104 **Level 3:** 80 credits comprising CH3433, CH3512, CH3612, CH3621, CH3613, CH3721, 2 from (CH3441, CH3511, CH3611, CH3712) and 40 credits from BL3004, BL3007 **Level 4:** 50 credits comprising CH4447,CH4462, and 70 credits from CH4511-2, CH4611-3, CH4711-3, CH5411, CH5611-4 **Other Information:** The Single Honours course is recognised by the Royal Society of Chemistry (RSC) for professional membership. The project (CH4447) will be supervised jointly by staff from Chemistry and Biology.
(M.Chem. Honours): **Chemistry (M.Chem.) 5 years**	**Chemistry (M.Chem.) Degree:** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 90 credits comprising passes at 15 or better in CH2101, CH2102 and CH2103 **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721. **Level 4:** 120 credits comprising CH4442, CH4511, CH4512, CH4611, CH4613, CH4711, CH4713, CH5411, 1 of (CH4612, CH4712) **Level 5:** 120 credits comprising CH5461, CH5441, CH5511, CH5611, CH5711, 4 from (CH5512-5, CH5612-4, CH5712-5). **Other Information:** The M. Chem.degree is recognised by the Royal Society of Chemistry (RSC) for professional membership.

Degree Programmes	Programme Requirements at:
(M.Chem. Honours) **Chemistry with Medicinal Chemistry (M.Chem.) 5 years**	**Chemistry with Medicinal Chemistry (M.Chem)** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 60 credits comprising passes at 15 or better in CH2101, CH2102 and CH2103 **Level 3:** 120 credits comprising CH3433, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3613, CH3621, CH3721, CH4613 **Level 4:** 120 credits comprising CH4444, CH4511, CH4512, CH4611, CH4711, CH5612, CH5411 **Level 5:** 120 credits comprising CH5441, CH5462, CH5511,2 from (CH5512, CH5513, CH5514), CH5611, CH5613, CH5614, CH5615
(M.Chem. Honours): **Chemistry with Medicinal Chemistry and External Placement (M.Chem.) 5 years**	**Chemistry with Medicinal Chemistry and External Placement (M.Chem):** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 60 credits comprising passes at 15 or better in CH2101, CH2102 and CH2103 **Level 3:** 120 credits comprising CH3433, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3613, CH3621, CH3721, CH4613 **Level 4:** 120 credits comprising CH4441, CH4451. **Level 5:** 120 credits comprising CH5411, CH5441, CH5462, CH5511, CH5611, CH5615, 3 from (CH5513, CH5612-4). **Other Information:** The M. Chem.degree is recognised by the Royal Society of Chemistry (RSC) for professional membership**.**
(M.Chem. Honours): **Chemistry with External Placement (M.Chem.) 5 years**	**Chemistry with External Placement (M.Chem):** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 90 credits comprising passes at 15 or better in CH2101, CH2102 and CH2103 **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721, **Level 4:** 120 credits comprising CH4441, CH4451. **Level 5:** 120 credits comprising CH5411, CH5441, CH5461, CH5511, CH5611, CH5711, 3 from (CH5512-5, CH5612-4, CH5712-5). **Other Information:** The M.Chem. degree is recognised by the Royal Society of Chemistry (RSC) for professional membership.

Degree Programmes	Programme Requirements at:
(M.Chem. Honours): **Chemistry with French (M. Chem.) 5 years**	**Chemistry with French (M.Chem. Honours) (5 year degree) :** **Level 1:** 120 credits comprising pass or bypass for CH1001, pass in CH1004 and 4 other level 1000 modules **Level 2:** 90 credits comprising passes at 15 or better in CH2101 and CH2102 or CH2103 **Level 3:** 90 credits comprising CH3441, and 70 credits from (CH3431, CH3511, CH3512, CH3521, CH3611, CH3612, CH3621, CH3711, CH3712, CH3721) **Level 4:** 90 credits from CH4441 **Level 5:** 90 credits comprising CH5411, CH5441, CH5461 and 30 credits from (CH5511-5, CH5611-4, CH5711-5). **Other Information** The M. Chem.degree is recognised by the Royal Society of Chemistry (RSC) for professional membership.
(M.Sci. Honours): **Chemistry and Physics (M.Sci. Honours) 5 year Degree**	**Chemistry element of Chemistry-Physics M.Sci. Degree:** **Level 1:** 40 credits comprising a pass or bypass in CH1001, CH1004 **Level 2:** 60 credits comprising passes at 15 or better in CH2101 and either CH2102 or CH2103 or CH2104 **Level 3:** 120 credits comprising CH3431, CH3441, CH3511, CH3512, CH3611, CH3711, CH3712, CH3721,CH4711, CH4712, CH4713 **Level 5:** 40 credits from CH5441 or 45 credits from PH5101, at least 30 credits from CH5411, CH5512, CH5514, CH5515, CH5712-CH5715
(M.Sci. Honours): **Materials Science**	**Materials Science M.Sci. Degree:** **Level 1:** 120 credits comprising a pass or bypass in CH1001, CH1004, CH1005, PH1011, PH1012 and MT1002 **Level 2:** 120 credits comprising passes at 11 or better in CH2101, CH2102, CH2104 and either MT2001 or PH2011 **Level 3:** 120 credits comprising CH3513, CH3711, CH3712, CH3713, CH3714, CH3715, CH3722, CH4711, CH4712, PH3002 and PH3074. **Level 4:** 120 credits comprising CH4441, CH4452 **Level 5:** 120 credits from CH5441, CH5515, CH5712, CH5713, CH5716 , CH5717, CH5718, PH5208

Modules

Normally the prerequisite for each of the following Honours modules is entry to the Honours Programme(s) for which they are specified, as well as any additional specific prerequisite(s) given.

General degree students wishing to enter 3000 modules and non-graduating students wishing to enter 3000 or 4000 level modules must consult with the relevant Honours Adviser within the School before making their selection.

InterDisciplinary (ID) Modules

There are modules which relate to this School – **ID4441 Combined Chemistry and Geoscience Research Project** and **ID3441 Enterprise and Venture Planning 1 & ID3442 Enterprise and Venture Planning 2** which are interdisciplinary and appear in the Interdisciplinary Section of the Catalogue (Section 23)

Chemistry (CH) Modules

CH3431 Chemistry Workshop

Credits: 10.0 Semester: 1

Anti-requisite: CH3432, CH3433

Description: The aim of the module is to provide a basis in spectroscopy and group theory relevant to other modules forming the honours programmes in chemistry. In addition, students will gain experience in data handling, information retrieval and problem solving.

Class Hour: To be arranged.

Teaching: Two seminars and one or two lectures, and occasional tutorials.

Assessment: Continuous Assessment = 100%

CH3432 Chemistry Workshop for Biomolecular Science

Credits: 10.0 Semester: 1

Anti-requisite: CH3431, CH3433

Description: The aim of the module is to provide a basis in spectroscopy and molecular modelling relevant to other modules forming the honours programmes in chemistry which interface with biology. In addition, students will gain experience in data handling, information retrieval and problem solving.

Class Hour: To be arranged.

Teaching: Two seminars and one or two lectures, and occasional tutorials.

Assessment: Continuous Assessment = 100%

CH3433 Chemistry Workshop for Chemistry with Medicinal Chemistry

Credits: 10.0 Semester: 1

Anti-requisite: CH3431, CH3432

Description: The aim of the module is to provide a basis in spectroscopy and group theory relevant to other modules forming the Honours programmes in Chemistry with Medicinal Chemistry. In addition, students will gain experience in data handling, information retrieval and problem solving.

Class Hour: To be arranged.

Teaching: Two seminars and one or two lectures, and occasional tutorials.

Assessment: Continuous Assessment = 100%

CH3441 Mini Chemistry Project

Credits: 20.0 Semester: 2

Anti-requisites ID3441, ID3442

Description: This is a group-based exercise where the students will tackle an unseen problem. Skills to be developed will vary but will include some or all of the following: The use of spectroscopy, retrosynthetic analysis, literature searching, web based searching and design, synthesis, catalysis, mechanistic studies, computational chemistry, surface chemistry, biological chemistry, communication skills.

Class Hour: 9.00 am Monday – Friday for 4 – 5 weeks.

Teaching: 7 hours per day 4 days a week, 4 hours on Wednesdays.

Assessment: Continuous Assessment = 100%

CH3442 External Placement for Chemical Sciences

Credits: 20.0 Semester: 2

Description: This module is designed to carry out a placement in a company or other body, in order to assist students in selecting an appropriate career outside direct Chemistry, but in which they will find their background Chemical knowledge useful (examples might include, Scientific Publishing, Patent Office, Management in the Chemical Industry, Hospital Management).

Class Hour: Full-time – 3 months between March & Sept

Teaching: Full-time

Assessment: Continuous Assessment = 100%

CH3511 Main Group Chemistry

Credits: 10.0 Semester: 2

Description: This module discusses the Chemistry of the elements of groups 2, 12, 13, 15, 17 and 18, with particular reference to systematic trends and to the chemistry of the hydrides, halides, oxides, hydroxides and solid state compounds. In all cases the basic chemistry is linked to the exciting applications of the compounds in fields as diverse as clearing runways from snow in Northern Canada to night vision and metal-containing enzymes. It also explores aspects of solid state Chemistry.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3512 Structural Elucidation and Organometallic Chemistry

Credits: 10.0 Semester: 1

Description: This module will discuss how the use of analytical data and IR and NMR spectroscopy leads to the elucidation of the composition, structure and bonding in inorganic compounds. A variety of case studies will illustrate these principles. In addition, the module offers a systematic introductory treatment of organometallic compounds, emphasising fundamental concepts and the principal functional groups of organometallic chemistry. Topics include: the hapto nomenclature and 18-electron rule; synthesis of complexes of CO, alkyl, alkene, alkyne and carbocyclic ligands; static and dynamic structures; reactions of coordinated ligands; unit processes involved in homogeneous catalytic cycles.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3513 Advanced Solid State Chemistry

Credits: 10.0 Semester: 1

Prerequisite: CH2102

Description: This module on Advanced Solid State Chemistry brings together a number of advanced concepts including advanced crystal chemistry, electronic effects, phase equilibria and extended defects. It is key to the understanding of both modern solid state chemistry and materials science.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures over 7 weeks and three tutorials.

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

CH3521 Inorganic Chemistry Laboratory

Credits: 10.0 Semester: 1

Description: This module comprises practical experiments involving synthesis, characterisation and measurements in inorganic chemistry.

Class Hour: 9.00 am – 12.00 noon Monday to Friday

Teaching: 3 Hours daily for weeks 1 - 6.

Assessment: Continuous Assessment = 100%

CH3611 Physical Organic Chemistry and Pericyclic Chemistry

Credits: 10.0 Semester: 2

Description: The objective of this module is to provide the student with a basic understanding of the physical aspects of organic chemistry. A problem-solving approach is employed in order to develop the ability to elucidate information, both qualitative and quantitative, concerning reaction mechanisms from experimental data. The use of quantum mechanical models of chemical reactivity is introduced, again with an emphasis on problem-solving and practical applications. The concepts developed in the first part of the module are then applied to the description and understanding of pericyclic reactions and stereoelectronic effects – topics which are key in synthetic chemistry.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3612 Synthetic Methodology

Credits: 10.0 Semester: 1

Description: This module aims to develop skills in the general area of synthetic organic chemistry. Students will gain an understanding of the importance of chirality and an appreciation of the preferred conformation of organic molecules. Detailed instruction on reaction mechanisms will be provided and topics in organic synthesis including retrosynthetic analysis, the use of protecting groups and ring forming reactions will be discussed.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3613 Carbohydrate and Nucleic Acid Chemistry

Credits: 10.0 Semester: 1

Description: The aim of the module is to cover aspects of the chemistry of nucleic acids. It will begin with an introduction to carbohydrate chemistry including discussion of biological processes, the synthesis of carbohydrates and carbohydrate-based pharmaceuticals. The structure and chemical synthesis of nucleic acids will then be discussed. The chemical reactivity of DNA and the ways in which it is chemically damaged will be examined. The chemical reactions of DNA will be related to mechanisms of carcinogenesis. The ways in which a range of drugs interact with DNA will be discussed in detail.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3621 Organic Chemistry Laboratory

Credits: 10.0 Semester: 1

Description: Practical experiments involving synthesis, characterisation and measurements in organic chemistry.

Class Hour: 9.00 am - 12.00 noon Monday to Friday.

Teaching: Daily three-hour practical classes over six weeks.

Assessment: Continuous Assessment = 100%

CH3711 Chemical Thermodynamics and an Introduction to Statistical Mechanics

Credits: 10.0 Semester: 1

Prerequisite: CH2102

Description: This module is mainly concerned with the study of thermodynamics. In the first set of lectures the field of classical chemical thermodynamics is addressed, in particular considering chemical equilibria and phase equilibria. In the second set of lectures the molecular basis of thermodynamics is covered in an introduction to the study of statistical mechanics.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3712 Quantum Theory of Atoms, Molecules and Solids

Credits: 10.0 Semester: 2

Prerequisite: CH2102

Description: This module builds on 'Quantum Theory of Atoms, Molecules and Solids. Part I' given in CH 2102. It provides an introduction to further, basic concepts of quantum mechanics that are an essential part of the description of the electronic structures of atoms, molecules and solids. While the module is mathematically based, the emphasis throughout is on the physical and chemical implications of the mathematical results and how this provides a coherent, quantitative framework for understanding the beauty and complexities of the electronic structure of atoms, molecules and solids.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3713 Sustainable Chemistry in Relation to the Semiconductor Industry

Credits: 10.0 Semester: 2

Description: This module focuses on the application of "green chemistry" concepts to the semiconductor and chemical industry. The module will examine the changes employed by the chemical and semiconductor industries in recent years in terms of production methods, cost, and the minimization of waste material. The module will also describe existing legislation as applied to the chemical industries.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3714 Surface Chemistry and Advanced Physical Chemistry

Credits: 10.0 Semester: 2

Description: This module focuses on the surface properties of the solid state and in particular the chemical interactions between solid state materials and selected adsorbates. The module will also include analytical methods to determine the surface composition and chemical properties of solid state materials that may or may not possess semiconducting properties.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3715 Introduction to analysis of materials

Credits: 10.0 Semester: 2

Description: The objective of this module is to introduce the principles of the most popular materials analysis methods using X-ray, ion beams, electrons and diffraction methods. The module will cover analytical principles of X-ray photoelectron spectroscopy (XPS) and Auger electron spectroscopy (AES) together with secondar ion mass spectroscopy (SIMS) and X-ray Diffraction methods (XRD). Diffraction techniques will also be covered with the introductory aspects of Electron Energy Loss Spectroscopy (EELS) together with vibrational spectroscopic techniques.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH3721 Physical Chemistry Laboratory

Credits: 10.0 Semester: 1

Anti-requisite CH3722

Description: This module comprises practical experiments involving physical measurements and the use of computational programmes in Chemistry.

Class Hour: 9.00 am – 12.00 noon or 1.00pm Monday to Friday

Teaching: 3 – 4 hours per day for 5 weeks

Assessment: Continuous Assessment = 100%

CH3722 Materials Laboratory

Credits: 10.0 Semester: 1

Anti-requisite: CH3721

Description: This module comprises practical experiments involving physical measurements and the use of computational programmes in Materials Science.

Class Hour: 9.00 am – 12.00 noon or 1.00 pm Monday to Friday

Teaching: 3 – 4 hours per day for 5 weeks

Assessment: Continuous Assessment = 100%

CH4441 External Placement

Credits: 90.0 Semester: Whole Year

Co-requisite: CH4451 or CH4452 or FR5810

Description: This 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.

Teaching: Day to day supervision by company supervisor, liaising with member of School academic staff.

Assessment: Continuous Assessment = 100%

CH4442 Chemistry Research Project

Credits: 40.0 Semester: Whole Year

Anti-requisites: CH4443 - CH4448, ID4441

Description: The research project at Level 4000 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.

Class Hour: Two days per week, to be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4443 Chemistry Research Project for Non-graduating Students

Credits: 45.0 Semester: Either

Anti-requisites: CH5441, CH4442, CH4444 - CH4448, ID4441

Description: The research project at Level 4000 only 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.

Class Hour: Two days per week, to be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4444 Chemistry Research Project

Credits: 60.0 Semester: Either or both

Anti-requisites: CH5441, CH4442 - CH4443, CH4445 - CH4448, ID4441

Description: The research project at Level 4000 only 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.

Class Hour: To be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4445 Chemistry Research Project for Non-graduating Students

Credits: 90.0 Semester: Whole Year

Anti-requisites: CH5441, CH4442 - CH4444, CH4446 - CH4448, ID4441

Description: The research project at Level 4000 only 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.

Class Hour: To be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4446 Chemistry Research Project for Non-graduating Students

Credits: 120.0 Semester: Whole Year

Anti-requisites: CH5441, CH4442 - CH4445, CH4447, CH4448, ID4441

Description: The research project at Level 4000 only 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.

Class Hour: To be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4447 Level 4000 Project for Chemistry/Pharmacology

Credits: 40.0 Semester: Whole Year

Anti-requisites: CH4442 - CH4446, CH4448, CH5441, ID4441

Description: The research project at Level 4000 for Chemistry/Pharmacology students only 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 jointly by members of the academic staff in Chemistry and Biology.

Class Hour: Two days per week, to be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4448 Chemistry Project for Chemistry and Geoscience

Credits: 20.0 Semester: 1

Anti-requisites: CH4442 – CH4447, CH5441, ID4441

Description: The research project at Level 4000 only 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.

Class Hour: To be arranged.

Teaching: Laboratory-based research project.

Assessment: Continuous Assessment = 100%

CH4451 MChem Distance Learning

Credits: 30.0 Semester: Whole Year

Anti-requisites: CH4511, CH4611, CH4711, CH4452

Co-requisite: CH4441

Description: This module offers the material covered by Level 4000 BSc/MChem modules CH4511, CH4611 and CH4711 in a distance learning mode to students on the MChem one year placement. See the module descriptions for modules CH4511, CH4611 and CH4711 for details of module content.

Teaching: Distance Learning

Assessment: Continuous Assessment = 100%

CH4452 Materials Science Distance Learning

Credits: 30.0 Semester: Whole Year

Availability: from 2006-07

Description: This distance learning module allows students to develop an advanced understanding of the basic concepts of Materials Science. It will be delivered in three sections, metals, ceramics and polymers, each approximately equivalent to a normal 10 credit lecture module.

Teaching: Distance Learning

Assessment: Continuous Assessment = 100%

CH4461 Integrating Chemistry

Credits: 10.0 Semester: 1

Anti-requisites: CH4462, CH5461 and CH5462

Description: This is a general chemistry module aimed at developing and consolidating fundamental aspects of basic understanding. Students will be encouraged to gain a deeper understanding of elementary core material by a combination of discussion, general reading, essay work and problem solving at a more advanced level than previously required. Students will be expected to read externally on related topics. In addition, each student will be required to submit an essay which will be on a topic relevant to the broader issues of chemical study and knowledge. The problems will be aimed at Level 4000 standard.

Class Hour: To be arranged.

Teaching: Two classes each week for 9 weeks.

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

CH4462 Integrating Chemistry for Medicinal Chemistry

Credits: 10.0 Semester: 1

Anti-requisites: CH4461, CH5461 and CH5462

Description: This is a general chemistry module aimed at developing and consolidating fundamental aspects of basic understanding. Students will be encouraged to gain a deeper understanding of elementary core material by a combination of discussion, general reading, essay work and problem solving at a more advanced level than previously required. Students will be expected to read externally on related topics. In addition, each student will be required to submit an essay which will be on a topic relevant to the broader issues of chemical study and knowledge. A proportion of the problems and examples will contain material specifically relevant to medicinal chemistry.

Class Hour: To be arranged.

Teaching: Two classes each week for 9 weeks.

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

CH4511 Inorganic Reaction Mechanisms and Bioinorganic Chemistry

Credits: 10.0 Semester: 1

Anti-requisite: CH4451

Description: This module aims to develop the students' understanding of the mechanisms that lie behind the reactions of inorganic compounds and to explore the role played by inorganic systems in biology and their growing importance in medicine. There will also be discussion of the mechanisms of action of some inorganic systems in biology which will link the two parts of the module together.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4512 Chemistry in the Natural Environment

Credits: 10.0 Semester: 2

Description: This module is concerned with the role of chemical processes in the Earth's crust responsible for the development of natural resources, such as minerals and petroleum, and the role of chemistry in their exploitation. The effect of natural and anthropogenic processes on the natural environment will also be discussed, particularly with reference to water chemistry, together with chemical routes to safeguard water quality.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4611 Target Synthesis and Medicinal Chemistry

Credits: 10.0 Semester: 1

Anti-requisite: CH4451

Description: The module will cover aspects of organic chemistry that are important for the synthesis of biologically active compounds such as pharmaceuticals and agrochemicals. Firstly, fundamental aspects of heterocyclic chemistry will be discussed, with a review of the structure, reactivity and synthesis of heterocyclic systems, which is important as the majority of pharmaceuticals and agrochemicals are heterocyclic compounds. The module will then go on to discuss the process of industrial chemical synthesis. This will include the design of synthetic routes, choice of reagents and conditions, as they apply to the development of processes for the synthesis of commercially important molecules.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4612 Blockbuster Pharmaceuticals

Credits: 10.0 Semester: 1

Anti-requisite: CH5615

Description: The module will discuss case studies from the most successful pharmaceutical products. How the compounds came to be discovered, what diseases they are targeting, how they work and how they are made and delivered to the market. Compounds that will feature are aspirin, penicillin, AZT, 5-flourouracil, Zantac, viagra, β–blockers, prozac etc.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4613 Natural Products and Society

Credits: 10.0 Semester: 2

Description: Natural products are low molecular weight compounds produced by plants, fungi and bacteria. They have had a dramatic impact in shaping our society. The module will discuss the impact of natural products in medicine, the food industry and in society more generally. Particular case studies will be covered eg. The discovery and impact of penicillin from a fungal mould, morphine as the most widely prescribed pain killer, taxol from the yew tree as a new generation anticancer compound. The role of natural flavours and fragrances in the food and cosmetics industries will be highlighted as well as the impact of plant alkaloids in medicine.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4711 Physical Chemistry of Solutions

Credits: 10.0 Semester: 1

Anti-requisite: CH4451

Description: This module discusses the physical chemistry of and in solutions. In the first part the thermodynamics of ideal and non-ideal solutions are covered, together with micellar solutions and the chemistry of colloidal suspensions. In the second part solution electrochemistry is covered.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4712 Energy Conversion and Storage

Credits: 10.0 Semester: 1

Description: In our efforts to mitigate global warming it is essential to develop new and improved methods of generation and storage of energy. Foremost among these methods are the electrochemical technologies of batteries and fuel cells. In this module we will discuss the technical details and applications of such devices. Particular emphasis will be placed on the underlying electrochemistry and materials chemistry.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH4713 Interactions of Light with Matter

Credits: 10.0 Semester: 2

Description: This module describes the fascinating properties of matter relevant to their interaction with electromagnetic radiation. Absorption, transmission, reflection and diffraction of light across the electromagnetic spectrum is covered. The properties of matter, particularly in the gas and solid phases, which are important for the emission, modification and transport of light are discussed at the atomic and molecular level.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH5411 Industrial Chemistry

Credits: 10.0 Semester: 2

Description: This module, to be given by visiting Industrial Chemists, will cover recent advances in the chemical, petrochemical and oil industries.

Class Hour: To be arranged.

Teaching: 2 – 5 lectures and 3 – 4 seminars over 5 – 7 weeks.

Assessment: Continuous Assessment = 100%

CH5441 Research Project

Credits: 40.0 Semester: Whole Year

Anti-requisites: CH4443, CH4445, CH4448, ID4441

Description: The research project at Stage 5 of the M.Chem. programme 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 is supervised by a member of the academic staff. The project topic and aims will be selected by both superviser and student and a literature survey will be carried out.

Class Hour: Two days per week, to be arranged.

Teaching: Laboratory-based research project

Assessment: Continuous Assessment = 100%

CH5461 Integrating Chemistry

Credits: 10.0 Semester: 1

Anti-requisites: CH5462, CH4461, CH4462

Description: This is a general chemistry module aimed at developing and consolidating fundamental aspects of basic understanding. Students will be encouraged to gain a deeper understanding of elementary core material by a combination of discussion, general reading, essay work and problem solving at a more advanced level than previously required. Students will be expected to read externally on related topics. In addition, each student will be required to submit an essay which will be on a topic relevant to the broader issues of chemical study and knowledge. The problems will be aimed at Level 5000 standard.

Class Hour: To be arranged.

Teaching: Two weekly classes over nine weeks.

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

CH5462 Integrating Chemistry for Medicinal Chemistry

Credits: 10.0 Semester: 1

Anti-requisites: CH5461, CH4461, CH4462

Description: This is a general chemistry module aimed at developing and consolidating fundamental aspects of basic understanding. Students will be encouraged to gain a deeper understanding of elementary core material by a combination of discussion, general reading, essay work and problem solving at a more advanced level than previously required. In addition, each student will be required to submit an essay which will be on a topic relevant to the broader issues of chemical study and knowledge. A proportion of the problems and examples will contain material specifically relevant to Medicinal chemistry.

Class Hour: To be arranged.

Teaching: 2-3 weekly classes over 6-8 weeks.

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

CH5511 Special Topics in Inorganic Chemistry

Credits: 10.0 Semester: 1

Description: This module discusses [1] the use of metal based systems in organic transformations and a detailed treatment of homogeneous catalysis and [2] the importance and structural similarities between rings, cages and clusters, particularly in main group chemistry.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH5513 Supramolecular and Macrocyclic Chemistry

Credits: 10.0 Semester: 2

Description: This module offers a systematic introductory treatment of molecular recognition, emphasizing fundamental concepts of intermolecular interactions and molecular recognition in solution. The nature, strength and directionality of orbital, hydrogen-bonding and hydrophobic interactions will be explored. Spectroscopic and other techniques for studying these interactions will be outlined with examples. Recognition of cations and anions using macrocycle, cryptand and spherand hosts will be discussed, as will the interaction of neutral molecules with cyclodextrins, calixarenes, cyclophanes and clefts with applications in catalysis and enzyme mimics. Recent developments in other applications such as molecular electronics and solar energy conversion will be described.

Class Hour: To be arranged.

Teaching: 2-3 weekly lectures over 5-7 weeks.

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

CH5514 Advanced Coordination Chemistry

Credits: 10.0 Semester: 2

Description: This is a Masters level module in advanced co-ordination chemistry covering the heavier d-block and f-block metals and also the theory behind bonding, magnetism and electronic spectroscopy in d-block metal complexes. At the end of the module students should be in a position to understand fully the nature of bonding in d- and f-block metal systems, to understand the electronic spectra of d-block complexes and to rationalise trends in chemical properties both down and across the periodic table.

Class Hour: To be arranged.

Teaching: 2-3 weekly lectures over 5-7 weeks.

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

CH5515 Characterisation of Solids

Credits: 10.0 Semester: 2

Description: This module aims to describe the most important experimental techniques available for the characterisation of solids, viz. X-ray crystallography, solid-state NMR and transmission electron microscopy. The fundamentals of each technique, together with examples of their applications to inorganic chemistry will be covered.

Class Hour: To be arranged.

Teaching: 2 – 3 weekly lectures over 5-7 weeks.

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

CH5611 Asymmetric Synthesis and Retrosynthesis

Credits: 10.0 Semester: 1

Description: This module discusses the methods available for the synthesis of chiral compounds. After a detailed introduction to the specialised terminology and analytical methods used, the main methods using chiral auxiliaries, chiral reagents and chiral catalysts will be described. This will then be combined with a consideration of synthetic strategy and total syntheses of several complex chiral compounds will be discussed.

Class Hour: To be arranged.

Teaching: 2 – 3 lectures per week over 5 – 7 weeks and 2-3 tutorials.

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

CH5612 Natural Products, Biosynthesis and Enzyme Co-factors

Credits: 10.0 Semester: 2

Description: The module will investigate the biosynthesis of the main natural products groups (polyketides, terpenes, alkaloids). Unifying features of their structures and biosynthesis will be described and methods for studying the biosynthesis of natural products will be taught (isotope tracer methods). The common enzyme co-factors (PLP, TPP, NADH, co-enzyme B12) will be highlighted and their mechanistic role in mediating enzymatic transformations will be explored.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks.

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

CH5613 Reactive Intermediates

Credits: 10.0 Semester: 2

Description: Aspects of the organic chemistry of the most important reactive intermediates *viz.*: carbo-cations, carbanions, free radicals, carbenes, nitrenes and arynes will be covered. Means of generating each type of reactive intermediate will be introduced. The key reactions of each intermediate will be reviewed and their characteristic reactions highlighted. An understanding of the use of each species in organic synthesis and of their significance in mechanistic analysis will be developed.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks

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

CH5614 Drug Discovery, Protein Crystallography and Combinatorial Chemistry

Credits: 10.0 Semester: 2

Description: This module will examine new methodologies for drug discovery. An overview of the processes of target discovery, lead discovery and lead optimisation will be given. The use of structural biology (protein crystallography, NMR), computational chemistry and combinatorial chemistry in 'rational drug design' will be described. The module will look at the technologies behind combinatorial library design, synthesis and high throughput screening. Broad and focused libraries will be discussed. Several examples will be explored, such as the development of drugs against AIDS and influenza.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks.

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

CH5615 Advanced Pharmaceutical Chemistry

Credits: 10.0 Semester: 1

Anti-requisite: CH4612

Description: The module will discuss case studies from the most successful pharmaceutical products. How the compounds came to be discovered, what diseases they are targeting, how they work and how they are made and delivered to the market. Compounds that will feature are aspirin, penicillin, AZT, 5-flourouracil, Zantac, viagra, β–blockers, prozac etc.

Class Hour: To be arranged.

Teaching: Two - three lectures over 5-7 weeks, two tutorials, plus extra directed reading.

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

CH5711 Advanced Spectroscopic Methods

Credits: 10.0 Semester: 1

Description: This module describes the importance of more advanced spectroscopic methods for the elucidation of structure and properties of increasingly complex molecules and materials. Particular attention will be paid to those techniques which exploit synchrotron radiation.

Class Hour: To be arranged.

Teaching: 2–3 lectures per week over 5–7 weeks and 2-3 tutorials.

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

CH5712 Functional Materials / Electrons in Solids

Credits: 10.0 Semester: 2

Description: The module introduces the physical concepts of dielectrics, semiconductors, and metals. Electronic properties of interfaces and thin films which are fundamental to devices such as microprocessors, lasers in CD players, or solar cells will be discussed.

Class Hour: To be arranged.

Teaching: 2-3 lectures over 5-7 weeks.

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

CH5713 Surface Science and Heterogeneous Catalysis

Credits: 10.0 Semester: 2

Description: The module describes the Chemistry of solid surfaces with particular reference to the structure of metal, oxide and semiconductor surfaces. The techniques available to characterise the uppermost atomic layers of a solid are presented and the novel reactivity of surfaces is linked to applications in sensors, electronic devices, heterogeneous catalysis as well as the processes of corrosion, friction and wear.

Class Hour: To be arranged.

Teaching: 2–3 weekly lectures over 5-7 weeks.

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

CH5714 Statistical Mechanics and Quantum Mechanics

Credits: 10.0 Semester: 2

Prerequisites: CH3711, CH3712

Description: This module builds on 'Statistical Mechanics. Part I', given in CH3712, 'Quantum Theory of Atoms, Molecules and Solids. Part I' given in CH 2102 and 'Quantum Theory of Atoms, Molecules and Solids. Part II' given in CH3711. While the module is mathematically based, the emphasis throughout is on the physical and chemical implications of the mathematical results and how this provides a coherent, quantitative framework for understanding the basis of thermodynamics and the electronic structure of atoms, molecules and solids.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks.

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

CH5715 Excited States in Molecules

Credits: 10.0 Semester: 2

Description: This module discusses the special properties of excited states in molecules. The creation, characterisation and the relevance of excited states in analysis and detection, in the operation of lasers and in their ability to carry out state selective chemistry is described.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks.

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

CH5717 Nanostructured Materials

Credits: 10.0 Semester: 1

Availability: 2007-08

Description: This module will introduce the concepts and science behind the engineered assembly of nanostructured materials and the application of these structures to functional materials and devices. Specific topics to be covered include: science of clusters, small particles, thin films, molecular assemblies, assembiles of nanostructures, novel carbon based materials, fullerenes and nanotubes, structure-property correlations in nanaostructures, advanced characterisation techniques, applications related to nanotechnology, MEMs and biotechnology and wide-band semiconductor nanoparticles.

Class Hour: To be arranged.

Teaching: 2 –3 weekly lectures over 5-7 weeks.

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

CH5718 Application of Polymer Chemistry to the Microelectronics Industry

Credits: 10.0 Semester: 1

Availability: 2007-08

Description: This module focuses on the properties and applications of polymeric materials relevant to the microelectronics industry. It will include structure-property relationships, synthesis and applications of specialised polymeric materials used in microelectronics industry and polymers used for processes such as lithography. This module will also include the procedures for coating thin polymeric films, high temperature polymers as used in the microelectronics industry and also some introduction to materials used in nano- and optoelectronics.

Class Hour: To be arranged.

Teaching: 2 – 3 weekly lectures over 5-7 weeks.

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