Module Specification

CH1207 Chemistry of the Real World

Academic Year: 2020/1
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)
- Lectures 25
- Seminars
- Practical Classes & Workshops 8
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study 117
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours 150

Period: Semester 2
Occurrence: E
Coordinator: Dylan Williams
Mark Scheme: UG Module Mark Scheme

No. Assessment Description Weight % Qual Mark Exam Hours Ass't Group Alt Reass't
004 Coursework (Final) 100

Intended Learning Outcomes
On successful completion of the module, student should be able to:
- Identify and describe how chemistry impacts on everyday life in such areas as the environment, sustainability & materials.
- Present and critically analyse the role played by chemistry in a particular area of society
- Work together in groups to analyse and solve unseen problem based chemical scenarios
- Analyse and critique how science and chemistry in particular is disseminated in the media
- Participate effectively in a range of teaching and learning activities (some involving group work), combine facts and ideas and communicate scientific concepts to a range of audience types

Teaching and Learning Methods
Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods
- Coursework (100%)

Pre-Requisites
-

Co-Requisites
-

Excluded Combinations
-

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes

Last Published: 5 July 2020
CH1208  Introductory Forensic Science I

Academic Year: 2020/1
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)
- Lectures 25
- Seminars
- Practical Classes & Workshops 8
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study 117
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours 150

Period: Semester 2
Occurrence: E
Coordinator: Rob Hillman
Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes
On successful completion of the module, student should be able to:
- Discuss the historic development of forensic chemistry and its relation to analytical techniques
- Describe the organisational and accreditation standards applied to forensic chemistry
- Describe and analyse aspects of crime scene management and recording including the collection and storage of evidence
- Demonstrate the ability to present evidence concisely and coherently to their peers
- Participate effectively in a range of teaching and learning activities (some involving group work), combine facts and ideas and communicate scientific concepts to a range of audience types
- Demonstrate the ability to undertake systematic and comprehensive legal research, analyse the research findings and present them in an appropriate and effective manner

Teaching and Learning Methods
Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods
- Coursework (100%)

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises
Module Specification

CH1209  Introductory Pharmaceutical Chemistry

Academic Year: 2020/1
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

| Lectures | 25 |
| Seminars |   |
| Practical Classes & Workshops | 8 |
| Tutorials |   |
| Fieldwork |   |
| Project Supervision |   |
| Guided Independent Study | 117 |
| Demonstration |   |
| Supervised time in studio/workshop |   |
| Work Based Learning |   |
| Placement |   |
| Year Abroad |   |
| Total Module Hours | 150 |

Period: Semester 2
Occurrence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Module Mark Scheme

Assessment Methods
- Coursework (100%)

Intended Learning Outcomes
On successful completion of the module, student should be able to:
- Identify and describe the chemical structure, organisation, properties and functions of various biological entities including; membranes, prokaryotic and eukaryotic cells, the nervous system and neurotransmission, molecular receptors and signalling mechanisms
- Describe the presence, interactions and various roles of amino acids, sugars, nucleotides and fatty acids in biological systems and drug discovery
- Describe the evolution of the pharmaceutical industry from historically important therapeutic areas to current targets and the overall process of drug design, development, screening and bringing to market
- Discuss the role and kinetics of enzymes and co-factors in biological catalysis, drug mode of action and their relationship to ATP and energy production
- Participate effectively in a range of teaching and learning activities (some involving group work), combine facts and ideas and communicate scientific concepts to a range of audience types

Teaching and Learning Methods
Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Pre-Requisites
- 

Co-Requisites
- 

Excluded Combinations
- 

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes

Last Published: 5 July 2020
Module Specification

CH2206 Analytical Chemistry in Practice

Academic Year: 2020/1
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)
- Lectures 33
- Seminars
- Practical Classes & Workshops 2
- Tutorials
- Fieldwork
- Project Supervision
- Guided Independent Study 115
- Demonstration
- Supervised time in studio/workshop
- Work Based Learning
- Placement
- Year Abroad
- Total Module Hours 150

Period: Semester 2
Occurrence: E
Coordinator: Elena Piletska
Mark Scheme: UG Module Mark Scheme

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Period: Semester 2
Occurrence: E1
Coordinator: Elena Piletska
Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes
On successful completion of the module, student should be able to:
- Identify the errors associated with analytical measurements and sampling methods and how they can be minimised and evaluated
- Describe the key components of analytical instrumentation and their function
- Describe the principles of a variety of spectrochemical methods and explain their use in chemical and biochemical analysis; choose the most appropriate method to solve specific analytical and bioanalytical problems
- Explain the principles of chromatography, electrophoresis and mass spectrometry and describe how these techniques can be used in bioanalysis; Describe the structure and biological function of DNA and RNA and explain how methods to analyse DNA are important in analytical chemistry and forensic science
- Evaluate and interpret the results from qualitative and quantitative analyses and solve problems involving analytical data in a critical manner assessing the significance and reliability of measurements

Teaching and Learning Methods
Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods
- Coursework (25%), Final Exam (75%)
- Reassessment by examination (100%)

Pre-Requisites
- 

Co-Requisites
- 

Excluded Combinations
-
Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes
### Module Specification

**CH3203 Advanced Physical Chemistry**

<table>
<thead>
<tr>
<th>Academic Year:</th>
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<td>Module Level:</td>
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<td>Scheme:</td>
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<td>Department:</td>
<td>Chemistry</td>
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<td>Credits:</td>
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**Student Workload (hours)**

<table>
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<th>Lectures</th>
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<tr>
<td>Practical Classes &amp; Workshops</td>
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<td>Tutorials</td>
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<td>Demonstration</td>
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<td>Supervised time in studio/workshop</td>
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<td>Work Based Learning</td>
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**Period:** Semester 2  
**Occurrence:** E  
**Coordinator:** Stephen Ball  
**Mark Scheme:** UG Module Mark Scheme

**Assessment Methods**

- Coursework (25%), Final Exam (75%)  
- Reassessment: Exam (100%)

**Intended Learning Outcomes**

On successful completion of the module, students should be able to:

- Discuss the mutual reliance of theory, statistical methods and spectroscopy
- Explain the Schrödinger equation for light atoms (H, He, Li etc) and simple diatomic molecules (H2+, H2, etc); identify the various terms as contributions to the potential energy or kinetic energy of the system
- Establish the symmetry of atomic and molecular wave functions; rank orbitals according to their energy; construct molecular orbital energy level diagrams and use them to infer properties about the bonding within molecules
- Implement Hückel theory to calculate the properties of π-bonded molecules and aromatic organic compounds
- Classify the various forms of molecular motion in terms of separation of their quantum mechanical energy levels
- Evaluate partition functions for a variety of simple chemical systems; use partition functions to calculate bulk thermodynamic properties of the system
- Explain key processes in the interaction between light and matter; use the information content of spectroscopic lines to infer properties of the molecule; identify the symmetry of energy levels and hence establish whether the transition is allowed or forbidden

**Teaching and Learning Methods**

The 33 lecture slots will involve a variety of teaching methods - lectures, example problems & group problem solving classes & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module.

DLI Students: Lectures, example problems, group problem solving classes, marked work & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module

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CH3203  Advanced Physical Chemistry

Pre-Requisites

Co-Requisites

Excluded Combinations


Guided Independent Study: Indicative Activities

Directed reading, set problems, group problem solving exercises, formative quizzes

DLI Students: Directed reading, set problems, group problem solving exercises, formative quizzes, presentations
Module Specification

CH3204 Biological Chemistry

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Period: Semester 2
Occurrence: E
Coordinator: Richard Blackburn

Student Workload (hours)

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Seminars</th>
<th>Practical Classes &amp; Workshops</th>
<th>Tutorials</th>
<th>Fieldwork</th>
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Mark Scheme: UG Module Mark Scheme

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Period: Semester 2
Occurrence: E1
Coordinator: Richard Blackburn

Mark Scheme: UG Module Mark Scheme

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</table>

Intended Learning Outcomes
On successful completion of the module, students should be able to:
- Discuss and rationalize the structure, chemistry and properties of simple carbohydrates and naturally occurring nucleosides; use this knowledge to solve unseen problems
- Explain the common strategies used for the synthesis of carbohydrates and use them to propose syntheses of target molecules
- Identify the structure, chemistry and functions of cofactors and vitamins; predict & rationalise the chemistry of these systems for both seen and unseen examples
- Produce and rationalise mechanisms and reaction pathways associated with cofactor catalysis, biosynthesis of natural products and energy production for both seen and unseen examples
- Explain and rationalise the chemistry involved for the laboratory synthesis and structure determination of DNA; apply this chemistry to design synthetic routes to such molecules and/or evaluate data to deduce DNA structure

Teaching and Learning Methods
The 33 lecture slots will involve a variety of teaching methods - lectures, example problems & group problem solving classes & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module.

Assessment Methods
- Coursework (25%), Final Exam (75%)
- Reassessment: Exam (100%)

Pre-Requisites

Co-Requisites
Excluded Combinations

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes
Module Specification

CH3205  Metals in Synthesis

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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<td>Seminars</td>
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Period: Semester 2
Occurrence: E
Coordinator: Sandeep Handa

Mark Scheme: UG Module Mark Scheme

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Period: Semester 2
Occurrence: E1
Coordinator: Sandeep Handa

Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Explain the importance of selectivity in synthesis
- Summarise the important features of the use of transition and main group elements in stoichiometric and catalytic organic synthesis. Use this information to predict the outcome of unseen reactions and propose synthetic routes to target molecules
- Discuss the important features of the synthetic chemistry of silicon, selenium, lithium, boron and aluminium; explain the selectivity seen in the reactions of these organometallic compounds and use this knowledge to predict and explain the outcome of unseen reactions
- Explain what is catalysis and the effect of a catalyst on the free energy of a reaction. Define turnover frequency and turnover number and use these terms to calculate the catalytic efficiency in unseen systems
- Discuss in detail specific examples of transition metal catalysed processes, including asymmetric catalysis, information on their mechanisms and key reaction steps
- Explain how spectroscopy, kinetics and labelling studies can be used to help elucidate reaction mechanisms; evaluate data from these studies to deduce mechanistic pathways in unseen systems

Teaching and Learning Methods

The 33 lecture slots will involve a variety of teaching methods - lectures, example problems & group problem solving classes & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module.

DLI Students: Lectures, example problems, group problem solving classes, marked work & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module

Assessment Methods
- Coursework (25%), Final Exam (75%)
- Reassessment: Exam (100%)
CH3205 Metals in Synthesis

Pre-Requisites

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes

DLI Students: Directed reading, set problems, group problem solving exercises, formative quizzes, presentations
Module Specification

CH3206  Advanced Analytical Chemistry

Student Workload (hours)

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<td>Seminars</td>
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<td>Year Abroad</td>
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<td>Total Module Hours 150</td>
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Period: Semester 2
Occurrence: E
Coordinator: Rob Hillman

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Discuss the principles underlying modern analytical techniques and their applications. Use this information to critically analyse and interpret data for the solution of unseen problems in analytical chemistry
- Explain the methods of analytical chemistry at interfaces
- Summarise the relevance of sensitivity and selectivity to choice of an analytical method for a specific application; use this information to analyse unseen scenarios and choose the correct methods to solve analytical problems
- Evaluate unseen problems in analytical chemistry and thus select and apply techniques to obtain the best results in a variety of situations. Have insight into the nature, mechanism and dynamics of a range of interfacial physical and chemical processes
- Recognise the nature of the interaction between surfaces and the environment to which they are exposed
- Explain how interfacial structure may be experimentally determined and simulated, evaluating different methods for different scenarios

Teaching and Learning Methods

The 33 lecture slots will involve a variety of teaching methods - lectures, example problems & group problem solving classes & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module.

DLI Students: Lectures, example problems, group problem solving classes, marked work & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module

Assessment Methods
- Coursework (25%), Final Exam (75%)
- Reassessment: Exam (100%)

Pre-Requisites
CH3206 Advanced Analytical Chemistry

Co-Requisites

Excluded Combinations

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes

DLI Students: Directed reading, set problems, group problem solving exercises, formative quizzes, presentations
Module Specification

CH3208 Advanced Materials Chemistry

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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<td>Total Module Hours</td>
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</table>

Period: Semester 2
Occurrence: E
Coordinator: Kal Karim

Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Apply chemical knowledge and computational methods to design materials with specific properties
- Explain the basis of the analytical techniques used to characterize chemical materials and critically evaluate the advantages and limitations of each technique for different applications
- Interpret analytical data in view of a materials properties; predict material properties based on analytical data and vice versa
- Use advanced chemical technologies and design concepts to propose novel materials and their synthesis
- Demonstrate awareness of the impact of organic materials in society and the environment particularly in the fields of sustainability, diagnostics, imaging and drug discovery

Teaching and Learning Methods

The 33 lecture slots will involve a variety of teaching methods - lectures, example problems & group problem solving classes & VLE directed activities. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module.

Assessment Methods

- Coursework (25%), Final Exam (75%)
- Reassessment: Exam (100%)

Pre-Requisites

Co-Requisites

Excluded Combinations

Last Published: 5 July 2020
Module Specification

CH3208 Advanced Materials Chemistry

Guided Independent Study: Indicative Activities
Directed reading, set problems, group problem solving exercises, formative quizzes
Module Specification

CH3211 Pharmaceutical Chemistry

Academic Year: 2020/1
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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<th>Lectures</th>
<th>Seminars</th>
<th>Practical Classes &amp; Workshops</th>
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<th>Project Supervision</th>
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Period: Semester 2
Occurrence: E
Coordinator: Richard Doveston

Mark Scheme: UG Module Mark Scheme

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Period: Semester 2
Occurrence: E1
Coordinator: Richard Doveston

Mark Scheme: UG Module Mark Scheme

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Intended Learning Outcomes

On successful completion of the module, students should be able to:
- Discuss and critically assess the important factors that need to be considered when deciding on possible synthetic routes to pharmaceutical molecules (e.g. safety, reaction scale, purification, cost & availability of reagents, market value & quality control)
- Describe the different stages involved in drug discovery, development and determining the mode of action of a drug
- Discuss the essential features of protein structure and how they can be determined
- Explain the basic principles and chemistry involved in solid phase synthesis of peptides; apply these strategies to propose synthetic routes to target peptides in unseen problems
- Explain how physiochemical properties of drugs can determine their activity and stability; rationalise the chemistry that can be used to alter the physiochemical properties of drugs
- Explain the concepts of combinatorial chemistry (including dynamic methods); apply these strategies for the synthesis of target molecules in unseen problems

Teaching and Learning Methods

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