Module Specification

CH1200 General Chemistry

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	5
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	113
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 1
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment 1	30				
005	Continuous Assessment 2	30				
006	Examination (Final)	40		1.5		

Period: Semester 1
Occurence: E1
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

On successful completion of the module, student should be able to:
- Explain the principles of atomic structure, electron configuration, energy quantisation, wave particle duality, molecular orbital theory and coordinate bonding
- Determine the shapes of covalent molecules using Valence-Shell Electron-Pair repulsion theory
- Predict the Lewis acidity or basicity of a molecule
- Describe chemical equilibria on both molecular and mathematical levels
- Describe the underlying principles of spectroscopy and apply quantitative relationships (e.g. Beer-Lambert law, Rydberg equation) to analyse spectra; predict and rationalize spectra of atoms & molecules
- Draw and name organic molecules explaining their structure, shapeand possible isomers
- Use curly arrow notation to rationalise and predict stability, polar reactivity and acidity for organic molecules

If the student is studying at the Dalian Leicester Institute the student should be able to:
- Draw the shapes of atomic orbitals and show how they can combine to form molecular orbitals using appropriate schematics and energy level diagrams
- Determine the shapes of covalent molecules using Valence-Shell Electron-Pair repulsion theory
- Predict the Lewis acidity or basicity of a molecule and describe what a coordinate bond is
- Describe chemical equilibria on both molecular and mathematical levels
- Explain the principles of atomic structure, electron configuration, energy quantisation, wave particle duality and molecular orbital theory
- Describe the underlying principles of spectroscopy and apply quantitative relationships (e.g. Beer-Lambert law, Rydberg equation) to analyse spectra
- Draw and name organic molecules explaining their structure, shape, possible isomers, hybridisation and ability to delocalise electron density through resonance
- Use curly arrow notation to rationalise and predict polar reactivity and acidity for organic molecules
- Predict and rationalise IR, NMR and MS spectra for organic molecules

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Module Specification

CH1200 General Chemistry

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods

- Coursework (30%), Class Test (30%), Final Exam (40%)
- Reassesment by examination (100%)

If the student is studying at the Dalian Leicester Institute
- Coursework (25%)
- 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

CH1201 Introductory Organic Chemistry

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Tutorial	10				
005	Coursework	15				
007	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Sandeep Handa
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Continuous Assessment	100				

Intended Learning Outcomes

On successful completion of the module, student at both Leicester and the Dalian Leicester Institute should be able to:
- Recognise functional groups, anticipate their reactivity and interconversions and the reagents required for these transformations
- Identify and explain the relationships between isomers and conformers of organic molecules.
- Rationalise and predict reactivity based on curly arrow mechanisms and diagrams; explain how structure and bonding controls the outcome and rate of organic reactions
- Interpret and discuss the differences between a variety of reaction mechanisms including nucleophilic substitution, elimination reactions, reactions of alkenes, reactions of carbonyls and electrophilic aromatic substitution
- Predict and interpret spectroscopic data for organic molecules whose structures are known; deduce structures of molecules using spectroscopic and analytical data

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods

- Coursework (25%), Final Exam (75%)
- Reassesment by examination (100%)

Pre-Requisites

-

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH1202 Introductory Inorganic Chemistry

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	32
Seminars	
Practical Classes & Workshops	5
Tutorials	4
Fieldwork	
Project Supervision	
Guided Independent Study	109
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Academic Year
Occurence: E
Coordinator: Mark Lowe
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Tutorial	10				
005	Coursework	15				
007	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Mark Lowe
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Continuous Assessment	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and the Dalian Leicester Institute should be able to:
- Calculate oxidation states and dn configurations for transition metal complexes and identify the common types of ligand and methods of complex preparation
- Describe bonding in transition metal complexes using ionic (crystal field theory) and covalent (molecular orbital) models and calculate and crystal field stabilisation energies and use these to explain and predict magnetic and spectroscopic properties of transition metal complexes
- Predict the geometries of complexes, recognising rotational axes, mirror planes and centres of inversion and draw these on diagrams of molecules, use these to assign point groups to molecules and identify the possibility of distortions from ideal geometries and isomerism
- Describe the inorganic chemistry of a range of main group compounds and discuss the broader applications of descriptive inorganic chemistry
- Interpret solid state structures in terms of the type of unit cell adopted, the coordination number and coordination geometry of each atom, the radius ratio, and the relevant bonding models for ionic and metallic solids

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods

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

Pre-Requisites

-

Co-Requisites

Excluded Combinations

-

Last Published: 28 September 2020

CH1202 Introductory Inorganic Chemistry

Guided Independent Study: Indicative Activities

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

UNIVERSITY OF LEICESTER

Module Specification

CH1203 Introductory Physical Chemistry

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	32
Seminars	
Practical Classes & Workshops	5
Tutorials	4
Fieldwork	
Project Supervision	
Guided Independent Study	109
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Academic Year
Occurence: E
Coordinator: Andrew Hudson
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Tutorial	10				
005	Coursework	15				
007	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Andrew Hudson
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
005	Continuous Assessment	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and Dalian Leicester Institute should be able to:
- Describe and explain the aims and terminology of thermodynamics including the first and second laws, basic thermochemistry, enthalpy and entropy, Gibbs energy, acid-base equilibria, simple statistical mechanics and phase diagrams. Discuss electrochemical process and how they relate to thermochemistry
- Describe and explain the properties of ideal and non-ideal gases including the use of virial coefficients, Maxwell distributions and collision rates
- Know the basic principles of reaction kinetics and how they can be measured; use these principles to calculate the effect of various parameters on the rates of chemical reactions
- Perform qualitative and quantitative analyses of and solve problems involving thermodynamic and kinetic data

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods

- Coursework (25%), Final Exam (75%)
- Reassesment by examination (100%)

Pre-Requisites

-

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH1204 Chemistry Key Skills & Maths

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	21
Seminars	
Practical Classes & Workshops	42
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	87
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Academic Year
Occurence: E
Coordinator: Andrew Hudson
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Examination (Semester 1)	20		1		
002	Coursework	40				
003	Examination (Semester 2) (Final)	40	40	2		

Period: Academic Year
Occurence: E1
Coordinator: Andrew Hudson
Mark Scheme: UG Honours Level Module Mark Scheme

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

Intended Learning Outcomes

On successful completion of the module, student should be able to:
Perform a variety of mathematical manipulations involving working with units, logarithms and trigonmetric functions, solving simultaneous & quatratic equations, plotting and extracting information from graphs
Differentiate and integrate simple and more complex functions using a variety of methods
Perform simple statistical analyses on datasets (mean, median, mode, standard deviation, and use the normal distribution function to identify statistical outliers); calculate errors and uncertainties
Communicate chemical concepts and ideas to a range of audience types using methods that will engage discipline specific and general audiences (e.g. posters, oral presentations and written materials)
Work as part of a diverse team on solving an open-ended scientific problem; planning teamwork and managing time effectively
Reflect on their own skills identifying areas of strength and weakness

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities

Assessment Methods

- Exam (1st semester, 20%), Coursework (40%), Final Exam (40%)

Pre-Requisites

-

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH1206 Scientific Method & Principles of Analytical Chemistry

Academic Year: 2018/9
Module Level: Year 1
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	3
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 1
Occurence: E
Coordinator: Sergey Piletsky
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Coursework	50				
006	Examination (Final)	50		1.5		

Period: Semester 1
Occurence: E1
Coordinator: Sergey Piletsky
Mark Scheme: UG Honours Level 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, students should be able to:
- Discuss the role of ethics in the pursuit of scientific discovery and be familiar with some of the underlying philosophical principles of science
- Describe the different types of analytical problems, the methods that can be used to solve them and the errors associated with each method and how they can be dealt with; use this knowledge to select the best technique to solve specific analytical problems
- Know the basic principles of electrochemical, chromatographic and UV/Vis and elemental spectroscopic techniques and discuss and evaluate their application in qualitative and quantitative analyses
- Know the principles and underlying chemistry of titrimetric and gravimetric quantitative methods of analysis
- Evaluate and interpret the results from qualitative and quantitative analyses and solve problems involving analytical data

Teaching and Learning Methods

Lectures, example problems, group problem solving classes & VLE directed activities

Assessment Methods

Coursework and exam

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Last Published: 28 September 2020

Module Specification

CH1207 Chemistry of the Real World

Academic Year: 2018/9
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
Occurence: 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: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH1208 Introductory Forensic Science I

Academic Year: 2018/9
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
Occurence: E
Coordinator: Rob Hillman
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:
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

UNIVERSITY OF LEICESTER

Module Specification

CH1209 Introductory Pharmaceutical Chemistry

Academic Year: 2018/9
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
Occurence: E
Coordinator: Richard Blackburn
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 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

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

Module Specification

CH2005 Bifunctional Molecules

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Alison Stuart
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 1
Occurence: E1
Coordinator: Alison Stuart
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should be able to: Understand the acidity of C-H bonds and how this is affected by having two functional groups on the carbon atom. Appreciate how carbon-carbon bonds can be formed from carbanions and electrophilic molecules and the application of such chemistry to the synthesis of medicinally important molecules. Appreciate the nature of amino acids as bifunctional molecules and as building blocks for peptides and proteins. Know the theory, application and interpretation of 1H NMR spectra of organic molecules. Key skills: at the end of this module students should be able to Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Class test, marked tutorial work and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

Module Specification

CH2006 Organometallic Chemistry

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 2
Occurence: E
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 2
Occurence: E1
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should: Know the methods of preparation, relative stability and reactivity of metal-carbonyls, -alkyls, -carbenes, -hydrides; as well as alkene, diene, allyl, cyclopentadienyl and benzene complexes. Know and be able to identify the basic reaction types, substitution, oxidative addition, migratory insertion, reductive elimination, salt elimination. Be able to use spectroscopic methods in the characterisation of organometallic species. Know the 18 electron rule (EAN) and be able to apply it. Students should be able to select or predict the most suitable spectroscopic or structural methods for the characterisation of a range of organometallic complexes. Key skills: at the end of this module students should be able to Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems. Be able to assign, predict and interpret spectroscopic data for organometallic compounds.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Class test, marked tutorial work and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH2007 Physical Chemistry of Colloids

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Shengfu Yang
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 1
Occurence: E1
Coordinator: Shengfu Yang
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should: Be able to distinguish the different ways a species can be transported through a solution. Know how solutes are transported in solution by migration and diffusion. Know what is meant by the term activity coefficient and understand how it changes with the concentration of an electrolyte solution. Understand how surfactants aggregate in solution to form micelles. Know what a colloidal sol is and what factors influence its stability. Be able to define surface tension and know how to calculate surface excess. Be able to discuss Langmuir, Freundlich and BET isotherms and appreciate how adsorption isotherms are controlled by the surface-adsorbate interactions. Know what methods are available to study surfaces and what information can be obtained from each technique. Be able to describe the capabilities of surface sensitive techniques and select appropriate technique(s) for studying a particular interface. Key skills: at the end of this module students should be able to Obtain new information from textbooks and other sources, describe relevant chemistry and discuss it with peers and teachers, solve numerical problems, group skills, written and oral communication.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Continuous assessment, end of semester examination and marked tutorial work.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2009 Chemistry of Rings

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	100

Period: Semester 2
Occurence: E
Coordinator: Alison Stuart
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 2
Occurence: E1
Coordinator: Alison Stuart
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

This module deals with two major issues. The first is the conformation and chemistry of alicyclic systems, that is, cyclic (3- to 8-membered) hydrocarbons and their derivatives. The second is the special chemistry and reactivity of aromatic hydrocarbons and their derivatives. The module introduces a number of fundamentally important concepts upon which many of the ideas underpinning courses in Year 3 and 4 are built.
Subject knowledge: at the end of this module students should be able to:
Represent important conformations of alicyclic systems (especially 6-membered); analyse the outcomes of reactions in terms of conformational equilibria and stereoelectronic requirements; explain the importance of ring strain in the synthesis and reactions of alicyclic systems; define the criteria for aromaticity; write accurate arrow-pushing mechanisms for electrophilic aromatic substitution and aromatic nucleophilic substitution reactions; explain the principal substituent effects on aromatic substitution reactions; propose effective synthetic interconversion reaction sequences between aromatic species.
Key skills: at the end of this module students should:
Have the ability to obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Tutorial work, Class test and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2010 Molecular Spectroscopy

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Andrew Ellis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 1
Occurence: E1
Coordinator: Andrew Ellis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should be able to: Recognise elements of symmetry and use these to determine point groups of molecules. Use group theory to determine irreducible representations for vibrations of molecules and hence predict the number of infrared and Raman spectra active stretching vibrations. Understand the principles and applications of vibrational spectroscopy including anharmonicity, isotopic labelling, rotational structure and mutual exclusion principle. Be able to calculate stretching frequencies or force constants from appropriate data. Understand the principles and applications of electronic spectroscopy, mass spectrometry and multinuclear NMR spectroscopy, including non-100% abundant nuclei. Be able to interpret or predict spectra based on these principles and to choose appropriate physical methods to solve chemical identification and characterisation problems. Key skills: at the end of this module students should be able to Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Continuous Assessment, marked tutorial work and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2011 Kinetics & Mechanism

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	22
Seminars	
Practical Classes & Workshops	2
Tutorials	2
Fieldwork	
Project Supervision	
Guided Independent Study	74
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	100

Period: Semester 2
Occurence: E
Coordinator: Mark Lowe
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
003	Tutorial Work	10				
004	Continuous Assessment	15				
005	Examination (Final)	75		2		

Period: Semester 2
Occurence: E1
Coordinator: Mark Lowe
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
004	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should be able to: Manipulate basic kinetic data and be able to apply this and deduce a rate law for a reaction from suitable experimental data. Discuss various experimental methods for determination of reaction rates. Understand the limitations of various experimental techniques for studying kinetics and be able to describe methods for studying fast reactions. Know and understand the principles of collision theory, Lindemann theory and transition state theory. Describe the main features of associative and dissociative substitution reactions. Understand the interpretation of activation parameters in mechanism. Understand the mechanisms of simple redox reactions, including the role of hydrogen ion concentration. Understand the variety and importance of reversible reactions, consecutive reactions and concurrent reactions. Key skills: at the end of this module students should be able to Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, tutorials, marked work.

Assessment Methods

Class test, end of semester examination and marked tutorial work.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Module Specification

CH2013 Science Communication and Career Skills

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 5

Student Workload (hours)

Lectures	2
Seminars	
Practical Classes & Workshops	8
Tutorials	1
Fieldwork	
Project Supervision	
Guided Independent Study	37
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	2
Placement	
Year Abroad	
Total Module Hours	50

Period: Academic Year
Occurence: E
Coordinator: Dylan Williams
Mark Scheme: UG Module Mark Scheme

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

Period: Academic Year
Occurence: E1
Coordinator: Dylan Williams
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

By the end of this module students should be able to:
Identify and research scientific concepts of interest to a defined target audience and prepare media resources that will communicate these concepts in an effective way.
Create, review and edit written scientific content suitable for a range of audiences (including writing journal articles and job applications).
Give an oral presentation on a scientific concept.
Produce a high standard CV and application letter for a variety of job scenarios.
Be aware of both subject specific and general transferable skills gained during their degree.

Teaching and Learning Methods

Lectures/workshops on how to communicate science using written and oral means.
Lectures/workshops on writing CV's and application letters.

Assessment Methods

Continuous assessment

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2021 Polymer Chemistry

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	3
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	77
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	100

Period: Semester 2
Occurence: E
Coordinator: Sergey Piletsky
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Semester 2
Occurence: E1
Coordinator: Sergey Piletsky
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should: Know about the methods for industrial production and characterization of polymers and their properties, e.g. glass transition temperature, and how to modify these properties. Know how to classify polymers on the basis of their structure, properties, or origin. Know the mechanisms of radical, cationic and anionic polymerization and methods for cross-linking. Be able to recognise repeat units of polymers and hence predict reasonable routes to them. Know how kinetics and thermodynamic factors affect polymerisation reactions. Know the application of a wide range of polymers and appreciate how their structure affects their properties. Key skills: at the end of this module students should be able to Obtain new information from textbooks and the web, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, workshops, marked work.

Assessment Methods

Final examination and continuous assessment.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

Module Specification

CH2023 Materials Science

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	3
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	77
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Andy Abbott
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Semester 1
Occurence: E1
Coordinator: Andy Abbott
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should:
Understand the terminology of materials mechanics. Understand the strength of materials based upon a knowledge of molecular structure. Know how alloys are formed and how their properties depend upon composition. Know some basic methods for polymer synthesis. Understand basic effects of polymer structure upon their physical properties. Understand the basics of corrosion.
Key Skills: at the end of this module students should be able to research topics using a variety of sources (textbooks, online), describe relevant chemistry with their peers and teachers, summarise information and solve problems.

Teaching and Learning Methods

Set text(s), lectures, structures problems, workshops and marked work.

Assessment Methods

Continuous assessment (written coursework); end of semester examination (2 hours).

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH2040 Introduction to Analytical Chemistry

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	3
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	77
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Corey Evans
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Semester 1
Occurence: E1
Coordinator: Corey Evans
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: The generic aims of this module are to introduce some basic concepts of analytical chemistry, of instrumental methods and of the processing and assessment of analytical data. Specific aims are to apply these methods in the context of particular techniques (based on titrimetry, gravimetry and spectrophotometry) relevant to forensic science. Learning outcomes: Subject knowledge: at the end of this module students should: Appreciate principles of sampling, calibration and statistical treatment of analytical data; Be able to describe the key components of analytical instrumentation; Understand the role of chemical analysis in forensic investigation; Know the principles of titrimetric methods (acid/base, complexometric, coulometric) and the underlying solution chemistry; Know the principles of gravimetric methods; Know the principles of spectrophotometric (AA, AE, XRF, EXAFS) and related methods for elemental analysis. Key skills: at the end of this module students should be able to: Obtain new information from textbooks and other sources. Perform tasks as part of a team. Select appropriate analytical methods. Perform analytical calculations. Evaluate and present analytical data in a critical manner.

Teaching and Learning Methods

Lectures, directed reading, problem-based workshops, group work, marked work.

Assessment Methods

Continuous assessment: small group literature research exercise resulting in oral presentation/written summary and examination at end of semester.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2041 Bioanalytical Chemistry

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	3
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	77
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	100

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

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

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

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: the aim of this module is to introduce some basic concepts of analytical chemistry and their application to biological systems. The course will include examples of bioanalytical chemistry in forensic and pharmaceutical analysis. Learning outcomes: Subject knowledge: at the end of this module students should: Be able to understand the role of chemical analysis in pharmaceutical chemistry and forensic investigation. Know the main methods of ionisation in mass spectrometry. Know the fragmentation patterns of the major functional groups and the application to structural determination. Know the uses of mass spectrometry for forensic and pharmaceutical analysis. Know the importance of HPLC, GC and TLC and capillary electrophoresis in analytical chemistry. Be able to understand fluorescence and its application in analytical and forensic analysis. Understand the structure of DNA, translation, transcription and the role of RNA. Be able to discuss PCR and its uses. Understand the genetic code. Be able to describe the use of DNA fingerprinting in forensic science. Key skills: at the end of this module students should be able to: Obtain new information from text books and other sources, discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, problem solving workshops.

Assessment Methods

Continuous assessment and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2071 CHEMISTRY PRACTICAL PART A

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	72
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	78
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 1
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical (Final)	100				
002	Attendance	0				

Intended Learning Outcomes

Decide which method is the most suitable for the separation and purification of components of a mixture of chemicals. Be able to advise and carry out procedures for the separation of neutral, acidic and basic molecules. Be able to carry out a range of separation techniques including vacuum and steam distillation and chromatography. Be able to record and interpret UV-visible, IR and MS data. Be able to make up standard solutions and use them to determine extinction coefficients. Be able to use UV-visible and atomic absorption spectroscopy to determine iron content. Use IR and UV-visible spectroscopy to investigate bonding in coordination complexes. Describe the requirements of a scientific abstract and be able to write abstracts for various experiments. Use ChemDraw to present chemical structures and reaction schemes. Record, analyse, interpret and present data in appropriate formats. Use computer programs to analyse experimental data. Assess potential sources of error and calculate the errors associated with a measurement. Work effectively in pairs or part of a larger group. Produce clear and concise written reports based on experimental work.

Teaching and Learning Methods

Practical Classes with appropriate demonstration supported by occasional lectures or workshops..

Assessment Methods

- Practical skills, quality of samples and data, ability to keep a laboratory notebook, ability to write a final report, ability of analyse data appropriately.
- Practical (100%), there are no re-assessment opportunities for this module, it must be passed at the first time of taking
- Note - students must attend and complete at least 75% of scheduled laboratory sessions to pass the module

Pre-Requisites

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Co-Requisites

-

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Module Specification

CH2072 CHEMISTRY PRACTICAL PART B

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 20

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	120
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	80
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical (Final)	100				
002	Attendance	0				

Intended Learning Outcomes

Decide which method is the most suitable for the separation and purification of components of a mixture of chemicals. Be able to advise and carry out procedures for the separation of neutral, acidic and basic molecules. Be able to carry out a range of separation techniques including vacuum and steam distillation and chromatography. Be able to record and interpret UV-visible, IR and MS data. Be able to make up standard solutions and use them to determine extinction coefficients. Be able to use UV-visible and atomic absorption spectroscopy to determine iron content. Use IR and UV-visible spectroscopy to investigate bonding in coordination complexes. Describe the requirements of a scientific abstract and be able to write abstracts for various experiments. Use ChemDraw to present chemical structures and reaction schemes. Record, analyse, interpret and present data in appropriate formats. Use computer programs to analyse experimental data. Assess potential sources of error and calculate the errors associated with a measurement. Work effectively in pairs or part of a larger group. Produce clear and concise written reports based on experimental work.

Teaching and Learning Methods

Practical Classes with appropriate demonstration supported by occasional lectures or workshops..

Assessment Methods

- Practical skills, quality of samples and data, ability to keep a laboratory notebook, ability to write a final report, ability of analyse data appropriately.
- Practical (100%), there are no re-assessment opportunities for this module, it must be passed at the first time of taking
- Note - students must attend and complete at least 75% of scheduled laboratory sessions to pass the module

Pre-Requisites

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Co-Requisites

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Excluded Combinations

-

Guided Independent Study: Indicative Activities

Module Specification

CH2073 CHEMISTRY PRACTICAL (PHARMACEUTICAL) PART A

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	48
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	52
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical (Final)	100				
002	Attendance	0				

Intended Learning Outcomes

Decide which method is the most suitable for the separation and purification of components of a mixture of chemicals. Be able to advise and carry out procedures for the separation of neutral, acidic and basic molecules. Be able to carry out a range of separation techniques including vacuum and steam distillation and chromatography. Be able to record and interpret UV-visible, IR and MS data. Be able to make up standard solutions and use them to determine extinction coefficients. Be able to use UV-visible and atomic absorption spectroscopy to determine iron content. Use IR and UV-visible spectroscopy to investigate bonding in coordination complexes. Describe the requirements of a scientific abstract and be able to write abstracts for various experiments. Use ChemDraw to present chemical structures and reaction schemes. Record, analyse, interpret and present data in appropriate formats. Use computer programs to analyse experimental data. Assess potential sources of error and calculate the errors associated with a measurement. Work effectively in pairs or part of a larger group. Produce clear and concise written reports based on experimental work.

Teaching and Learning Methods

Practical Classes with appropriate demonstration supported by occasional lectures or workshops..

Assessment Methods

- Practical skills, quality of samples and data, ability to keep a laboratory notebook, ability to write a final report, ability of analyse data appropriately.
- Practical (100%), there are no re-assessment opportunities for this module, it must be passed at the first time of taking
- Note - students must attend and complete at least 75% of scheduled laboratory sessions to pass the module

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH2074 CHEMISTRY PRACTICAL (PHARMACEUTICAL) PART B

Academic Year: 2018/9
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	90
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	60
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 2
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Honours Level Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical (Final)	100				
002	Attendance	0				

Intended Learning Outcomes

Know, be able to explain and apply a range of practical and spectroscopic procedures involved in the study of inorganic, coordination and organometallic chemistry, including melting points, IR and UV-visible spectroscopy, magnetic moments, NMR spectroscopy, and mass spectrometry. Work with moisture sensitive reagents. Isolate and purify compounds by solvent extraction and recrysallisation. Work safely with a poisonous substance. Handle safely reactions that generate water soluble toxic fumes. Carry out distillations at various pressures and steam distillation. Prepare scientific reports describing experimental work and results and discuss their findings with respect to the mechanisms of the reactions carried out. Present analytical and spectroscopic data in easy to interpret formats. Record, analyse and present data in appropriate formats. Work safely and efficiently with good laboratory practice. Use a wide range of techniques for making kinetic, thermodynamic and spectroscopic measurements. Use computer programs to analyse experimental data. Assess potential sources of error and calculate the errors associated with a measurement. Work effectively in pairs or part of a larger group. Produce clear and concise written reports based on experimental work..

Teaching and Learning Methods

Practical Classes with appropriate demonstration supported by occasional lectures or workshops..

Assessment Methods

- Practical skills, quality of samples and data, ability to keep a laboratory notebook, ability to write a final report, ability of analyse data appropriately.
- Practical (100%), there are no re-assessment opportunities for this module, it must be passed at the first time of taking.
- Note - students must attend and complete at least 75% of scheduled laboratory sessions to pass the module.

Pre-Requisites

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Co-Requisites

-

Excluded Combinations

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Guided Independent Study: Indicative Activities

Module Specification

CH3200 Chemistry General Skills

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 5

Student Workload (hours)

Lectures	5
Seminars	0
Practical Classes & Workshops	0
Tutorials	0
Fieldwork	0
Project Supervision	0
Guided Independent Study	45
Demonstration	0
Supervised time in studio/workshop	0
Work Based Learning	0
Placement	0
Year Abroad	0
Total Module Hours	50

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Period: Academic Year
Occurence: E1
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

The aim of this module is to test your knowledge of the general principles covered in the core modules during years 1 and 2. They are the principles that underpin the more difficult concepts covered in levels 3 and 4 and are the minimum knowledge you should have across the full breadth of chemistry. These topics are also ones that are often covered in oral exams for projects and/or with external examiners. Learning Objectives: The CORE material from modules CH1000, CH1002, CH1006, CH1007, CH1008, CH2005,6,7,9,10,11. You will also be provided with a list of topics which you should know. The module also aims to improve your communication and career skills.

Teaching and Learning Methods

Self-learning, practice multiple choice questions.

Assessment Methods

Continuous Assessment

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3201 Advanced Organic Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 1
Occurence: E1
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

At the end of this module students should: Appreciate the importance of spectroscopy (particularly NMR and MS) in the determination of the structure and shape of organic compounds; be able to analyse spectra and hence deduce the structure of molecules; recognise and be able to classify the principal types of pericyclic reaction; appreciate how the mechanism relates to the selectivity of such pericyclic reactions and why thermally and photochemically activated molecules frequently exhibit contrasting selectivity; know and understand how radicals and carbenes can be generated and the types and mechanisms of reaction that they most commonly exhibit; appreciate how the reactivity of transient species can be investigated; recognise the advantages and limitations of the high reactivity of transient intermediates.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, marked work. Application of the ideas encountered in lectures to the solution of problems is an essential part of the module and some of the lecture slots will be given over to workshops. Problem sheets will be distributed in advance and students are required to bring their written solutions to the workshop.

Assessment Methods

Final examination and class test.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH3202 Advanced Inorganic Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 1
Occurence: E
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 1
Occurence: E1
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: To revise and develop the basic concepts of inorganic chemistry through an appreciation of key techniques and then examine the role of modern inorganic chemistry in biomedicine, catalysis and supramolecular chemistry. Course structure: The module begins with a series of lectures covering some of the key techniques in inorganic chemistry (Prof Hope). It then proceeds to focus on specific areas namely, biomedicine (Dr Lowe), catalysis (Dr Solan) and supramolecular chemistry (Prof Hope/Dr Solan). Each aspect of the course will be supported by a number of workshops.
Subject knowledge: at the end of this module students should: Understand the basic principles of diffraction techniques. Know what information can be obtained from each technique, appreciate the significance/relevance of the data available from each techniques to inform interpretation of the data and be able to select which technique is most appropriate for a given situation. Appreciate that the principles of NMR spectroscopy can apply to all NMR active nuclei, including non-100% spin ½ and quadrupolar nuclei. Appreciate the information that can be determined from a study of IR (and Raman), UV spectroscopy. Be able to examine how magnetism and EPR can be used together to interpret physical behaviour of inorganic compounds. Be able to show what information mass spectrometry and cyclovoltametry can give with inorganic compounds. Appreciate how the understanding of basic inorganic chemistry and appropriate physical methods can be applied to solve unseen inorganic chemical problems. Appreciate the importance of inorganic chemistry in Biomedicine, small molecule binding in haemoglobin, cis-platin, metals in medicine, lanthanide chemistry, MRI, fluorescence, spin-orbit coupling. Appreciate the importance of inorganic chemistry in catalysis: hydroformylation, acetic acid manufacture, polymerisation of alkenes, oligomerisation of alkenes and relation to the SHOP process, ring opening polymerisation (e.g., synthesis of biodegradable polymers like polylactide and polycaprolactone). Appreciate the importance of inorganic chemistry in supramolecular chemistry: molecular boxes, metallohelices, chirality, molecular recognition, kinetics, thermodynamics, molecular magnetism, quantum dots, Au nanoparticles.

Teaching and Learning Methods

Lectures, set texts, workshops.

Assessment Methods

Final examination; class test.

Pre-Requisites

Co-Requisites

Last Published: 28 September 2020

CH3202 Advanced Inorganic Chemistry

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3203 Advanced Physical Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 2
Occurence: E
Coordinator: Stephen Ball
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 2
Occurence: E1
Coordinator: Stephen Ball
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: This module aims to provide an understanding of the theoretical concepts that underpin much of modern physical chemistry. At the microscopic level, theory provides the energies and symmetries of quantised energy levels, and yields a fundamental understanding of the nature of chemical bonding through the overlap of atomic orbitals to form molecular orbitals. At the macroscopic level, statistical mechanics uses quantum theory?s energy levels to account for the properties of collections of molecules (thermodynamic quantities such as entropy, position of chemical equilibria). Spectroscopy provides experimental verification of the energy levels and their symmetry, and links to macroscopic collections of molecules through, for example, the intensity of spectroscopic lines (populations) and spectroscopic determinations of temperature and absorber concentrations. Delivery (30 sessions): Lectures (23 sessions): introduction (1), molecular structure & bonding (9), statistical mechanics (8), spectroscopy (5). Workshops (5 sessions): molecular structure & bonding (2), statistical mechanics (2), spectroscopy (1). Continuous assessment presentations (2 sessions). Subject Knowledge: at the end of this course students should be able to: Appreciate the mutual reliance of theory, statistical methods and spectroscopy. Write down 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. Use molecular orbital (MO) theory to construct molecular orbitals from a linear combination of atomic orbitals (LCAO approximation); 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 ?-bonded molecules and aromatic organic compounds. Classify the various forms of molecular motion in terms of separation of their quantum mechanical energy levels (translation, rotation, vibration, electronic); discuss how the Boltzmann distribution describes how the total energy is distributed over a large chemically relevant collection of molecules; explain how the Boltzmann distribution influences the intensity of spectroscopic lines. Define a partition function; evaluate partition functions for a variety of simple chemical systems; use partition functions to calculate bulk thermodynamic properties of the system (internal energy, entropy, position of chemical equilibrium) by knowing the energy levels of individual molecules. Explain key processes in the interaction between light and matter (absorption, spontaneous and stimulated emission, non-radioactive relaxation); use the information content of spectroscopic lines (frequency, intensity, line shape) to infer properties of the molecule; identify the symmetry of energy levels and hence establish whether the transition between a lower and upper state is allowed or forbidden.

Teaching and Learning Methods

Lectures, workshops and continuous assessment presentations.

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH3203 Advanced Physical Chemistry

Assessment Methods

End of module exam and written work.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3204 Biological Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 2
Occurence: E1
Coordinator: Richard Blackburn
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: The aim of this course is to provide students with an understanding of a range of fundamental topics in biological chemistry. The course will address the structure and biological roles of carbohydrates, nucleotides and nucleic acids and will use chemical principles to provide an appreciation of the diverse roles of metal ions in biological systems and their roles in both the pharmaceutical industry and in living systems. Learning Outcomes: Subject knowledge: at the end of this module students should be: Familiar with the structure and chemistry of simple carbohydrates; be aware of strategies for the synthesis of carbohydrates and the use of carbohydrates in organic synthesis. Aware of the structures and chemistry of a range of biologically important heterocyclic compounds and cofactors. Know the structures and properties of the naturally-occurring nucleosides and nucleotides. Appreciate the chemical reactivity of DNA and its relevance to toxicology. Appreciate the contribution of chemistry to genetic engineering and drug development. Understand the chemistry involved in laboratory synthesis of DNA and its structure determination. Able to describe the occurrence and function of metals and cofactors in biological systems. Able to apply different spectroscopic and kinetic techniques to the study of metal ions in biological systems. Know how metal ion substitution and the study of model compounds can aid the understanding of complex metalloproteins. Able to discuss electron transfer, oxygen transport and the role of various metal ions in biological systems. Able to discuss the transport and storage of iron. Key skills: at the end of this module students should be able to: Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems

Teaching and Learning Methods

Lectures, set texts, web-based material, example problems and tutorial questions.

Assessment Methods

Final examination and class test.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3205 Metals in Synthesis

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 2
Occurence: E
Coordinator: David Davies
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 2
Occurence: E1
Coordinator: David Davies
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: This module aims to provide students with an understanding of the use of main group (part A) and transition metals (part B) in stoichiometric and catalytic organic synthesis, and a knowledge of the mechanisms of the reactions involved. Learning Outcomes: Subject knowledge: At the end of this module students should be able to: Understand the concepts of regioselectivity, diastereoselectivity and enantioselectivity. Appreciate the important features of the use of transition and main group elements in stoichiometric and catalytic organic synthesis. Discuss the important features of the synthetic chemistry of silicon, selenium, lithium, boron and aluminium. Determine the number of valence electrons for a metal (18 e ?rule) and recognise and understand the basic types of organometallic reactions. Discuss the effect of coordination to a metal on the structure and reactivity of alkenes, dienes, allyls, arenes etc. and the use of these effects in organic synthesis. Explain what is catalysis and the effect of a catalyst on the free energy of a reaction. Define turnover frequency and turnover number. Discuss in detail specific examples of transition metal catalysed processes including information on their mechanisms and key reaction steps. These processes should include, hydrogenation of alkenes and carbonyl compounds, Wacker oxidation of alkenes, metathesis, cyclopropanation, cross-coupling reactions and nucleophilic attack on unsaturated substrates. Discuss asymmetric catalysis including hydrogenation, epoxidation, cyclopropanation and chiral ligand design. Explain how spectroscopy, kinetics and labelling studies can be used to help elucidate reaction mechanisms. Key Skills: At the end of this module students should be able to: Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve synthetic and mechanistic problems in organic synthesis using metals.

Teaching and Learning Methods

Set texts, research papers, lectures, example problems, group problem solving workshops.

Assessment Methods

Final examination and written work/test.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH3205 Metals in Synthesis

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3206 Advanced Analytical Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	150

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

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 2
Occurence: E1
Coordinator: Rob Hillman
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

This module aims to provide students with an understanding of the principles underlying modern analytical techniques and will focus at liquid/solid, liquid/liquid, liquid/gas and solid/gas interfaces. These techniques are vital for understanding adsorption and desorption processes which are involved in aspects such as catalysis, fuel cells, photovoltaic devices, surface modification and detergents to name but a few.
Subject knowledge: at the end of this module students should:
Have an appreciation of the methods of analytical chemistry at interfaces.
Understand the relevance of sensitivity and selectivity to choice of an analytical method for a specific application.
Have some knowledge of how to select and apply techniques to obtain the best results in a variety of situations. Show some insight into the nature, mechanism and dynamics of a range of interfacial physical and chemical processes.
Be familiar with the fundamentals and application of a number of different analytical techniques, including those based on electrochemistry, microscopy/imaging (SEM, TEM, STM, Raman microprobe), and surface sensitive spectroscopy (XPS, Auger, LEED, TPD, SIMS, SEXAFS, ellipsometry and neutron reflectivity).
Understand the nature of the interaction between surfaces and the environment to which they are exposed; this will include isotherms for “dry” and “wet” interfaces. Describe the structure and properties of liquid/solid, liquid/liquid, liquid/gas and solid/gas interfaces. Know how interfacial structure may be experimentally determined and simulated.
Key skills: at the end of this module students should be able to:
Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem-solving workshops.

Assessment Methods

Continuous assessment and end of semester examination.

Pre-Requisites

Co-Requisites

Excluded Combinations

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UNIVERSITY OF LEICESTER

Module Specification

CH3206 Advanced Analytical Chemistry

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3207 Industrial Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	150

Period: Academic Year
Occurence: E
Coordinator: Kal Karim
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Academic Year
Occurence: E1
Coordinator: Kal Karim
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: To provide students with an insight into the use of chemistry on an industrial scale. Learning Outcomes: Subject knowledge: at the end of this module students should: At the end of this module students should be able to: have a reasonable knowledge and understanding of the specific chemistry discussed; appreciate the different general factors that are considered by industry and academia when deciding upon possible routes to a desired product, e.g. safety, scale of reaction, separation of products, cost and availability of reagents, intended market, quality control, etc.; be aware of some of the problems encountered in large-scale chemical syntheses and continuous or batch processing; consider the different stages involved in drug discovery and development; understand the principles of scale-up and process development; consider the environmental impact of the chemical industry; appreciate the diversity of the chemical industry. Through participation in a business game run by speakers from a leading industrial company (students divided into small groups), appreciate the factors and the decisions necessary in the design of a specific chemical process in terms of the underlying chemistry, safety and economic issues. Key skills: at the end of this module students should be able to: Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, solve problems, team work in small groups.

Teaching and Learning Methods

Lectures (the majority will be given by a diverse range of visitors from industry), group problem solving workshop (business game).

Assessment Methods

Final examination and continuous assessment.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Module Specification

CH3211 Pharmaceutical Chemistry

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	150

Period: Semester 2
Occurence: E
Coordinator: Richard Doveston
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2.5		

Period: Semester 2
Occurence: E1
Coordinator: Richard Doveston
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: This module aims to provide students with an understanding of the principles of how drugs are designed to interact with key receptors in the human body and how they are synthesised. Learning Outcomes: Subject knowledge: at the end of this module students should: Appreciate the different general factors that are considered by industry and academia when deciding upon possible routes to a pharmaceutical product, e.g. safety, scale of reaction, separation of products, cost and availability of reagents, intended market, quality control, etc. Be aware of some of the problems encountered in large-scale chemical syntheses. Consider the different stages involved in drug discovery and development. Understand the principles of scale-up and process development. Understand what a receptor, agonist and antagonist are. Appreciate modern ideas on receptor structure and signal transduction including ion channels and G-protein-coupled receptors. Recognise the key chemical aspects of the cholinergenic and adrenergic signalling systems and their relation to the design of agonists and antagonists. Understand the concepts involved in qualitative structure activity studies. Appreciate how the concepts of chemistry can be applied to the design of specific agonists and antagonists of key receptors in the human body. Understand the different methods for the synthesis of heterocyclic compounds. Key Skills: at the end of this module students should be able to: Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and staff and understand how a drug can be developed from knowledge of the structure and function of a neurotransmitter.

Teaching and Learning Methods

Lectures (including visitors from the pharmaceutical and related industries), set text(s), example problems, group problem-solving workshops.

Assessment Methods

Final examination and written work.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

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UNIVERSITY OF LEICESTER

Module Specification

CH3212 Forensic Science

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	30
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	120
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	40				
002	Examination (Final)	60		1.5		

Period: Semester 2
Occurence: E1
Coordinator: Rob Hillman
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: The generic aim of this module is to learn how chemical and other analytical methods (in some cases encountered earlier in the course) are applied by practitioners of forensic science. The module also aims, through problem solving and group activities, to develop the ability to combine different methods and the outputs they generate in order to assemble critical mass of information necessary to make operationally useful decisions. Learning Outcomes: Subject knowledge: at the end of this module students should: Have an appreciation of the capabilities of analytical techniques; understand the relevance of sensitivity and selectivity to choice of an analytical method for a specific application; have some knowledge of how to select and apply techniques to obtain the best results in a variety of situations; appreciate the contributions of chemical analysis to aspects of pathology, fire investigation, road traffic accidents, forensic engineering and explosives detection. Key skills: at the end of this module students should be able to: Obtain new information from textbooks and other sources; describe the role and limitations of analytical techniques in solving forensic problems; be able to discuss these techniques and the information they provide with peers and teachers; solve problems; design and execute analytical procedures; give an oral presentation; work productively as part of a group; apply laboratory-based knowledge to the identification and collection of evidence at a crime scene.

Teaching and Learning Methods

Lectures, directed reading, problem-based workshops, group work, laboratory work, primary literature critique, simulated crime scene investigation, give a presentation.

Assessment Methods

Continuous assessment: group project on a student-selected topic covered in the course, resulting in oral presentation/written summary; practical work notebook recording and reports; examination at end of semester.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Module Specification

CH3251 Chemistry Project Part 1

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 20

Student Workload (hours)

Lectures	5
Seminars	
Practical Classes & Workshops	162
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	33
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 1
Occurence: E
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
002	Experimental/Practical Work (Final)	100				

Intended Learning Outcomes

Subject knowledge: at the end of this module students should be able to: Plan a research project, setting shorter and longer term goals. Organise work efficiently. Use appropriate resources, including computer databases to find out information about a particular area of research. Consolidate knowledge of fundamental chemical principles introduced in levels 1 & 2, and be able to apply these fundamental principles to genuine, complex, chemical problems. Carry out a piece of scientific research using appropriate techniques, and analyse the results obtained. Keep a clear and accurate record of work. Write a detailed report of their project. Assess the safety issues of the work they are doing. Collaborate with other workers in the same field. Give an oral presentation of their work. Record, analyse and present data in an appropriate formats, give a presentation, answer questions orally on topics relating to their project.

Teaching and Learning Methods

Lectures, practical classes with appropriate demonstration, individual supervision.

Assessment Methods

The project will be assessed against specific criteria regarding your skills and commitment in four broad categories: Practical competence, initiative and independence, commitment, organisation and record keeping.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH3252 Chemistry Project Part 2

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 20

Student Workload (hours)

Lectures	5
Seminars	
Practical Classes & Workshops	15
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	180
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	200

Period: Semester 2
Occurence: E
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Project Report, Oral Examination; Presentation (100%)	100				

Intended Learning Outcomes

Subject knowledge: at the end of this module students should be able to: Plan a research project, setting shorter and longer term goals. Organise work efficiently. Use appropriate resources, including computer databases to find out information about a particular area of research. Consolidate knowledge of fundamental chemical principles introduced in levels 1 & 2, and be able to apply these fundamental principles to genuine, complex, chemical problems. Carry out a piece of scientific research using appropriate techniques, and analyse the results obtained. Keep a clear and accurate record of work. Write a detailed report of their project. Assess the safety issues of the work they are doing. Collaborate with other workers in the same field. Give an oral presentation of their work. Record, analyse and present data in an appropriate formats, give a presentation, answer questions orally on topics relating to their project.

Teaching and Learning Methods

Lectures, practical classes with appropriate demonstration, individual supervision.

Assessment Methods

The project will be assessed against specific criteria regarding your skills 3 categories: (a) Project Report; structure and clarity of expression, understanding and analysis, production standard and survey of the literature. (b) Oral Examination; understanding of aims and results and of the relevant literature. (c) Presentation; structure, effectiveness and use of display material.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

Module Specification

CH3255 Advanced Chemistry Practical Part 1

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	2
Seminars	
Practical Classes & Workshops	72
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	26
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	100

Period: Semester 1
Occurence: E
Coordinator: Stephen Ball
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical/Report (100%) (Final)	100		0		

Intended Learning Outcomes

Aims: This module provides students with advanced training in experimental techniques used in physical chemistry. The students gain experience using advanced instrumentation (spectroscopic, analytical etc), and obtaining & processing datasets. The subject of the experiments complements theory knowledge covered in Level 1-3 lectures.
Learning outcomes: by the end of this module, students should be able to: carry out advanced experimental procedures; plan the detail of their experimental work from an outline description of each experiment's purpose, method and available equipment; organise their time effectively in order to complete the task within the timetabled laboratory hours; function as part of a small team (the experimental work is typically carried out in pairs); process their data to reach scientific conclusions; present complex scientific results/conclusions in the form of a clear and concise report aimed at a scientific audience, using appropriate scientific language, writing style and referencing to the literature.
Key skills: recording large and potentially complex datasets; data processing and data management; presenting results as a scientific report; acting on markers' feedback on the report for the first experiment in order to better prepare reports for subsequent experiments.

Teaching and Learning Methods

Introduction lecture; practical classes with appropriate demonstration; students acting on written feedback about their reports.

Assessment Methods

Laboratory work and individually assessed reports.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3256 Advanced Chemical Practical Part 2

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	108
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	42
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical/Report (Final)	100		0		

Intended Learning Outcomes

Aims: This module has been designed to provide students with advanced training in experimental techniques and give practical experience in the generation and analysis of spectroscopic data, complimenting theoretical knowledge gained from lectures (Level 1-3 modules). Learning Outcomes: Subject knowledge: at the end of this module students should be able to: Carry out a number of advanced experimental procedures; purify and analyse chemical products using a variety of methods; take charge of their experiments and design them so that they can complete their tasks; function as part of a team; manage their time effectively; write comprehensive scientific reports aimed at a scientific audience; present scientific information in a clear and concise fashion. Key Skills: at the end of this module students should be proficient in: Recording, analysing and presenting data in appropriate formats.

Teaching and Learning Methods

Lectures, workshops, practical classes with appropriate demonstration.

Assessment Methods

Laboratory work + reports.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3257 Advanced Chemical Practical Part 3

Academic Year: 2018/9
Module Level: Year 3
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	2
Seminars	
Practical Classes & Workshops	72
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	76
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

Period: Semester 2
Occurence: E
Coordinator: Gregory Solan
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Practical/Report (100%) (Final)	100		0		

Intended Learning Outcomes

Aims
This module has been designed to provide students with advanced training in experimental techniques and give practical experience in the generation and analysis of spectroscopic data, complimenting theoretical knowledge gained from lectures (Level 1-3 modules). The module builds on the advanced synthetic practical. You will use these techniques in a more open ended extended investigation of a research type problem. The module also provides experience in working as a team, planning a series of experiments to explore a scientific problem. The module also includes a literature review exercise.

Subject knowledge
At the end of this module students should be able to:
As a team, plan/design a series of experiments to investigate a scientific problem
Carry out a number of advanced experimental procedures; purify and analyse chemical products using a variety of methods;
Function effectively as an individual and as part of a team;
Manage their time effectively, both lab time (which is limited) and other time to meet deadlines;
Write a comprehensive but concise scientific report presenting the experimental data in the format of a research paper;
Summarise the important points of their experiments and make suggestions for further work in that area.
Summarise important points from a number of research papers and make suggestions for further work in that area.

Key Skills
At the end of this module students should be proficient in:
Recording, analysing and presenting data in appropriate formats, summarising results concisely for an appropriate audience, observing scientific conventions in presentation of results, managing time effectively, working in a team.

Teaching and Learning Methods

Practical classes with appropriate demonstration, guidance by experiment manager.

Assessment Methods

Laboratory work + report (including team work); literature exercise.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4201 Advanced Structure Determination

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: James Hodgkinson
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: James Hodgkinson
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: The module continues the development of the theory and application of modern spectroscopic methods, especially resonance spectroscopies (NMR, ESR). Where possible, an interactive 'problem-solving' approach is used in dealing with the determination of structure and shape in synthetic chemistry. Problems will be set and discussed throughout the module. Subject knowledge: at the end of this course students should: Be aware of the range of major spectroscopic techniques currently available to synthetic chemists and to recognise the analytical, structural and stereochemical information they each can provide. Be able to discuss the magnetic properties of nuclei and electrons, to summarise the main features (resonant frequencies, line intensities, lineshapes) and to describe the physical and chemical interactions that define these features. Be able to analyse complex NMR spectra and extract key data, selecting and making use of appropriate 1D and 2D NMR experiments in simplifying and assigning spectra fully. Be able to understand the significance of chemical shift and coupling data, and to be able to present these data clearly and concisely in line with current conventions. To be aware of techniques based on Correlation Spectroscopy, their uses and their limitations. Be aware of the importance of variation of temperature in the study of time-dependent processes using NMR spectroscopy, and to obtain data concerning equilibria and rates of reaction from VT NMR experiments. Key Skills: at the end of this course students should be able to: Obtain new information from textbooks and the worldwide web, describe and orally communicate relevant chemistry in workshops and problem sessions and discuss it with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops.

Assessment Methods

Final Examination and group problem solving exercises.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4202 Advanced Synthetic Methods

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: This module aims to provide students with the skills necessary to propose a synthetic plan for any molecule. The module will introduce students to the need for and the approaches by which selectivity can be introduced into the synthesis of target molecules. Major landmarks in the field of organic synthesis will be discussed to reinforce synthetic strategies and to give students a perspective of the subject. Subject knowledge: at the end of this course students should be able to: Propose possible synthetic routes to almost any molecule. Use disconnections based on the carbonyl group as a foundation for synthetic planning. Understand the common atom approach, functional group addition and the synthesis of heterocyclic compounds. Understand and be able to apply chemo-, regio-, diastereo- and enantioselective reactions in the synthesis of molecules. Formulate in discussion a synthetic plan for a natural product. A short write up of this exercise will form part of the assessment for the course. The course provides a useful revision of the major synthetically useful reactions in organic chemistry. Key Skills: at the end of this module students should be able to: Obtain new information from text books, the world wide web and scientific articles/reviews; describe and discuss the common strategies employed in modern day organic synthesis and be able to apply these methods for the synthesis of unseen target molecules.

Teaching and Learning Methods

Lectures, set text(s), directed reading (literature articles), group problem solving workshops.

Assessment Methods

Final examination and continuous assessment - synthetic problems.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH4203 Earth System Science

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Stephen Ball
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Stephen Ball
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: Earth system science views the Earth as a synergistic physical system of interrelated phenomena, governed by complex processes involving the geosphere, atmosphere, hydrosphere and. biosphere. Fundamental to the Earth system science approach is the need to emphasize relevant interactions of chemical, physical, biological and dynamical processes that extend over spatial scales from microns to the size of planetary orbits, and over time scales of milliseconds to billions of years. In building on the traditional disciplines to study the Earth, the system approach has become widely accepted as a framework from which to pose disciplinary and interdisciplinary questions in relationship to humankind. The aim of the course is to give students a contemporary view of earth system science by looking at the physical and chemical basis of processes in each compartment but also how these can be linked together in a system view. The proposed course will look at the physical and chemical basis of Earth system science. It is envisaged that the course will have the following elements [1] Atmospheric Chemistry (10 lectures) (PSM + SB) Atmosphere - The overall aim of this course is to explore the fundamental physical and chemical processes that control atmospheric composition in the atmospheric context. This section of the course will overview the structure of the atmosphere, the role of the main regions and constituents, stratospheric and tropospheric photochemistry of ozone. Catalytic processes, CFC?s and N2O. Lifetimes of molecules in the atmosphere. Tropospheric photochemistry, hydroxyl radicals, nitrogen compounds, hydrocarbons, the sulphur cycle and acid rain. The ozone hole and the influence of chemistry on climate. [2] Climate Physics (4 lectures) (JJR and HB) - This element of the course will look at the physical basis of the climate system and the interactions between the different compartments. The role of space observations in climate monitoring will be considered. [3] Land Surface Processes (4 lectures) ?Biopshere? (HB and JK) - Interactions between the biosphere and the earth system will be explored. In particular the role of fire in ecosystem progression and also the building and application of ecosystem models. Learning Outcomes: At the end of this module students should be able to: understand the basis of atmospheric chemistry and physics and the concept of earth-system science as an integrative metaphor.
Key Skills: at the end of this module students should be able to: Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, enhance presentation skills, solve problems.

Teaching and Learning Methods

Methods: Set text(s), lectures, example problems, presentations and poster production. As part of the continuous assessment, elements from: (a) Short information sheet on topical issue; (b) Poster on Earth System Science and connectiveness; (c) Presentation of literature reviews [will be selected].

Assessment Methods

Final examination and poster presentation.

Last Published: 28 September 2020

Module Specification

CH4203 Earth System Science

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4204 Green Chemistry

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Eric Hope
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	50				
002	Examination (Final)	50		2		

Period: Academic Year
Occurence: E1
Coordinator: Eric Hope
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: This module aims to introduce students to wider, political/environmental, issues which impact upon the chemical industry, to illustrate how chemists wrestle with and solve these issues and to prompt the students to question how best to exploit their fundamental scientific knowledge.
Subject knowledge: at the end of this module students should be able to:
Understand the basic tenets of Greener chemical processes including the political and environmental drivers.
Discuss the applicability and application of metrics for the evaluation of chemical processes.
Discuss specific alternatives to established processes, including alternative solvents, reactor design, renewable resources, atom efficient reactions, the design of safer (e.g. less toxic) chemicals, energy issues and full life cycle analysis.
Discuss in detail specific examples of new, Green, approaches to genuine industrial scale chemical processes.
Outline legislation on the use and control of hazardous substances.
Key skills: at the end of this module students should be able to:
Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

Teaching and Learning Methods

Set text(s), lectures, example problems, group problem solving workshops, marked work.

Assessment Methods

Final examination; research paper interrogation and essay.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4206 Cancer Chemistry

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	0
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Richard Blackburn
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Richard Blackburn
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: The course is directed at the role of chemistry in understanding and treating cancer. Subject knowledge: at the end of this module students should: Understand from the chemical stand point what cancer is, how it starts and how it can be controlled; understand the terms apoptosis, angiogenesis, metastasis and how small molecules control these processes leading to new treatments for cancer; know the key chemical processes involved in the development of cancer, including DNA damage by chemical carcinogenesis, and the key chemical reactions involved in DNA repair; bifunctional cancer drugs, DNA alkylation and crosslinking; radiation therapy of cancer; have a good appreciation of the main approaches to cancer drug discovery by a comparison between taxol, cis-platin and gleevec; be familiar with the principal techniques for biological assays, particularly methods for high throughput screening; be familiar with the contribution of computational methods to inhibitor design. Understand the importance of genomics and proteomics in the field of drug discovery; understand the principles of combinatorial syntheses and the contribution of this field to the identification of lead compounds; know the key reactions of modern synthetic chemistry and hence be able to design rationale synthetic routes to some cancer drug candidates; be able to obtain new information from a variety of sources but in particular from primary research literature, be able to work independently or as part of a group, be able to propose solutions to problems. Key skills: at the end of this module students should be able to: Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

Teaching and Learning Methods

Lectures, set texts and discussion sessions based on student presentations.

Assessment Methods

End of semester examination and coursework.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Last Published: 28 September 2020

Module Specification

CH4206 Cancer Chemistry

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4207 Computational Chemistry

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	18
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	2
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Andrew Ellis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	50				
002	Examination (Final)	50		2		

Period: Academic Year
Occurence: E1
Coordinator: Andrew Ellis
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

To become familiar and comfortable with modern computational techniques in the prediction and analysis of chemical phenomena. Techniques to focus on properties such as molecular structure and molecular dynamics.

Teaching and Learning Methods

Lectures, set texts, web-based material, example problems.

Assessment Methods

Final examination and continuous assessment exercises.

Pre-Requisites

CH3203

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4209 Nanotechnology

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Kal Karim
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	25				
002	Examination (Final)	75		2		

Period: Academic Year
Occurence: E1
Coordinator: Kal Karim
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Be able to define what is meant by nanotechnology and appreciate its role as a ‘discipline straddling’ topic.
Describe the forces operating between nanoscale objects
Be able to discuss a range of methods for fabricating nano-objects, including ‘wet’ chemical methods and gas phase routes.
Design or select an appropriate nano-materials for use in biomedical devices
Be able to describe some important methods for nanoparticle characterisation, including various types of microscopy and spectroscopic techniques such as surface-enhanced Raman spectroscopy.
Define what is molecular imprinting
Demonstrate the computational design, synthesis and characterisation of MIPs and evaluate the results
Describe some important application of nanoscience and nanotechnology.
Application of nanomaterials in diagnostics, imaging and drug delivery

Teaching and Learning Methods

Lectures, set text(s), directed reading (literature articles), student presentation.

Assessment Methods

Coursework and final examination

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4212 Advanced Forensic Science

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Academic Year
Occurence: E
Coordinator: Rob Hillman
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	60				
002	Examination (Final)	40		1.5		

Period: Academic Year
Occurence: E1
Coordinator: Rob Hillman
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuous Assessment	100				

Intended Learning Outcomes

Aims: Lawyers, forensic scientists and other fact investigators spend considerable time engaged in the gathering and organisation of “evidence that will be presented at trial. The aim of this module is to learn how diverse scientific methods are applied by practitioners of forensic science in the acquisition, interpretation and presentation of physical, biological and other evidence. By combining selected activities from the fields of forensic archaeology and the law of evidence with the experience of forensic science practitioners, the module aims to develop the ability to visualize the full train of events from searching for evidence through to its presentation in court. Topics to be covered will include the processes of “proof”, trial rules of evidence admissibility, legal relevance, direct and circumstantial evidence, burdens and standards of proof, fingerprint evidence, and forensic toxicology.
Subject knowledge: at the end of this module students should:
Be able to analyze and practice the process of making inferences about facts and “evidence” in forensic contexts; appreciate the contributions of scientific analysis to aspects of specialist investigations, selected from digital evidence, fire investigation, pathology, toxicology and vehicle/accident investigation; possess the ability to apply archaeological methodology to the field of criminal investigation, including: the application of geophysical techniques and landscape analysis in the search for buried remains, excavation of buried remains, analysis of human skeletal remains (applied physical anthropology), archaeological science for information gathering at the scene of a crime; have an awareness of the judicial and police frameworks in the UK and the role of the forensic archaeologist within those systems; understand one key method for organizing and evaluating forensic evidence, namely the Wigmorean Method for the analysis of legal evidence; understand the special roles of expert forensic witnesses in the Anglo-American legal systems.
Key skills: at the end of this module students should be able to:
Obtain new information from diverse scientific and legal sources; describe the role and limitations of investigative techniques in solving forensic problems; discuss these techniques and the information they provide with peers and teachers; design solutions to investigative problems; assess the evidential value of recovered items and facts; give an oral presentation on evidence location, analysis, interpretation or presentation in court; work productively as part of a group; apply laboratory-based knowledge to the location, collection and assessment of evidence from a crime scene; master the basic skills of fact analysis and the rules that govern their presentation in court; relate the logic of proof to selected rules of legal evidence in England and Wales.

Teaching and Learning Methods

Lectures, directed reading, problem-based workshops, group work, laboratory work, primary literature critique, give a presentation.

UNIVERSITY OF LEICESTER

Module Specification

CH4212 Advanced Forensic Science

Assessment Methods

Law and (partial) archaeology components by in course assignments (involving essay/report writing and presentations); special topics and (partial) archaeology by examination at end of semester.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4251 Chemistry Project Part 1

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 25

Student Workload (hours)

Lectures	4
Seminars	
Practical Classes & Workshops	184
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	-0.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	187.5

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Continuously Assessed Lab Work (100%) (Final)	100				

Intended Learning Outcomes

Aims: The aim of this module is to give students experience of doing research as part of an active research group within the Department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Learning Outcomes: Subject knowledge: at the end of this module students should: Have experience of doing research as part of an active research group within the department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Part one will mostly involve the practical, experimental part of the project. The second part involves the data analysis, writing a report, including a summary of the relevant literature, and giving an oral presentation, and an oral examination. Key Skills: at the end of this module students should be able to: Record, analyse and present data in an appropriate formats.

Teaching and Learning Methods

Lectures, workshops, practical classes with appropriate demonstration.

Assessment Methods

Continuously assessed laboratory work.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

Module Specification

CH4252 Chemistry Project Part 2

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 25

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	94
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	93.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	187.5

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

Aims: The aim of this module is to give students experience of doing research as part of an active research group within the Department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Learning Outcomes: Subject knowledge: at the end of this module students should: Have experience of doing research as part of an active research group within the department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Part one will mostly involve the practical, experimental part of the project. The second part involves the data analysis, writing a report, including a summary of the relevant literature, and giving an oral presentation, and an oral examination. Key Skills: at the end of this module students should be able to: Record, analyse and present data in an appropriate formats.

Teaching and Learning Methods

Lectures, workshops, practical classes with appropriate demonstration.

Assessment Methods

Project report

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH4253 Chemistry Project Part 3

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 10

Student Workload (hours)

Lectures	
Seminars	
Practical Classes & Workshops	2
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	73
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	75

Period: Academic Year
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

No.	Assessment Description	Weight %	Qual Mark	Exam Hours	Ass't Group	Alt Reass't
001	Oral Exam & Presentation (100%) (Final)	100				

Intended Learning Outcomes

Aims: The aim of this module is to give students experience of doing research as part of an active research group within the Department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Learning Outcomes: Subject knowledge: at the end of this module students should: Have experience of doing research as part of an active research group within the department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work. Part one will mostly involve the practical, experimental part of the project. The second part involves the data analysis, writing a report, including a summary of the relevant literature, and giving an oral presentation, and an oral examination. Key Skills: at the end of this module students should be able to: Record, analyse and present data in an appropriate formats.

Teaching and Learning Methods

Lectures, workshops, practical classes with appropriate demonstration.

Assessment Methods

Oral exam and presentation.

Pre-Requisites

Co-Requisites

Excluded Combinations

-

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4701 STUDY ABROAD MASTERS ORGANIC CHEMISTRY

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

Aims: This module combines aspects of modern spectroscopic methods and synthetic chemistry.
Subject knowledge: at the end of this course students should:
• Be aware of the range of major spectroscopic techniques currently available to synthetic chemists and to recognise the analytical, structural and stereochemical information they each can provide.
• Be able to discuss the magnetic properties of nuclei and electrons, to summarise the main features (resonant frequencies, line intensities, lineshapes) and to describe the physical and chemical interactions that define these features.
• Be able to analyse complex NMR spectra and extract key data, selecting and making use of appropriate 1D and 2D NMR experiments in simplifying and assigning spectra fully.
• Be able to understand the significance of chemical shift and coupling data, and to be able to present these data clearly and concisely in line with current conventions.
• Be aware of techniques based on Correlation Spectroscopy, their uses, how and when they are applied and their limitations.
• Be able to propose possible synthetic routes to almost any molecule.
• Be able to use disconnections based on the carbonyl group as a foundation for synthetic planning.
• Be able to explain and use the common atom approach, functional group addition and the synthesis of heterocyclic compounds.
• Be able to explain the important factors controlling selectivity in commonly employed synthetic reactions.
• Be able to apply chemo-, regio-, diastereo- and enantioselective reactions in the synthesis of molecules.

Teaching and Learning Methods

Set text(s), lectures, directed reading (literature articles), group problem solving workshops.

Assessment Methods

Continuous assessment – problem solving exercises

Pre-Requisites

Co-Requisites

Excluded Combinations

For Erasmus / Study Abroad students only

Guided Independent Study: Indicative Activities

Last Published: 28 September 2020

UNIVERSITY OF LEICESTER

Module Specification

CH4702 STUDY ABROAD MASTERS PHYSICAL CHEMISTRY

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

Aims: This module combines aspects of modern chemistry applied to earth system science and computational chemistry.
Subject knowledge: at the end of this course students should:

• Understand the basis of atmospheric chemistry and physics and the concept of earth-system science as an integrative metaphor.
• Be able to describe the physical principles behind major simulation techniques such as ab initio quantum chemistry, molecular dynamics, and the Monte Carlo method.
• Be able to use well-known software utilising the above methods to predict properties in individual molecules and molecular ensembles. You will also be expected to be able to critically assess the strengths and limitations of such simulations.
• Be able to write short computational routines to solve mathematical problems.
• Be able to apply your knowledge to new chemical problems (this will be an important part of the assessment process).
• Be able to present data from computational simulations in a clear and concise way.

Teaching and Learning Methods

Set text(s), lectures, directed reading (literature articles), group problem solving workshops

Assessment Methods

Continuous assessment

Pre-Requisites

Co-Requisites

Excluded Combinations

For Erasmus / Study Abroad students only

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4703 STUDY ABROAD MASTERS BIOLOGICAL CHEMISTRY

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

Aims: This module combines aspects of modern chemistry knowledge and techniques applied to cancer and bioinorganic chemistry.
Subject knowledge: at the end of this course students should:

• know from the chemical stand point what cancer is, how it starts and how it can be controlled;
• know the meaning of the terms apoptosis, angiogenesis, metastasis and how small molecules control these processes leading to new treatments for cancer;
• know the key chemical processes involved in the development of cancer, including DNA damage by chemical carcinogenesis, and the key chemical reactions involved in DNA repair; bifunctional cancer drugs, DNA alkylation and crosslinking; radiation therapy of cancer.
• have a good appreciation of the main approaches to cancer drug discovery by a comparison between taxol, cis-platin and gleevec;
• be familiar with the principal techniques for biological assays, particularly methods for high throughput screening;
• be familiar with the contribution of computational methods to inhibitor design;
• appreciate the importance of genomics and proteomics in the field of drug discovery;
• Be able to describe the occurrence and function of metals and non-metals in biological systems.
• Be able to apply different spectroscopic and kinetic techniques to the study of metal ions in biological systems.
• Know how metal ion substitution and the study of model compounds can aid the understanding of complex metalloproteins.
• Be able to discuss electron transfer, oxygen transport and the role of various metal ions in biological systems.
• Be able to discuss the transport and storage of iron.

Teaching and Learning Methods

Set text(s), lectures, directed reading (literature articles), group problem solving workshops

Assessment Methods

Continuous assessment

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

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UNIVERSITY OF LEICESTER

Module Specification

CH4704 STUDY ABROAD MASTERS MATERIALS CHEMISTRY

Academic Year: 2018/9
Module Level: Year 4
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	20
Seminars	
Practical Classes & Workshops	
Tutorials	
Fieldwork	
Project Supervision	
Guided Independent Study	92.5
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	112.5

Period: Semester 1
Occurence: E
Coordinator: Sandeep Handa
Mark Scheme: UG Module Mark Scheme

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

Intended Learning Outcomes

Aims: This module combines aspects of green chemistry and nanotechnology
Subject knowledge: at the end of this course students should:

• Appreciate and be able to apply core chemical principles to wider problems in industry, merchandising and commerce from an environmental, clean technology or Green chemistry perspective.
• Appreciate the impact of social, political, environmental and economic forces on the development and implementation of Greener chemical processes.
• Discuss the applicability, validity and application of metrics for the evaluation of chemical processes.
• Discuss specific alternatives to established processes, including alternative solvents, reactor design, renewable resources, atom efficient reactions, the design of safer (e.g. less toxic) chemicals, energy issues and full life cycle analysis.
• Discuss in detail specific examples of new, Green, approaches to genuine industrial scale chemical processes.
• Be able to define what is meant by nanotechnology and appreciate its role as a ‘discipline straddling’ topic.
• Describe the forces operating between nanoscale objects
• Be able to discuss a range of methods for fabricating nano-objects, including ‘wet’ chemical methods and gas phase routes.
• Be able to describe some important methods for nanoparticle characterisation, including various types of microscopy and spectroscopic techniques such as surface-enhanced Raman spectroscopy.
• Define what is molecular imprinting
• Demonstrate the computational design, synthesis and characterisation of MIPs and evaluate the results
• Describe some important application of nanoscience and nanotechnology.

Teaching and Learning Methods

Set text(s), lectures, directed reading (literature articles), group problem solving workshops

Assessment Methods

Continuous assessment

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

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