Module Specification

CH1200 General Chemistry

Academic Year: 2019/0
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 (Final)	100				

Last Published: 14 November 2019

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Module Specification

CH1200 General Chemistry

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

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

UNIVERSITY OF LEICESTER

Module Specification

CH1201 Introductory Organic Chemistry

Academic Year: 2019/0
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: 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

-

Last Published: 14 November 2019

CH1201 Introductory Organic Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Module Specification

CH1202 Introductory Inorganic Chemistry

Academic Year: 2019/0
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 (Final)	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

-

Last Published: 14 November 2019

Module Specification

CH1202 Introductory Inorganic Chemistry

Co-Requisites

-

Excluded Combinations

-

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: 2019/0
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 (Final)	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

-

Last Published: 14 November 2019

CH1203 Introductory Physical Chemistry

Guided Independent Study: Indicative Activities

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

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Module Specification

CH1204 Chemistry Key Skills & Maths

Academic Year: 2019/0
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: Stephen Ball
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: Stephen Ball
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
Demonstrate academic integrity in their submitted work through appropriate use of academic citation and referencing conventions (e.g. RSC style) for chemistry (for example in directly quoting or paraphrasing the work of others).

Teaching and Learning Methods

Lectures, example problems, tutorials, marked work, group problem solving classes & VLE directed activities
- In this module the importance and role of demonstrating academic integrity In academic work will be explained. Furthermore, this module upholds the university's regulations on academic misconduct by clearly explaining to all students what constitutes plagiarism, collusion and other unfair advantages In assessment (including clear definitions and examples) and by providing a familiarity with the penalties for academic misconduct.
- the module will provide explicit guidance on how to demonstrate academic integrity, how to acknowledge the work of others appropriately and avoid plagiarism and collusion, including explicit training In how to reference any relevant type of existing work. this will be delivered through a combination of course materials, appropriately contextualised instruction and experiential learning opportunities, and the compulsory completion by each student of an on-line tutorial on avoiding plagiarism, which will be recorded.A12

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Module Specification

CH1204 Chemistry Key Skills & Maths

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
On-line tutorial on avoiding plagiarism

UNIVERSITY OF LEICESTER

Module Specification

CH1206 Scientific Method & Principles of Analytical Chemistry

Academic Year: 2019/0
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

-

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CH1206 Scientific Method & Principles of Analytical Chemistry

Guided Independent Study: Indicative Activities

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

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Module Specification

CH1207 Chemistry of the Real World

Academic Year: 2019/0
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

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UNIVERSITY OF LEICESTER

Module Specification

CH1208 Introductory Forensic Science I

Academic Year: 2019/0
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: 2019/0
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:
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

CH2200 Spectroscopy Theory & Practice

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	33
Seminars	
Practical Classes & Workshops	4
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	110
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

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

Period: Semester 1
Occurence: E1
Coordinator: Andrew Ellis
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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and the Dalian Leicester Institute should be able to:
- Identify and explain at a quantum level the nature of the transitions induced when specific wavelengths of electromagnetic radiation interact with molecules
- Interpret or predict data (from more than one spectroscopic technique) and hence identify structural or bonding characteristics and/or determine the full structure of molecules
- Analyse molecular spectroscopic data and conduct calculations relating to the properties of molecules
- Choose appropriate physical methods to solve chemical identification and characterisation problems
- Recognise elements of symmetry and use these to determine point groups of molecules; use this analysis to predict vibrational spectra

Teaching and Learning Methods

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

Assessment Methods

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

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Last Published: 14 November 2019

CH2200 Spectroscopy Theory & Practice

Guided Independent Study: Indicative Activities

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

Module Specification

CH2201 Organic Chemistry

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	33
Seminars	
Practical Classes & Workshops	4
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	110
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

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

Period: Academic Year
Occurence: E1
Coordinator:
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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and the Dalian Leicester Institute should be able to:
- Explain how carbon-carbon bonds can be formed from carbanions and electrophilic molecules and how this chemistry can be used in both the retrosynthetic analysis and the synthesis of organic molecules
- Discuss the structure and reactivity of amino acids and the application of this chemistry for the synthesis and structure determination of peptides
- Represent important conformations of alicyclic systems (especially 6-membered); predict and rationalise their relative stability and their influence on the stereoelectronic requirements of reaction pathways
- Discuss and explain the electronic structure of aromatic carbocycles and heterocycles and its effect upon reactivity; use this information to propose effective reaction sequences to synthesise and interconvert aromatic species
- Rationalise and predict reactivity based on curly arrow mechanisms and diagrams; explain how structure and bonding controls the outcome and selectivity of organic reactions

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

-

Last Published: 14 November 2019

CH2201 Organic Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

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Module Specification

CH2202 Inorganic Chemistry

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	33
Seminars	
Practical Classes & Workshops	4
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	110
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

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

Period: Academic Year
Occurence: E1
Coordinator: Gregory Solan
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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and the Dalian Leicester Institute should be able to:
- State the methods of preparation, and describe the bonding, relative stability and reactivity of metal carbonyls, -alkyls, -carbenes, -hydrides; as well as alkene, diene, allyl, cyclopentadienyl and benzene complexes
- Describe inorganic reactions in terms of the basic reaction types: substitution, oxidative addition, migratory insertion, reductive elimination, salt elimination
- Be able to use spectroscopic (IR, NMR and Mass Spectrometry) microanalytical data and structural methods in the characterisation of organometallic species.
- Apply the concepts of chemical kinetics to inorganic chemistry including making connections between the kinetics of a process and the mechanism of a reaction
- Discuss the importance of inorganic chemistry in catalysis and describe the mechanistic steps in a number of industrially important catalytic cycles

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

-

Last Published: 14 November 2019

CH2202 Inorganic Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

UNIVERSITY OF LEICESTER

Module Specification

CH2203 Physical Chemistry

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

Lectures	33
Seminars	
Practical Classes & Workshops	4
Tutorials	3
Fieldwork	
Project Supervision	
Guided Independent Study	110
Demonstration	
Supervised time in studio/workshop	
Work Based Learning	
Placement	
Year Abroad	
Total Module Hours	150

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

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

Period: Academic Year
Occurence: E1
Coordinator: Corey Evans
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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, students at both Leicester and the Dalian Leicester Institute should be able to:
- Describe the thermodynamics of solution formation, distinguishing the different methods of transportation and explaining and analyzing the factors affecting ion migration & diffusion. Distinguish the different ways a species can be transported through a solution. Explain the factors that affect ion migration and diffusion
- Describe the nature of a colloid and the factors affecting its stability. Explain the techniques used to determine the size and shape of colloidal particles. Discuss the interplay between the attractive and repulsive interactions between colloidal particles
- Describe how the kinetics of chemical reactions are influenced by homogenous and heterogeneous catalysts including associated mechanisms
- Perform qualitative and quantitative analyses of and solve problems involving the movement of charged and neutral species in solutions and kinetic data associated with adsorption and desorption processes on surfaces.
- Describe the process of surface growth and distinguish between the different techniques used to probe a surface. Explain the interactions at the electrode-solution interface and be able to determine the rate of electron transfer at the surface of an electrode. Understand adsorption and desorption processes on a surface.

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

-

Last Published: 14 November 2019

CH2203 Physical Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

Module Specification

CH2206 Analytical Chemistry in Practice

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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

Period: Semester 2
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	Coursework	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 (Final)	100				

Intended Learning Outcomes

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

Teaching and Learning Methods

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

Assessment Methods

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

Pre-Requisites

-

Co-Requisites

-

Last Published: 14 November 2019

Module Specification

CH2206 Analytical Chemistry in Practice

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

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Module Specification

CH2207 Polymer & Materials Chemistry

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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

Period: Semester 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	Coursework	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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, student should be able to:
- Describe the terminology of materials mechanics and explain the strength of materials in relation to their molecular structure
- Discuss the formation of alloys; explain and predict the chemical and physical properties of alloys based upon a knowledge of their composition
- Describe and explain the methods for production of polymers and characterization of their properties (e.g. glass transition temperature); explain and predict how polymer structure affects physical properties
- Classify polymers on the basis of their structure, properties or origin; describe the applications of polymers explaining how they are related to their structure and properties
- Discuss and rationalise the key mechanisms for polymerization (radical, cationic and anionic) and for cross-linking
- Recognise repeat units of polymers and hence predict appropriate routes for their synthesis
- Discuss and explain how kinetic & thermodynamic factors affect polymerisation reactions

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

-

Last Published: 14 November 2019

CH2207 Polymer & Materials Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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

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Module Specification

CH2208 Introductory Forensic Science II

Academic Year: 2019/0
Module Level: Year 2
Scheme: UG
Department: Chemistry
Credits: 15

Student Workload (hours)

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

Period: Semester 1
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	Coursework	40				
002	Examination (Final)	60		1.5		

Period: Semester 1
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 (Final)	100				

Intended Learning Outcomes

On successful completion of the module, student should be able to:
- Appreciate the needs for recording, observational and analytical skills when dealing with a forensic investigation
- Discuss the different types of evidence explaining the limitations of each
- Explain the need for good communication skills in an expert witness and the need for scientific reasoning
- Discuss the underlying philosophical principles of science, including deductive and inductive reasoning and the concept of falsification
- Discuss the role and function of the principle actors in and main elements of the criminal justice system
- Explain the relationship between statutory material, code of practice & case law as authorities for legal propositions
- Advise on the application of law to hypothetical situations

Teaching and Learning Methods

Lectures, example problems, marked work, workshop group problem solving classes

Assessment Methods

- Coursework (40%), Final Exam (60%)

Pre-Requisites

-

Co-Requisites

-

Excluded Combinations

-

Last Published: 14 November 2019

CH2208 Introductory Forensic Science II

Guided Independent Study: Indicative Activities

Directed reading, set problems, group problem solving exercises

UNIVERSITY OF LEICESTER

Module Specification

CH3200 Chemistry General Skills

Academic Year: 2019/0
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: Dylan Williams
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: Dylan Williams
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: 2019/0
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: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3202 Advanced Inorganic Chemistry

Academic Year: 2019/0
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.

Last Published: 14 November 2019

Module Specification

CH3202 Advanced Inorganic Chemistry

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3203 Advanced Physical Chemistry

Academic Year: 2019/0
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.

Last Published: 14 November 2019

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Module Specification

CH3203 Advanced Physical Chemistry

Teaching and Learning Methods

Lectures, workshops and continuous assessment presentations.

Assessment Methods

End of module exam and written work.

Pre-Requisites

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3204 Biological Chemistry

Academic Year: 2019/0
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

Last Published: 14 November 2019

Module Specification

CH3204 Biological Chemistry

Excluded Combinations

-

Guided Independent Study: Indicative Activities

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Module Specification

CH3205 Metals in Synthesis

Academic Year: 2019/0
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: 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 2
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 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

Last Published: 14 November 2019

Module Specification

CH3205 Metals in Synthesis

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3206 Advanced Analytical Chemistry

Academic Year: 2019/0
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

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3206 Advanced Analytical Chemistry

Co-Requisites

Excluded Combinations

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Guided Independent Study: Indicative Activities

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3207 Industrial Chemistry

Academic Year: 2019/0
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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Last Published: 14 November 2019

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Module Specification

CH3207 Industrial Chemistry

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3211 Pharmaceutical Chemistry

Academic Year: 2019/0
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

Last Published: 14 November 2019

Module Specification

CH3211 Pharmaceutical Chemistry

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3212 Forensic Science

Academic Year: 2019/0
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

Last Published: 14 November 2019

Module Specification

CH3212 Forensic Science

Excluded Combinations

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Guided Independent Study: Indicative Activities

Module Specification

CH3251 Chemistry Project Part 1

Academic Year: 2019/0
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: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH3252 Chemistry Project Part 2

Academic Year: 2019/0
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

UNIVERSITY OF LEICESTER

Module Specification

CH3255 Advanced Chemistry Practical Part 1

Academic Year: 2019/0
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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3256 Advanced Chemical Practical Part 2

Academic Year: 2019/0
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: Richard Doveston
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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3257 Advanced Chemical Practical Part 3

Academic Year: 2019/0
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: Fabrizio Ortu
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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH3257 Advanced Chemical Practical Part 3

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH4201 Advanced Structure Determination

Academic Year: 2019/0
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 (Final)	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

Last Published: 14 November 2019

Module Specification

CH4201 Advanced Structure Determination

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4202 Advanced Synthetic Methods

Academic Year: 2019/0
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 (Final)	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

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Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH4202 Advanced Synthetic Methods

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4203 Earth System Science

Academic Year: 2019/0
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 (Final)	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.

Last Published: 14 November 2019

Module Specification

CH4203 Earth System Science

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.

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: 2019/0
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: 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	50				
002	Examination (Final)	50		1.5		

Period: Academic Year
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 (Final)	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

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Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH4204 Green Chemistry

Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4206 Cancer Chemistry

Academic Year: 2019/0
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

Last Published: 14 November 2019

Module Specification

CH4206 Cancer Chemistry

Excluded Combinations

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4207 Computational Chemistry

Academic Year: 2019/0
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

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Guided Independent Study: Indicative Activities

Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH4209 Nanotechnology

Academic Year: 2019/0
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

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Guided Independent Study: Indicative Activities

Last Published: 14 November 2019

Module Specification

CH4212 Advanced Forensic Science

Academic Year: 2019/0
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 (Final)	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.

Last Published: 14 November 2019

Module Specification

CH4212 Advanced Forensic Science

Teaching and Learning Methods

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

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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4251 Chemistry Project Part 1

Academic Year: 2019/0
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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4252 Chemistry Project Part 2

Academic Year: 2019/0
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

UNIVERSITY OF LEICESTER

Module Specification

CH4253 Chemistry Project Part 3

Academic Year: 2019/0
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

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Guided Independent Study: Indicative Activities

UNIVERSITY OF LEICESTER

Module Specification

CH4701 Study Abroad Masters Organic Chemistry

Academic Year: 2019/0
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

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UNIVERSITY OF LEICESTER

Module Specification

CH4702 Study Abroad Masters Physical Chemistry

Academic Year: 2019/0
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

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UNIVERSITY OF LEICESTER

Module Specification

CH4703 Study Abroad Masters Biological Chemistry

Academic Year: 2019/0
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 synthetic organic chemistry.
Subject knowledge: at the end of this course students should:

•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.
•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.

Teaching and Learning Methods

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

Assessment Methods

Continuous assessment

Pre-Requisites

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Last Published: 14 November 2019

Module Specification

CH4703 Study Abroad Masters Biological Chemistry

Co-Requisites

-

Excluded Combinations

For Erasmus / Study Abroad students only

Guided Independent Study: Indicative Activities

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UNIVERSITY OF LEICESTER

Module Specification

CH4704 Study Abroad Masters Materials Chemistry

Academic Year: 2019/0
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

For Erasmus / Study Abroad students only

Guided Independent Study: Indicative Activities

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Last Published: 14 November 2019

UNIVERSITY OF LEICESTER

Module Specification

CH4704 Study Abroad Masters Materials Chemistry

Last Published: 14 November 2019