UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

2019-20 Entry. Date amended: April 2018

1. Programme Title(s) and UCAS code(s):

BSc Chemistry F100

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full time

b) Type of study:

Campus-style based in Panjin Campus, DUT, PRC.

4. Registration periods

The normal period of registration is four years

The maximum period of registration is six years

5. Typical entry requirements:

All students that have followed the Chinese school and qualification system must be from the same Gaokao group (the top group out of four) as students entering other DUT undergraduate programmes. Students must also possess a sufficient level of English language to enable such students to undertake studies with the English language as the teaching medium.

For Year 1 entry, a Gaokao English language score of 70% for English language or an IELTS score of 5.0 will be required. After intensive English language teaching in Year 1, students will be required to demonstrate CEFR Level B2 in English language (otherwise IELTS 6.0).

6. Accreditation of Prior Learning:

APL will not be accepted for exemptions from individual modules, however may be considered for direct entry to year 2, on a case by case and subject to the general provisions of the University APL policy.

7. Programme aims:

The programme aims to provide a broad and in-depth understanding of ideas central to chemistry

- To provide students with direct experience of a UK-style degree programme
- To enhance and develop the students' English language skills
- To train students in the practical skills necessary for the safe manipulation of chemicals
- To generate interest in, and understanding of, the wider role of chemistry in society e.g. industry and commerce
- To enable students to develop independent learning skills as well as the experience of working as part of a team
- To stimulate intellectual development, develop powers of critical analysis and ability to solve problems
- To enhance written and oral communication skills
- To provide students with training in mathematical techniques and IT skills
- To introduce students to chemical research methodology through carrying out a research project
- To introduce students to some topics of current chemical or chemical engineering research

- To equip students with the knowledge and generic skills for employment or further training in R&D, science-based industry and establishments, education, and for training at management levels in other professions.

8. Reference points used to inform the programme specification:

- QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland
- QAA Benchmark Statement for Chemistry 2014
- QAA subject review
- PDR report (May 2011)
- University Learning Strategy
- University Employability Strategy
- NSS 2014
- First destination survey
- External examiners reports
- RSC accreditation [http://www.rsc.org/Education/courses-and-careers/accredited-courses/index.asp],

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Discipline specific knowledge and competencies		
(i) Mastery of an appropriate body of knowledge		
Typical students should be able to: recall and apply basic chemistry theory across all three main areas of chemistry (organic, inorganic and physical) and related mathematics; solve structured and unseen model problems; conduct experiments and apply practical techniques.	Lectures; Directed Reading; Problem Classes; Tutorials; Laboratory Practical Classes; Computer aided learning.	Written exams; assessed practical work; assessed computer exercises; assessed problems; tutorial work.
Typical students should have detailed knowledge of selected topics in five areas of chemistry (analytical, chemical engineering, organic, inorganic and physical).	Lectures; Directed Reading; Problem Classes; Computer aided learning; Project supervision.	Written exams; assessed computer exercises; project assessment.
(ii) Understanding and application of key concepts and techniques		
Typical students should be able to: apply chemical concepts in new situations e.g. ability to predict physical and chemical properties by comparison with analogues; apply logic and chemical knowledge to make deductions based on (limited) evidence; solve familiar and unfamiliar chemistry related problems; design, construct and undertake experiments; demonstrate professional use of standard equipment and knowledge of and application of safety procedures.	Lectures; Directed Reading; Problem Classes; Tutorials; Laboratory Practical Classes; Computer aided learning; Project supervision.	Written exams; assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(iii) Critical analysis of key issues		

Typical students should be able to: critically appraise physical and chemical information, and discuss its limitations; summarise key findings of scientific papers; draw quantitative conclusions from sample data; critically assess and compare scientific theories	Progressively through the programme, particularly in the 4th year. Lectures; Problem Classes; Tutorials; Laboratory Practical Classes; Group projects; Computer aided learning; Project supervision.	Written exams; assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(iv) Clear and concise presentation of material		
Typical students should be able to: present scientific ideas, data and results in a variety of (appropriate) forms, e.g. reports, seminars, posters; use chemical software, e.g. drawing, molecular modelling; participate in scientific discussion and debate.	Tutorials, Laboratory Practical Classes; Group projects; Problem classes; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(v) Critical appraisal of evidence with appropriate insight		
Typical students should be able to: discuss and implement experimental methodology; collect and critically analyse data; draw valid inferences from data; interrogate and discuss scientific literature.	Tutorials, Laboratory Practical Classes; Group projects; Problem classes; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(vi) Other discipline specific competencies		
Typical students should be able to: respond to questioning; give a short seminar.	Tutorials: Group project supervision; Project supervision	Tutorial work; project assessment.
(b) Transferable skills		
(i) Oral communication		
In English, typical students should be able to: give reasoned arguments in response to chemical questions; give a short seminar on a chemical topic	Tutorials; Group work; Group project supervision; Project supervision	Tutorial work; Oral project presentations and examinations
(ii) Written communication		
In English, typical students should be able to: write abstracts, tutorial and problem class work, lab notebooks, lab reports and project dissertation; communicate scientifically.	Lectures; Tutorials; Practical classes; Group work; Writing workshops; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; assessed essays; tutorial work; project assessment.
(iii) Information technology		
Typical students should be able to: use mathematical packages for data analysis; use spreadsheets, presentation and word processing facilities; use scientific software packages, e.g. drawing or molecular modelling.	Problem classes; Practical classes; Group work; Project supervision	Assessed practical work; assessed computer exercises; project assessment.
(iv) Numeracy		
Typical students should be able to: use analytical and graphical methods; use calculus in Chemistry and Chemical Engineering; analyse data; solve numerical problems.	Progressively throughout course.	Written exams; assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(v) Team working		
Typical students should be able to: discuss concepts and formulate plans working with peers; organize time and tasks; produce joint reports/presentations; recognize individual strengths.	Group problem solving; Group projects; Project supervision	Group assessments (oral and written); project assessment.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(vi) Problem solving		
Typical students should be able to: apply knowledge; analyse and solve familiar and unfamiliar problems; plan and implement laboratory work and projects.	Lectures; Problem Classes; Tutorials; Laboratory Practical Classes; Computer aided learning; Project supervision.	Written exams; assessed practical work; assessed computer exercises; assessed problems; tutorial work; project assessment.
(vii) Information handling		
Typical students should be able to: describe and discuss the scientific method; gather, retrieve, manipulate and analyse chemical data and information from a variety of sources including scientific journals and databases; present data in appropriate forms.	Lectures; Problem Classes; Tutorials; Laboratory Practical Classes; Computer aided learning; Project supervision.	Written exams; assessed practical work; assessed computer exercises; assessed problems; tutorial work; project assessment.
(viii) Skills for lifelong learning		
Typical students should be able to: demonstrate understanding of the professional responsibilities of a chemist; develop their study and time management skills; learn independently; access and search scholarly articles and databases; retrieve information; analyse data; work in groups; plan and implement group and individual activities.	Progressively through the programme, particularly in the 4th year. Lectures; Problem Classes; Tutorials; Laboratory Practical Classes; Group projects; Computer aided learning; Project supervision.	Meeting deadlines; All assessment elements; Project assessment.

10. Progression points:

Minimum assessment levels are outlined with each module specification as set out in **Senate Regulation 5.** Additional progression criteria include:-

- Students must pass the English language modules in year 1, which cannot be carried into year 2.
- Students must pass each of the chemistry laboratory practical modules in years 2 and 3, for which there are no opportunities for reassessment, and which cannot be carried into the subsequent year. These modules have an additional attendance requirement wherein students may not be absent for more than 25% of the schedule laboratory classes. Additional "catch-up" sessions will be provided for students for whom non-attendance has been mitigated.

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course.

Transfer between different degrees: Students not satisfying the UoL progression requirements may be allowed to transfer onto DUT programmes. Students satisfying the UoL progression requirements may be allowed to transfer to the University of Leicester campus-based BSc Chemistry degree programme, subject to capacity and physical resource limitations on the UoL campus.

11. Scheme of Assessment

The programme follows the standard scheme of award and classification set out **in Senate Regulation 5.**

12. Special features:

Programme delivered entirely in English with UK-style facilities provided on Panjin campus, Small group tutorials via simultaneous on-line classroom approaches, group problem solving, research-

based projects, problem based learning.

13. Indications of programme quality

All current BSc degrees were accredited by the Royal Society of Chemistry (RSC) in Jan 2016. It is our intention to seek accreditation from the RSC for this BSc Chemistry programme during the next accreditation review.

14. External Examiners

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for the in-house BSc Chemistry programme can be found **here**.

Appendix 1: Programme structure (programme regulations) (overleaf)

Appendix 2: Module specifications

See module specification database http://www.le.ac.uk/sas/courses/documentation

Appendix 3: Skills matrix

APPENDIX 1

BSc CHEMISTRY

FIRST YEAR MODULES

SEMESTER 1

Core Modules			**Credits**
EL0002	ENGLISH FOR GENERAL ACADEMIC PURPOSES	45	
CH0280	ADVANCED MATHEMATICS I	15	
		Semester Total	**60**

Additional Non-Credit Bearing Modules

MILITARY THEORY AND TRAINING

MORAL CULTIVATION AND BASIC LAW

PHYSICAL EDUCATION I

SEMESTER 2

Core Modules			**Credits**
EL0005	ENGLISH FOR SPECIFIC ACADEMIC PURPOSES	15	
CH0061	INTRODUCTION TO CHEMISTRY	30	
CH0281	ADVANCED MATHEMATICS II	15	
		Semester Total	**60**

Additional Non-Credit Bearing Modules

CHINESE MODERN CONTEMPORARY HISTORY AND SITUATION POLICY

PHYSICAL EDUCATION II

SEMESTER 3

Additional Non-Credit Bearing Modules

ENGINEERING TRAINING

COLLEGE STUDENT MENTAL HEALTH AND HEALTH EDUCATION

SECOND YEAR MODULES

SEMESTER 1

Core Modules

CH1200	GENERAL CHEMISTRY	15	
CH1202	INTRODUCTORY INORGANIC CHEMISTRY	15	
CH1283	COLLEGE PHYSICS AND PRACTICAL A	15	
CH1282	ADVANCED MATHEMATICS III	15	
		Semester Total	**60**

Additional Non-Credit Bearing Modules

PRINCIPLE OF MARXISM AND THEORY OF SOCIALISM

SEMESTER 2

Core Modules			**Credits**
CH1201	INTRODUCTORY ORGANIC CHEMISTRY	15	
CH1203	INTRODUCTORY PHYSICAL CHEMISTRY	15	
CH1205	INTRODUCTORY CHEMISTRY PRACTICAL B	15	
CH1284	COLLEGE PHYSICS AND PRACTICAL B	15	
		Semester Total	**60**

Additional Non-Credit Bearing Modules

COLLEGE COMPUTING

SEMESTER 3

Additional Non-Credit Bearing Modules

COGNITION PRACTCIAL

THIRD YEAR MODULES

SEMESTER 1

Core Modules	**Credits**	
CH2200	SPECTROSCOPY THEORY AND PRACTICE	15
CH2201	ORGANIC CHEMISTRY	15
CH2204	PRACTICAL CHEMISTRY AND KEY SKILLS A	15
CH2880	PRINCIPLES OF CHEMICAL ENGINEERING AND PRACTICAL I	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 1

ENGINEERING DRAWING

SEMESTER 2

Core Modules		**Credits**
CH2202	INORGANIC CHEMISTRY	15
CH2203	PHYSICAL CHEMISTRY	15
CH2205	PRACTICAL CHEMISTRY AND KEY SKILLS B	15
CH2881	PRINCIPLES OF CHEMICAL ENGINEERING AND PRACTICAL II	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 2

ELECTROTECHNICS

SEMESTER 3

Additional Non-Credit Bearing Modules

PRODUCTION PRACTICAL

FOURTH YEAR MODULES

SEMESTER 1

Core Modules		**Credits**
CH3201	ADVANCED ORGANIC CHEMISTRY	15
CH3202	ADVANCED INORGANIC CHEMISTRY	15
CH3203	ADVANCED PHYSICAL CHEMISTRY	15
Optional Modules (ONE OF)		
CH3206	ADVANCED ANALYTICAL CHEMISTRY	15
CH3280	POLYMER CHEMISTRY AND PHYSICS	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 3

SEMESTER 2

Core Modules		**Credits**
CH3851	CHEMISTRY PROJECT (PART 1)	30
CH3852	CHEMISTRY PROJECT (PART 2)	15
Optional Modules (ONE OF)		
CH3205	METALS IN SYNTHESIS	15

CH4207	COMPUTATIONAL CHEMISTRY	15
	Semester Total	**60**

APPENDIX 2

Module Specification

Date created/amended: 08/03/2017
Last amended by: E G Hope

EL0002 English for General Academic Purposes

Year	2017/8
Level	0
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	45
Department	ELTU
Module Coordinator	James Lambert
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	
Seminars	224.00
Tutorials	1.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	225.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	450.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Speaking Test	20			0.3	
Listening Test	20			0.6	
Reading Test	20			1	
Writing Test	20			1	
Project Essay	20				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Demonstrate that they can discuss their ideas orally in English with other students and staff.	Speaking Test, Listening Test
Demonstrate that they can express themselves appropriately in writing	Project Essay, Writing Test
Demonstrate that they can use English language sources in their written and spoken assignments appropriately referenced and without plagiarism.	Project Essay, Writing Test, Listening Test
Demonstrate that they can acquire knowledge gained through research and independent study in English and apply that knowledge.	Reading Test, Writing Test, Project Essay

Demonstrate that they can choose their own aims and work outside class to achieve them.	Project Essay

Teaching and Learning Methods

Methodology

Methods:

Students will be engaged in student centred Communicative Language Teaching classroom practice which will facilitate learning and acquisition of language and language skill competencie

Students will be engaged in activities which will simulate modes of learning and assessment used in their chosen degree such as problem based learning and report writing.

-Individual contributions to open class

-Pair and small group work

-Task Based Learning situations

-Process Writing approach

Learner Training

Students will be engaged in skills and tools that will make them better language learners in and out of clas

-Analysing discourse and recognising valuable features, lexis and structures

-Managing and recording their learning

-Exploring online and paper-based resources to assist their learnin

-Peer evaluation and reflection

Loop input

Activity content will relate to the values and expectations of UK-type university stud, such as critical thinking, plagiarism and independent study.

The Language and Skills syllabus will focus on generic features of academic language, skills and study modes

The Learner Trianing syllabus will offer students opportunities to identify and acquire academic language, skills and other features specific to their chosen field of study.

Guided Independent Study: Indicative Activities

PDP journal
Contribution to online discussions
Completion of online tasks

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: 08/03/2017
Last amended by: E G Hope

UNIVERSITY OF LEICESTER

EL0005 English for Specific Academic Purposes

Year	2017/8
Level	0
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	ELTU
Module Coordinator	James Lambert
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	
Seminars	74.00
Tutorials	1.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	75.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Presentation Assessment	30			0.3	
Portfolio of Coursework	50				
Classroom Contribution	20				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Demonstrate that they can discuss techchnical and scientific ideas orally in English with other students and staff.	Classroom Contribution
Demonstrate that they can express themselves appropriately in technical and scientific writing.	Portfolio of Coursework
Demonstrate that they can use English language sources and material from other coursework in their written and spoken assignments appropriately referenced and without plagiarism.	Presentation Assessment; Portfolio of Courseworkt
Demonstrate that they can acquire knowledge gained through research and independent study in English and apply that knowledge.	Presentation Assessment; Portfolio of Course work; Classroom Contribution
Demonstrate that they can choose their own aims and work outside class to achieve them.	Presentation Assessment

Teaching and Learning Methods

Methodology
Methods:
Students will be engaged in student centred Communicative Language Teaching classroom practice which will facilitate learning and acquisition of language and language skill competencie
Students will be engaged in activities which will simulate modes of learning and assessment used in their chosen degree such as problem based learning and report writing.

-Individual contributions to open class
-Pair and small group work
-Task Based Learning situations
-Process Writing approach

Learner Training
Students will be engaged in skills and tools that will make them better language learners in and out of clas
-Analysing discourse and recognising valuable features, lexis and structures
-Managing and recording their learning
-Exploring online and paper-based resources to assist their learnin
-Peer evaluation and reflection

Loop input
Activity content will relate to the values and expectations of UK-type university stud, such as critical thinking, plagiarism and independent study.
The Language and Skills syllabus will focus on generic features of academic language, skills and study modes
The Learner Trianing syllabus will offer students opportunities to identify and acquire academic language, skills and other features specific to their chosen field of study

Guided Independent Study: Indicative Activities

PDP journal
Contribution to online discussions
Completion of online tasks

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: Eric Hope

UNIVERSITY OF LEICESTER

CH0280 Advanced Mathematics I

Year	2017/8
Level	0
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	TBA
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours Level

Student Workload	
Lectures	55.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	90.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	Percentage Split	Qualifying Mark*	Alternative Reassessment*	Examination Duration (hrs)	Due Date (DL only)*
Examination (Final)	100			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
After completing this module students should be able to: • Appreciate limit and continuous functions; the nature and operation of the monotone convergence theorem and irrational numbers; infinitesimal comparison function; the continuity of function. • Use differentiation, including differential functions, derivatives, local linear approximations, Luobida law, differential mean value and Taylor's theorem, to study the behavior of functions. • Use and apply integration, including the fundamental theorem of calculus, indefinite integrals and abnormal integrals. • Use and apply differential equations including an appreciation of the basic concept of differential equations, the elementary integral method and higher order differential equations.	Examination

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: Eric Hope

UNIVERSITY OF LEICESTER

CH0281 Advanced Mathematics II

Year	2017/8
Level	0
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	TBA
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	55.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	90.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	Percentage Split	Qualifying Mark*	Alternative Reassessment*	Examination Duration (hrs)	Due Date (DL only)*
Examination (Final)	100			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
After completing this module students should be able to: • Use and apply to the solution of problems partial differential of multivariate functions, including partial derivatives and higher order partial derivatives. • Appreciate the geometric application of partial derivatives, the extreme value of multivariate functions, directional derivatives and gradients. • Use and apply to the solution of problems total differential of multivariate functions. • Appreciate numerical integration of multivariate functions. • Appreciate the concept and properties of integral quantitative functions. • Calculate double integrals, triple points, curve and integral of value functions. • Apply quantitative value integrals in geometry and physics applications.	Examination

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended:Jan2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH0061 Introduction to Chemistry

Year	2017/8
Level	0
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	30
Department	Chemistry
Module Coordinator	t.b.a
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	60.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	35.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	205.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	300.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Examination (Final)	75			2	
Coursework	25				
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Explain the nature of atoms and molecules and the concept of isotopes, moles and stoichiometry and perform appropriate calculations.	Coursework and exam
Name simple organic molecules using IUPAC rules, and explain what is meant by regiochemistry and stereochemistry.	Coursework and exam
Draw accurate representations of orbitals, inorganic and organic molecules, including chiral molecules.	Coursework and exam
State the aims and terminology of thermodynamics, including the first and second laws, enthalpy, entropy, Gibbs energy, chemical potentials, and chemical equilibrium.	Coursework and exam
Explain the difference between exothermic and endothermic reactions and the concepts of reversible reaction and dynamic equilibrium	Coursework and exam
Define what is meant by the term oxidation state and be able to work out the oxidation state of an element in a compound	Coursework and exam

Recognise electrophiles and nucleophiles and be able to use curly arrows to depict a reaction mechanism	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1200 General Chemistry

Year	2018/9
Level	1
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Prof Davies
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	1.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	99.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Draw the shapes of atomic orbitals and show how they can combine to form molecular orbitals using appropriate schematics and energy level diagrams	Coursework and exam
Determine the shapes of covalent molecules using Valence-Shell Electron-Pair repulsion theory	Coursework and exam
Predict the Lewis acidity or basicity of a molecule and describe what a coordinate bond is	Coursework and exam
Describe chemical equilibria on both molecular and mathematical levels	Coursework and exam
Explain the principles of atomic structure, electron configuration, energy quantisation, wave particle duality and molecular orbital theory	Coursework and exam
Describe the underlying principles of spectroscopy and apply quantitative relationships (e.g. Beer-Lambert law, Rydberg equation) to analyse spectra	Coursework and exam
Draw and name organic molecules explaining their structure, shape, possible	Coursework and exam

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	Coursework and exam
Predict and rationalise IR, NMR and MS spectra for organic molecules	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1201 Introductory Organic Chemistry

Year	2018/9
Level	1
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Handa
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	4.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	96.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Recognise functional groups, anticipate their reactivity and interconversions and the reagents required for these transformations	Coursework and exam
Identify and explain the relationships between isomers and conformers of organic molecules.	Coursework and exam
Rationalise and predict reactivity based on curly arrow mechanisms and diagrams; explain how structure and bonding controls the outcome and rate of organic reactions	Coursework and exam
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	Coursework and exam
Predict and interpret spectroscopic data for organic molecules whose structures are known; deduce structures of molecules using spectroscopic and analytical data	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E Hope

UNIVERSITY OF LEICESTER

CH1202 Introductory Inorganic Chemistry

Year	2018/9
Level	1
Period	Sem 1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Lowe
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	4.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	96.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Calculate oxidation states and dn configurations for transition metal complexes and identify the common types of ligand and methods of complex preparation	Coursework and exam
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	Coursework and exam
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	Coursework and exam
Describe the inorganic chemistry of a range of main group compounds and discuss the broader applications of descriptive inorganic chemistry	Coursework and exam
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	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

Directed reading, set problems, group problem based learning, formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1203 Introductory Physical Chemistry

Year	2018/9
Level	1
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr C Evans
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	4.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	96.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
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	Coursework and exam
Describe and explain the properties of ideal and non-ideal gases including the use of virial coefficients, Maxwell distributions and collision rates	Coursework and exam
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	Coursework and exam
Perform qualitative and quantitative analyses of and solve problems involving thermodynamic and kinetic data	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1205 Introductory Chemistry Practical B

Year	2018/9
Level	1
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Lowe
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	120.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	30.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	100				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Manipulate simple laboratory equipment and glassware and hence perform a variety of basic synthetic and analytical practical procedures (either individually or as part of a larger team) in a safe manner and following good chemistry laboratory practice	Coursework
Accurately observe and record experimental details and results and appreciate the different types of errors that may occur and how to deal with them	Coursework
Interpret experimental data and report the findings in a concise written report	Coursework
Prepare, separate and purify compounds using different techniques including recrystallisation, distillation and tlc; characterise and identify these compounds using a variety of analytical and spectroscopic methods	Coursework
Employ a range of analytical techniques to determine important thermodynamic, kinetic and spectroscopic properties of systems, solutions and reactions	Coursework

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations.

Nb Students must pass this module, for which there are no opportunities for reassessment, and which cannot be carried into the subsequent year. This module has an additional attendance requirement wherein students may not be absent for more than 25% of the schedule laboratory classes. Additional “catch-up” sessions will be provided for students for whom non-attendance has been mitigated.

Guided Independent Study: Indicative Activities

Directed reading, pre-lab exercises, online video demonstrations and simulations.

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: Eric Hope

UNIVERSITY OF LEICESTER

CH1282 Advanced Mathematics III

Year	2018/19
Level	1
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr S Yang
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours Level

Student Workload	
Lectures	55.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	90.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	Percentage Split	Qualifying Mark*	Alternative Reassessment*	Examination Duration (hrs)	Due Date (DL only)*
Examination (Final)	100			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
After completing this module students should be able to: • Use and apply vector algebra, spatial analytical geometry, vector operations, vector coordinates as applied to straight lines, curves, surfaces and space planes. • Use and apply curve integrals, surface integrals of vectors. • Use and apply integral of vector valued functions on directional curves and directional surfaces. • Appreciate the relationship between the integral, curve integral and surface integral. • Use and apply path-independence of plane curve integrals. • Use and apply infinite series, the discrimination between convergence and divergence of positive and arbitrary series, power series and Fourier series.	Examination

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1283 College Physics and Practical A

Year	2018/9
Level	1
Period	Sem 1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	t.b.a.
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	42.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	15.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	93.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	40				
Examination (Final)	60			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of physics practical procedures (either individually or as part of a larger team) in a safe manner and following good physics laboratory practice	Coursework
Be able to record and interpret data, and present the data in an appropriate format	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework
Explain the principles of some of, particle motion, Newton's law of motion and centroid motion theorem, momentum theorem and momentum conservation law, angular momentum theorem and conservation of angular momentum, functional principle and conservation law of mechanical energy, rigid body movement and law, compound movement, simple harmonic vibration, damping vibration and forced vibration.	Coursework and exam
Explain the principles of some physical theories, such as wave theories, Huygens principle and the Doppler effect.	Coursework and exam

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, example problem group problem solving classes & VLE directed activities

Guided Independent Study: Indicative Activities

Directed reading, set problems, pre-lab exercises, online video demonstrations and simulations. group problem solving exercises, formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH1284 College Physics and Practical B

Year	2018/9
Level	1
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	t.b.a.
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	42.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	15.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	93.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	40				
Examination (Final)	60			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of physics practical procedures (either individually or as part of a larger team) in a safe manner and following good physics laboratory practice	Coursework
Be able to record and interpret data, and present the data in an appropriate format	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework
Explain the principles of some of, magnetism, ferromagnetism, electromagnetism, Maxwell's equations, optics and thin lens imaging, interference and diffraction, Huygens-Fresnel principle and the scattering and absorption of light.	Coursework and exam
Be able to apply Schrodinger's Equation, the Compton effect and microscopic particle volatility, probability wave and probability amplitude, and the basic principles of quantum, nuclear and particle physics.	Coursework and exam

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, example problem group problem solving classes & VLE directed activities

Guided Independent Study: Indicative Activities

Directed reading, set problems, pre-lab exercises, online video demonstrations and simulations. group problem solving exercises, formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2200 Spectroscopy Theory & Practice

Year	2019/20
Level	2
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Prof Ellis
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	3.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	4.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	98.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Identify and explain at a quantum level the nature of the transitions induced when specific wavelengths of electromagnetic radiation interact with molecules	Coursework and exam
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	Coursework and exam
Analyse molecular spectroscopic data and conduct calculations relating to the properties of molecules	Coursework and exam
To choose appropriate physical methods to solve chemical identification and characterisation problems	Coursework and exam
Recognise elements of symmetry and use these to determine point groups of molecules; use this analysis to predict vibrational spectra	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2201 Organic Chemistry

Year	2019/20
Level	2
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Stuart
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	3.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	4.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	98.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Explain how carbon-carbon bonds can be formed from carbanions and electrophilic molecules and how this chemistry can be used in retrosynthetic analysis and for the synthesis of organic molecules	Coursework and exam
Discuss the structure and reactivity of amino acids and the application of this chemistry for the synthesis and structure determination of peptides	Coursework and exam
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	Coursework and exam
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	Coursework and exam
Rationalise and predict reactivity based on curly arrow mechanisms and diagrams; explain how structure and bonding controls the outcome and selectivity of organic	Coursework and exam

reactions	

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2202 Inorganic Chemistry

Year	2019/20
Level	2
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Solan
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	3.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	4.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	98.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
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	Coursework and exam
Describe inorganic reactions in terms of the basic reaction types: substitution, oxidative addition, migratory insertion, reductive elimination, salt elimination	Coursework and exam
Be able to use spectroscopic (IR, NMR and Mass Spectrometry) microanalytical data and structural methods in the characterisation of organometallic species.	Coursework and exam
Apply the concepts of chemical kinetics to inorganic chemistry including making connections between the kinetics of a process and the mechanism of a reaction	Coursework and exam
Appreciate the importance of inorganic chemistry in catalysis and describe the mechanistic steps in a number of industrially important catalytic cycles	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E.Hope

UNIVERSITY OF LEICESTER

CH2203 Physical Chemistry

Year	2019/20
Level	2
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Evans
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	45.00
Seminars	
Tutorials	3.00
Project Supervision	
Demonstration	
Practical Classes and Workshops	4.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	98.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Describe the thermodynamics of solution formation. Distinguish the different ways a species can be transported through a solution. Explain the factors that affect ion migration and diffusion	Coursework and exam
Describe what a colloid is and how gravitational and Brownian motion control colloidal stability. Explain how different techniques are used to determine the size and shape of colloidal particles. Discuss the formation of electric double layer around charged surfaces and describe the interplay between the attractive and repulsive interactions between colloidal particles	Coursework and exam
Know the principles of collision theory and transition state theory. Describe the different methods use in the determination of reaction rates in fast reactions. Discuss the different variety of reactions and their associated mechanisms	Coursework and exam
Describe how the kinetics of chemical reactions are influence by homogenous and heterogeneous catalysts. Discuss the mechanisms associated with homogenous and	Coursework and exam

heterogeneous catalytic processes. Describe different techniques used to monitor and model catalytic processes	
Perform qualitative and quantitative analyses of and solve problems involving the movement of charged and neutral species in solutions and kinetic data	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E.Hope

UNIVERSITY OF LEICESTER

CH2204 Practical Chemistry & key skills – Part A

Year	2019/20
Level	2
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Prof Davies
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	1.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	96.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	53.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	100				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of analytical and computational practical procedures (either individually or as part of a larger team) in a safe manner and following good chemistry laboratory practice	Coursework
Determine the most appropriate methods for the separation and purification of components of a mixture of chemicals; carry out these procedures (including extraction, distillation and tlc and column chromatography) to isolate pure compounds from mixtures	Coursework
Be able to record and interpret data from a variety of analytical and spectroscopic techniques including UV-visible, AA, IR and MS and present the data in an appropriate format	Coursework
Employ a range of analytical techniques to determine important thermodynamic, kinetic and spectroscopic properties of systems, solutions and reactions; assess potential sources of errors in these techniques and calculate the errors associated with the final measurement	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, group problem solving & VLE directed activities

Nb Students must pass this module, for which there are no opportunities for reassessment, and which cannot be carried into the subsequent year. This module has an additional attendance requirement wherein students may not be absent for more than 25% of the schedule laboratory classes. Additional “catch-up” sessions will be provided for students for whom non-attendance has been mitigated.

Guided Independent Study: Indicative Activities

Directed reading, pre-lab exercises, online video demonstrations and simulations.

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2205 Practical Chemistry & key skills – Part B

Year	2019/20
Level	2
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Blackburn
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours level

Student Workload	
Lectures	1.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	96.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	53.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	100				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of intermediate synthetic, analytical and computational practical procedures (either individually or as part of a larger team) in a safe manner and following good chemistry laboratory practice	Coursework
Prepare and purify a variety of organic and inorganic compounds using single or multi-step synthetic procedures; characterise and identify the products from these syntheses using appropriate spectroscopic techniques	Coursework
Employ a range of analytical techniques to determine important thermodynamic, kinetic and spectroscopic properties of systems, solutions and reactions; assess potential sources of errors in these techniques and calculate the errors associated with the final measurement	Coursework
Conduct a series of related measurements to solve a practical problem and write up an extended report of their findings	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, group problem solving & VLE directed activities.

Nb Students must pass this module, for which there are no opportunities for reassessment, and which cannot be carried into the subsequent year. This module has an additional attendance requirement wherein students may not be absent for more than 25% of the schedule laboratory classes. Additional "catch-up" sessions will be provided for students for whom non-attendance has been mitigated.

Guided Independent Study: Indicative Activities

Directed reading, pre-lab exercises, online video demonstrations and simulations.

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2880 Principles of Chemical Engineering and Practical I

Year	2019/20
Level	2
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	t.b.a.
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours Level

Student Workload	
Lectures	42.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	15.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	93.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Coursework	50				
Examination (Final)	50			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of chemical engineering practical procedures (either individually or as part of a larger team) in a safe manner and following good chemistry laboratory practice	Coursework
Be able to record and interpret data from a variety of analytical and physical techniques and present the data in an appropriate format	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework
Explain the principles of some of fluid flow, fluidization, settlement, hydrodynamics, evaporation and heat transfer, and describe how these techniques can be used.	Coursework and Exam
Describe the key components of fluid delivery, heat-exchanger, evaporation and fluidization equipment.	Coursework and Exam
Perform qualitative and quantitative analyses of and solve problems involving some of hydrodynamics, heat transfer, evaporation and separation.	Coursework and Exam

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, example problems, group problem solving classes & VLE directed activities

Guided Independent Study: Indicative Activities

Directed reading, set problems, pre-lab exercises, online video demonstrations and simulations.group problem solving exercises, formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH2881 Principles of Chemical Engineering and Practical II

Year	2019/20
Level	2
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	t.b.a.
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours Level

Student Workload	
Lectures	44.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	16.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	90.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Coursework	40				
PBL exercise and oral presentation	10				
Examination (Final)	50			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Plan and perform a variety of chemical engineering practical procedures (either individually or as part of a larger team) in a safe manner and following good chemistry laboratory practice	Coursework
Be able to record and interpret data from a variety of analytical and physical techniques and present the data in an appropriate format	Coursework
Accurately observe and record experimental details and results; subsequently interpret this information and present their findings in a professional format	Coursework
Explain the principles of some of distillation, absorption, liquid-liquid extraction, drying and membrane separation, and describe how these techniques can be used.	Coursework and Exam
Describe the key components of gas-liquid mass transfer, liquid-liquid extraction, distillation, and membrane-separation equipment.	Coursework and Exam
Perform qualitative and quantitative analyses of and solve problems involving some of distillation, absorption, extraction, drying and separation.	Coursework and Exam

Teaching and Learning Methods

Lectures, pre-lab exercises, supervised practical work supported by demonstrations and experimental simulations, example problems, group problem solving classes, problem-based learning exercise & VLE directed activities

Guided Independent Study: Indicative Activities

Directed reading, set problems, pre-lab exercises, online video demonstrations and simulations.group problem solving exercises, formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3201 Advanced Organic Chemistry

Year	2020/1
Level	3
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Handa
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2.5	
Examination (Final)	100		Yes	2.5	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Appreciate the importance of spectroscopy (particularly NMR and MS) in the determination of the structure and shape of organic compounds. Interpret or predict NMR, MS and IR data, and hence determine the full structure, including stereochemistry, of organic molecules.	Coursework and exam
Recognise and be able to classify the principal types of pericyclic reaction.	Exam
Appreciate how the mechanism relates to the selectivity of such pericyclic reactions and why thermally and photochemically-activated molecules frequently exhibit contrasting selectivity. Use this knowledge to predict the outcome of unseen reactions.	Exam
Know and understand how radicals and carbenes can be generated and the types and mechanisms of reaction that they most commonly exhibit. Use this information to predict the outcome of unseen reactions.	Exam

Appreciate how the reactivity of transient species can be investigated, and recognise the advantages and limitations of the high reactivity of transient intermediates.	Exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3202 Advanced Inorganic Chemistry

Year	2020/1
Level	3
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Solan
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2.5	
Examination (Final)	100		Yes	2.5	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Appreciate how the understanding of basic and advanced topics in inorganic chemistry, and appropriate physical methods can be applied to solve unseen inorganic chemical problems.	Coursework and exam
Recognise what information can be obtained from each physical technique, appreciating the significance/relevance of the data available from each technique to inform interpretation of the data and be able to select which technique is most appropriate for a given situation.	Coursework and exam
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.	Exam
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	Exam

biodegradable polymers like polylactide and polycaprolactone).	

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3203 Advanced Physical Chemistry

Year	2020/1
Level	3
Period	Sem1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Ball
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2.5	
Examination (Final)	100		Yes	2.5	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Appreciate the mutual reliance of theory, statistical methods and spectroscopy.	Coursework and exam
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.	Coursework and exam
Use molecular orbital (MO) theory to construct molecular orbitals from a linear combination of atomic orbitals (LCAO approximation).	Coursework and exam
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	Coursework and exam
Implement Hückel theory to calculate the properties of π-bonded molecules and aromatic organic compounds.	Coursework and exam
Classify the various forms of molecular motion in terms of separation of their quantum mechanical energy levels	Coursework and exam

Evaluate partition functions for a variety of simple chemical systems; use partition functions to calculate bulk thermodynamic properties of the system.	Coursework and exam
Explain key processes in the interaction between light and matter; use the information content of spectroscopic lines to infer properties of the molecule; identify the symmetry of energy levels and hence establish whether the transition is allowed or forbidden.	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3205 Metals in Synthesis

Year	2020/1
Level	3
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Prof Davies
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2.5	
Examination (Final)	100		Yes	2.5	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Appreciate the concepts of regioselectivity, diastereoselectivity and enantioselectivity.	Coursework and exam
Appreciate the important features of the use of transition and main group elements in stoichiometric and catalytic organic synthesis. Use this information to predict the outcome of unseen reactions.	Coursework and exam
Discuss the important features of the synthetic chemistry of silicon, selenium, lithium, boron and aluminium.	Coursework and exam
Explain what is catalysis and the effect of a catalyst on the free energy of a reaction. Define turnover frequency and turnover number.	Coursework and exam
Discuss in detail specific examples of transition metal catalysed processes, including asymmetric catalysis, information on their mechanisms and key reaction steps,	Coursework and exam
Explain how spectroscopy, kinetics and labelling studies can be used to help elucidate reaction mechanisms.	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3206 Advanced Analytical Chemistry

Year	2020/1
Level	3
Period	Sem 1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Prof Hillman
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	5.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2.5	
Examination (Final)	100		Yes	2.5	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Be able to discuss the principles underlying modern analytical techniques. Be familiar with the fundamentals and applications of these techniques. Use this information to analyse and interpret data for the solution of unseen problems in analytical chemistry.	Coursework and exam
Have an appreciation of the methods of analytical chemistry at interfaces.	Coursework and exam
Appreciate the relevance of sensitivity and selectivity to choice of an analytical method for a specific application.	Coursework and exam
Explain how to select and apply techniques to obtain the best results in a variety of situations. Have insight into the nature, mechanism and dynamics of a range of interfacial physical and chemical processes.	Coursework and exam
Recognise the nature of the interaction between surfaces and the environment to which they are exposed.	Coursework and exam
Explain how interfacial structure may be experimentally determined and simulated.	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan2017
Last amended by: Z. Tan

UNIVERSITY OF LEICESTER

CH3280 Polymer Chemistry and Physics

Year	2020/1
Level	3
Period	Sem 1
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	tba
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	45.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	10.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	95.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Coursework	25				
Examination (Final)	75			2	
Examination (Final)	100		Yes	2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Appreciate the mechanisms of polymerizations including condensation polymerization, free radical polymerization and ionic polymerization. Use this information to predict the outcome of unseen polymerisations.	Coursework and exam
Appreciate both the structure of polymer chains and the aggregation structure of polymers, and the physical techniques used in their evaluation.	Coursework and exam
Appreciate the mechanical properties of polymers, the rheological properties of polymer melts, and how polymer materials are processed.	Coursework and exam
Appreciate the properties of polymer solutions and the chemical reactions of polymers. Use this information to predict the outcome of unseen interactions and reactions.	Coursework and exam

Discuss in detail the synthesis, properties and functions of specific examples of “new” polymer materials such as the functional polymers, biological macromolecules, biomedical polymer materials, and environmentally friendly polymers.	Coursework and exam

Teaching and Learning Methods

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

Guided Independent Study: Indicative Activities

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

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3851 Chemistry Research Project Part 1

Year	2020/1
Level	3
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	30
Department	Chemistry
Module Coordinator	Dr Solan
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	5.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	290.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	5.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	300.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Experimental/Practical Work	100				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Be able to plan a research project, setting shorter and longer term goals. Organise work efficiently.	Experimental/Practical Work
Use appropriate resources, including computer databases to find out information about a particular area of research. Use this information to synthesize and contextualize ideas from this research and apply them to their practical work.	Experimental/Practical Work
Consolidate knowledge of fundamental chemical principles introduced in levels 1, 2 & 3, and be able to apply these fundamental principles to genuine, complex, chemical problems.	Experimental/Practical Work
Carry out a piece of scientific research using appropriate techniques, and analyse the results obtained.	Experimental/Practical Work
Keep a clear and accurate record of work.	Experimental/Practical Work
Assess the safety issues of the work they are doing.	Experimental/Practical Work

Teaching and Learning Methods

Lectures, practical classes with appropriate demonstration, individual supervision.

Guided Independent Study: Indicative Activities

Directed reading.

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Jan 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH3852 Chemistry Research Project Part 2

Year	2020/1
Level	3
Period	Sem2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Solan
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Pass for Credit

Student Workload	
Lectures	
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	50.00
Supervised time in lab/studio/workshop	
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	100.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Sp**	**Qualifying Ma**	**Alternative Reassessment***	**Examination D (hrs)**	**Due Date** (DL only)*
Project report; Oral Examination; Presentation	100				

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Be able to plan a research project, setting shorter and longer term goals. Organise work efficiently.	Project Report
Use appropriate resources, including computer databases to find out information about a particular area of research.	Project Report
Consolidate knowledge of fundamental chemical principles introduced in levels 1, 2 & 3, and be able to apply these fundamental principles to genuine, complex, chemical problems.	Project Report
Carry out a piece of scientific research using appropriate techniques, and analyse the results obtained.	Project Report
Keep a clear and accurate record of work.	Project Report
Assess the safety issues of the work they are doing.	Project Report
Record, analyse and present data in an appropriate formats	Project Report
Be able to research relevant primary scientific literature, synthesize and contextualize ideas from this research. Present a report, including insight and analysis as appropriate, on this research.	Project Report

Give an oral presentation of their work and answer questions orally on topics relating to their project.	Oral Presentation; Oral Examination

Teaching and Learning Methods

Practical classes with appropriate demonstration, individual supervision.

Guided Independent Study: Indicative Activities

Directed reading.

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

Module Specification

Date created/amended: Mar 2017
Last amended by: E. Hope

UNIVERSITY OF LEICESTER

CH4207 Computational Chemistry

Year	2020/1
Level	3
Period	Sem 2
Occurrence	P
Spanning Years Y/N?	N
Credits	15
Department	Chemistry
Module Coordinator	Dr Yang
Pre-requisites*	
Co-requisites*	
Excluded combinations*	
Module Mark Scheme	Undergraduate
Minimum Assessment Level (UG only)	Honours Level

Student Workload	
Lectures	30.00
Seminars	
Tutorials	
Project Supervision	
Demonstration	
Practical Classes and Workshops	
Supervised time in lab/studio/workshop	4.00
Fieldwork	
External Visits	
Work Based Learning	
Guided Independent Study	116.00
Placement	
Year Abroad	
TOTAL MODULE HOURS	150.00

Assessment Element	**Percentage Split**	**Qualifying Mark***	**Alternative Reassessment***	**Examination Duration (hrs)**	**Due Date** (DL only)*
Coursework	50				
Examination (Final)	50			2	

Mapping of Intended Learning Outcomes, including transferable skills, against Assessment Methods

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

Intended Learning Outcome	How Assessed
Explain the physical principles behind the major simulation techniques such as *ab initio* quantum chemistry, molecular dynamic & Monte Carlo procedures	Coursework and Exam
Use appropriate software utilising the above methods to predict properties in individual molecules and molecular assemblies; critically assessing the strengths and limitations of such simulations	Coursework and Exam
Write short computational routines to determine physical quantities where appropriate.	Coursework and Exam
Apply knowledge of the above techniques to solve unseen chemical problems	Coursework and Exam
Present data from computational simulations in a clear and concise way.	Coursework and Exam

Teaching and Learning Methods

Lectures, set texts, web-based material, illustrations of software packages, example problems.

Guided Independent Study: Indicative Activities

Directed reading, set problems, pre-lab exercises, online video demonstrations and simulations.group problem solving exercises,

formative quizzes

*** INDICATES AN OPTIONAL FIELD, ALL OTHER FIELDS MUST BE COMPLETED**

APPENDIX 3

Programme Specification Appendix 3

Skills Matrix: F100 Chemistry

Date amended: 17th May 2017

Programme Learning Outcomes	English for General Academic Purposes	English for Specific Academic Purposes	Foundation Chemistry	Adv Maths I	Adv Maths II	General Chemistry	Introductory Organic Chemistry	Introductory Inorganic Chemistry	Introductory Physical Chemistry	Introductory Chemistry Practical B	Adv Maths III	College Physics and Practical A	College Physics and Practical B	Spectroscopy Theory and Practice	Organic Chemistry	Inorganic Chemistry	Physical Chemistry	Chemistry Practical I	Chemistry Practical II	Principles of Chemical Engineering and Practical I	Principles of Chemical Engineering and Practical II	Advanced Organic Chemistry	Advanced Inorganic Chemistry	Advanced Physical Chemistry	Advanced Analytical Chemistry	Polymer Chemistry and Physics	Metals in Organic Synthesis	Computational Chemistry	Final Year Project I	Final Year Project III
	EL0001	EL0005	CH0061	CH1280	CH1281	CH1200	CH1201	CH1202	CH1203	CH1205	CH1282	CH1283	CH1284	CH2200	CH2201	CH2202	CH2203	CH2204	CH2205	CH2880	CH2881	CH3201	CH3202	CH3203	CH3206	CH3280	CH3205	CH4207	CH3281	CH3282
(a) Discipline specific knowledge and competencies																														
(i) Mastery of an appropriate body of knowledge																														
Recall and apply basic chemistry theory across all three main areas of chemistry and related mathematics				X	X						X									X	X									
Solve structured model problems			X	X	X	X	X	X	X		X	X	X	X	X	X	X			X	X									
Solve unseeen model problems																				X		X	X	X	X	X	X	X		
Conduct experiments and apply practical techniques										X		X	X					X	X		X								X	
Advanced knowledge of selected areas of organic chemistry																						X				X	X			
Advanced knowledge of selected areas of inorganic chemistry																							X				X			
Advanced knowledge of selected areas of physical chemistry																					X			X		X		X		
Advanced knowledge of selected areas of analytical chemistry																					X				X					
(ii) Understanding and application of key concepts and techniques																														
Apply chemical concepts in new situations			X			X	X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
Apply logic and chemical knowledge to make deductions based on (limited) evidence														X	X	X	X	X	X	X	X	X	X	X	X		X		X	X
Design, construct and undertake experiments																			X		X								X	
Demonstrate professional use of standard equipment and knowledge of safety procedures										X		X	X					X	X	X	X								X	
(iii) Critical analysis of key issues																														
Critically appraise physical and chemical information														X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Summarise key findings of scientific papers.		X																												X
Draw quantitative conclusions from sample data									X	X		X	X	X		X	X	X	X	X	X		X	X	X			X	X	X
Critically assess and compare scientific theories																					X	X	X	X	X	X	X	X	X	X
(iv) Clear and concise presentation of material																														
Present scientific ideas, data and results in appropriate formats										X		X	X					X	X	X	X	X	X	X	X	X	X	X		X
Use chemical software, e.g. drawing, molecular modelling;			X							X								X	X		X	X						X		X
Participate in scientific discussion and debate.																												X		X
(v) Critical appraisal of evidence with appropriate insight																														
Discuss and implement experimental methodology										X		X	X					X	X	X	X								X	
Collect and critically analyse data;										X		X	X					X	X	X	X								X	
Draw valid inferences from data																		X	X	X	X	X	X	X	X	X	X	X	X	X
Interrogate and discuss scientific literature.															X	X	X	X	X			X	X	X	X	X	X	X	X	X
(vi) Other discipline specific competencies																														
Respond to questioning	X	X																												X
Give a short seminar.	X	X																												X

Programme Learning Outcomes (b) Transferable skills	English for General Academic Purposes EL0001	English for Specific Academic Purposes EL0005	Foundation Chemistry CH0061	Adv Maths I CH1280	Adv Maths II CH1281	General Chemistry CH1200	Introductory Organic Chemistry CH1201	Introductory Inorganic Chemistry CH1202	Introductory Physical Chemistry CH1203	Introductory Chemistry Practical B CH1205	Adv Maths III CH1282	College Physics and Practical A CH1283	College Physics and Practical B CH1284	Spectroscopy Theory and Practice CH2200	Organic Chemistry CH2201	Inorganic Chemistry CH2202	Physical Chemistry CH2203	Chemistry Practical I CH2204	Chemistry Practical II CH2205	Principles of Chemical Engineering and Practical I CH2880	Principles of Chemical Engineering and Practical II CH2881	Advanced Organic Chemistry CH3201	Advanced Inorganic Chemistry CH3202	Advanced Physical Chemistry CH3203	Advanced Analytical Chemistry CH3206	Polymer Chemistry and Physics CH3280	Metals in Organic Synthesis CH3205	Computational Chemistry CH4207	Final Year Project I CH3281	Final Year Project III CH3282
(i) Oral communication																															
Give reasoned arguments in response to chemical questions																			X										X		X
Give a short seminar on a chemical topic																			X										X		X
(ii) Written communication																															
Write abstracts, tutorial and problem class work, lab notebooks, lab reports and project dissertation		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Communicate scientifically		X								X								X	X											X
(iii) Information technology																															
Use mathematical packages for data analysis				X	X					X	X	X	X					X	X	X	X									X	X
Use spreadsheets, presentation and word processing facilities				X	X					X		X	X					X	X	X	X										
Use of scientific software packages, e.g. drawing or molecular modelling										X										X	X										X
(iv) Numeracy																															
Use analytical and graphical methods				X	X						X	X	X					X	X	X	X								X		
Analyse data			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Solve numerical problems				X	X						X	X	X	X				X	X	X	X	X			X						
Use calculus in Chemistry				X	X													X	X	X	X	X			X						
(v) Team working																															
Discuss concepts and formulate plans working with peers; organize time and tasks; produce joint reports/presentations; recognize individual strengths.	X	X					X	X	X										X										X	
(vi) Problem solving																															
Apply knowledge	X	X										X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Analyse and solve familiar and unfamiliar problems			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Plan and implement laboratory work and projects.										X		X	X					X	X	X	X									X	
(vii) Information handling																															
Describe and discuss the scientific method	X	X																													X
Gather, retrieve and manipulate chemical evidence and information from a variety of sources			X											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Use electronic scientific databases																								X						X	X
(viii) Skills for lifelong learning																															
Demonstrate understanding of the professional responsibilities of a chemist										X								X	X	X	X									X	
Develop their study and time management skills	X	X												X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Learn independently																					X	X	X	X	X	X	X	X	X	X	X
Access and search scholarly articles and databases	X	X													X	X	X	X	X			X	X	X	X	X		X	X	X	X
Analyse data			X							X		X	X					X	X		X	X	X	X	X	X	X	X	X	X	X
Plan and implement group and individual activities.	X	X																	X										X	X	X