Chemistry Department Undergraduate Level 4

Course Handbook

2016 - 2017

- Chemistry (USA/Industry/EU)
- Chemistry with Forensic Science (USA/Industry/EU)
- Pharmaceutical Chemistry (Industry)
Table of Contents

Calendar 2016 - 2017.................................................................................................................................................... 5
Welcome Back from the Head of Department.............................................................. 6
Introduction................................................................................................................................................................ 6
Department Details .................................................................................................................................................... 7
Research in the Department of Chemistry................................................................. 7
Departmental Communications .................................................................................. 8
Staff List and Key Contacts ...................................................................................... 8
Staff Directory.............................................................................................................. 9
Student Communications and Personal Details ..................................................... 11
Information on the Web............................................................................................ 11
Department Facilities ............................................................................................... 11
Learn at Leicester .................................................................................................... 13
University Library..................................................................................................... 13
IT Services................................................................................................................ 14
Student Learning Development.................................................................................. 14
Students’ Union Education Unit (ED)....................................................................... 14
Learn a New Language with Languages at Leicester ............................................. 15
Other University Facilities....................................................................................... 15
University Regulations............................................................................................ 15
Student Responsibilities ......................................................................................... 16
Attendance and Engagement Requirements............................................................ 16
Neglect of Academic Obligations............................................................................. 16
Examination Regulations......................................................................................... 17
Degree Programmes and Module Information....................................................... 18
Programme and Module Specifications .................................................................... 18
Attendance Requirements......................................................................................... 18
Coursework Submission............................................................................................ 19
Change of Module.................................................................................................... 19
Marking and Assessment Practices.......................................................................... 19
Feedback and the Return of Work from Staff........................................................ 20
Progression and Classification of Awards............................................................... 20
Referencing and Academic Integrity........................................................................ 21
What we mean by ‘plagiarism’, ‘self-plagiarism’ and ‘collusion’............................ 21
Resources and advice to help you study with integrity and avoid committing plagiarism... 21
Referencing style..................................................................................................... 22
Mitigating Circumstances......................................................................................... 22
Module CH4207 Computational Chemistry ................................................................. 46
Module CH4208 Bioinorganic Chemistry .................................................................. 47
Module CH4209 Nanotechnology .............................................................................. 48
Module CH4212 Advanced Forensic Science ........................................................... 49
Module CH4251/2/3 Chemistry Project Parts 1, 2 & 3 .............................................. 51
Calendar 2016 - 2017

Semester 1: 26 September – 20 January 2017

September
- Monday 26th WEEK 1 Autumn Term & 1st Semester begins

October
- Monday 3rd WEEK 2
- Monday 10th WEEK 3
- Monday 17th WEEK 4
- Monday 24th WEEK 5
- Monday 31st WEEK 6

November
- Monday 7th WEEK 7
- Monday 14th WEEK 8
- Monday 21st WEEK 9
- Monday 28th WEEK 10

December
- Monday 5th WEEK 11 Autumn Term ends Friday 9th December

CHRISTMAS VACATION (4 weeks)

January
- Monday 9th WEEK 12 Spring Term and Exams begin
- Monday 16th WEEK 13 Exams end Friday 20th January

Semester 2: 23 January 2017 – 23 June 2017

January
- Monday 23rd WEEK 14 Semester 2 begins
- Monday 30th WEEK 15

February
- Monday 6th WEEK 16
- Monday 13th WEEK 17
- Monday 20th WEEK 18
- Monday 27th WEEK 19

March
- Monday 6th WEEK 20
- Monday 13th WEEK 21
- Monday 20th WEEK 22 Spring Term ends Friday 24th March

EASTER VACATION (5 weeks)

May
- Monday 1st WEEK 23 Summer Term begins*
- Monday 8th WEEK 24 Revision Week
- Monday 15th WEEK 25 Exams begin Monday 15th May
- Monday 22nd WEEK 26
- Monday 29th WEEK 27 Exams end Friday 2nd June

June
- Monday 5th WEEK 28
- Monday 12th WEEK 29
- Monday 19th WEEK 30 Summer Term ends Friday 23rd June

August/September
- Monday 4th WEEK 31 Resit Exams begin Monday 4th September
- Resit Exams end Saturday 9th September

[For those students who did not pass their modules and have to resit/sit the failed modules in September]

TERM DATES AT A GLANCE

Autumn Term: 26 September 2016 – 9 December 2016
Spring Term: 9 January 2017 – 24 March 2017
Summer Term: 1 May 2017* – 23 June 2017

* Summer term officially starts on Bank Holiday Monday, teaching starts on the Tuesday following the Bank Holiday
Welcome Back from the Head of Department

Welcome back and well done in having made it all of the way to level 4! You are now entering the final year of your undergraduate studies and it is my sincere hope that you have a successful and enjoyable final year. You are now chemists of considerable stature and you should approach the year ahead with confidence.

This handbook provides the usual mixture of information about the modules available in level 4 along with more general information on the course structure, regulations, and our expectations of you. You will be familiar with much of the general information from previous handbooks but it is a good idea to look through this handbook and refresh your memory. You will of course also want to see what topics are included in the level 4 modules and how these will be assessed.

A considerable proportion of the marks that will contribute to your overall degree score and classification have already been determined but there is still much to play for in level 4. You will meet some very advanced topics in the lecture modules. You will also have the opportunity to participate in a major research project. Many students find the project a highlight of their degree course and you should throw yourself into the project with gusto. However, you must also find sufficient time to work on the other aspects of your course if you wish to score highly in level 4. Getting that balance right is crucial.

Good luck for the new academic year!

Professor Andrew M. Ellis
Head of Department

Introduction

This handbook has been written to provide information to all our undergraduate students. It aims not only to explain the workings of the Department but also to provide information that you will require throughout your degree programme. Its contents will:

- outline the structure and organisation of the Department;
- advise on study skills and written work;
- explain our teaching and assessment methods;
- outline our programme structures and module content;
- advise on the aims and objectives of each degree programme;
- offer information on support services for students.

Further information will be provided for you at appropriate times during your studies. In the meantime, we would be pleased to receive your suggestions and ideas for topics that might be included in this handbook in future by e-mail to chemadmin@le.ac.uk
Department Details

The Department of Chemistry at the University of Leicester is recognised both internationally for its research and its excellence in teaching. We have invested in modern, state-of-the-art facilities for carrying out agenda setting research and for the provision of high quality undergraduate teaching.

With substantial funding for industrial and government sponsored research, our research interests are multidisciplinary, focussing on diverse topics such as biological chemistry, green chemistry, atmospheric chemistry and laser spectroscopy.

This research ranges from fundamental cutting-edge work on bio-inspired nanomaterials to global studies of chemicals and their effect on climate change. Recent research work has led to the formation of "spin-out" companies and three purpose built demonstrator units to display our technology to industry.

The Department is a friendly and supportive environment in which to both study and carry out research and consistently we have been rated very highly in the National Student Satisfaction Survey (95% overall satisfaction in the 2016 survey).

We offer a range of three and four year courses that reflect the modern needs for chemistry in industry and society and all BSc and MChem Chemistry degree programmes have full accreditation from the Royal Society of Chemistry.

What sets us apart from other departments is our dedication to providing student-focussed, multi-media learning methods to ensure high quality modern teaching. The result is that our graduates are equipped with both the specialist chemistry knowledge and a host of important transferable skills highly valued by employers.

Research in the Department of Chemistry

The academic and teaching staff of the Department are researchers as well as teachers. In addition to teaching the discipline of Chemistry to students at the undergraduate and postgraduate levels, they actively contribute to the development and dissemination of new ideas in Chemistry.

The close relationship between teaching and research is one of the great advantages of studying at University. You will come into contact with staff who are actively engaged in the subject – not just teaching it as a fixed body of knowledge.

Members of the Department of Chemistry at Leicester are active in many different research areas. With substantial funding from government and industrial sponsors, our research interests are multidisciplinary and diverse, which enables the Department to offer a wide choice of topics for undergraduate research projects.

Full details can be found at: http://www2.le.ac.uk/departments/chemistry/research
# Departmental Communications

## Staff List and Key Contacts

As well as administrative staff and your personal tutor you may need to contact other staff members if you have a specific query. Please e-mail them at the below e-mail address with your query or to book an appointment with them.

<table>
<thead>
<tr>
<th>Head of Department (HoD)</th>
<th>Prof. Andrew Ellis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programme Co-ordinators and Tutors</strong></td>
<td></td>
</tr>
<tr>
<td>Chemistry (USA/Ind/EU)</td>
<td>Dr Sandeep Handa</td>
</tr>
<tr>
<td>Chemistry with Forensic Science (USA/Ind/EU)</td>
<td>Prof. Rob Hillman</td>
</tr>
<tr>
<td>Pharmaceutical Chemistry (Ind)</td>
<td>Dr Sandeep Handa</td>
</tr>
<tr>
<td>Erasmus Co-ordinator</td>
<td>Dr Antonio Guerreiro/Dr Sandeep Handa</td>
</tr>
<tr>
<td>Level 1</td>
<td>Dr Mark Lowe</td>
</tr>
<tr>
<td>Level 2</td>
<td>Dr Dylan Williams</td>
</tr>
<tr>
<td>Level 3</td>
<td>Dr Greg Solan</td>
</tr>
<tr>
<td>Level 4</td>
<td>Dr Sandeep Handa</td>
</tr>
<tr>
<td><strong>Officers &amp; Tutors</strong></td>
<td></td>
</tr>
<tr>
<td>Careers Tutor &amp; Personal Development Plan Co-ordinator</td>
<td>Dr Kal Karim</td>
</tr>
<tr>
<td>Special Needs Tutor (AccessAbility)</td>
<td>Prof. Paul Cullis</td>
</tr>
<tr>
<td>Director of MSc Postgraduate Admissions</td>
<td>Prof. Eric Hope</td>
</tr>
<tr>
<td>Senior Tutor</td>
<td>Prof. Andy Abbott</td>
</tr>
<tr>
<td>Head of Teaching</td>
<td>Dr Sandeep Handa</td>
</tr>
<tr>
<td>Postgraduate Tutor</td>
<td>Prof. Karl Ryder</td>
</tr>
<tr>
<td>Admissions Officer</td>
<td>Dr Richard Blackburn</td>
</tr>
<tr>
<td>Examinations Officer</td>
<td>Dr Andrew Hudson</td>
</tr>
<tr>
<td>Department Safety Officer</td>
<td>Dr Michael Whitcombe</td>
</tr>
<tr>
<td>Building Safety Supervisor/Technical Manager</td>
<td>Dr Dominic Banks</td>
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<tr>
<td>Plagiarism Officer</td>
<td>Dr Kal Karim</td>
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<tr>
<td>Outreach Officer</td>
<td>Dr Barbara Villa-Marcos</td>
</tr>
<tr>
<td>Library Liaison Officer</td>
<td>Dr Dylan Williams</td>
</tr>
<tr>
<td>Athena SWAN</td>
<td>Dr Alison Stuart</td>
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</tbody>
</table>
Administrative Staff

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration Manager</td>
<td>Claire Cartwright</td>
</tr>
<tr>
<td>Programme Administrator</td>
<td>Zahira Ahmed</td>
</tr>
<tr>
<td>Programme Administrator</td>
<td>Caroline Bilson</td>
</tr>
<tr>
<td>Programme Administrator</td>
<td>Vicky Robbins</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>Gigi Law</td>
</tr>
</tbody>
</table>

Staff Directory

Day-to-day queries should be sent to chemadmin@le.ac.uk. We would recommend using this e-mail address to ensure you receive the most efficient response. If you need to contact a member of staff individually please see the contact list below. You can also find up-to-date contact details on the Department’s website: www.le.ac.uk/departments/chemistry/people

<table>
<thead>
<tr>
<th>Name</th>
<th>Room Number</th>
<th>Phone Number</th>
<th>E-mail Address</th>
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</thead>
<tbody>
<tr>
<td>Academic Staff</td>
<td></td>
<td></td>
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</table>
### Chemistry Department Staff

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**MC = Materials Centre**

### Administrative & Support Staff

Day-to-day teaching and administrative enquiries – chemadmin@le.ac.uk

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<td><a href="mailto:vkr3@le.ac.uk">vkr3@le.ac.uk</a></td>
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<tr>
<td>Mr Carl SCHIEFERSTEIN</td>
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<tr>
<td>Mr Kuldip SINGH</td>
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<td>2146/2118</td>
<td><a href="mailto:ks42@le.ac.uk">ks42@le.ac.uk</a></td>
</tr>
<tr>
<td>Mr David SWINFIELD</td>
<td>-1.18</td>
<td>2111</td>
<td><a href="mailto:ds130@le.ac.uk">ds130@le.ac.uk</a></td>
</tr>
</tbody>
</table>
**Student Communications and Personal Details**

The University keeps a record of your personal details such as your full name, addresses i.e. home address and term-time address, telephone numbers, personal email address and your emergency contact details. It is important to keep your details up to date as this will help you to receive information about your studies and exams and also ensure that official documents are provided to you with the correct name details.

You can check and update your details by logging-in to MyStudentRecord [http://mystudentrecord.le.ac.uk](http://mystudentrecord.le.ac.uk) using your University username and password. Click on the My Details tab and you will then be able to review and change your personal details.

It is important that you check your University email account frequently to ensure that you do not miss any important communication from the University. If you are experiencing any difficulties with your computer account, you should advise IT Services who will attempt to assist you in resolving the problem.

**Information on the Web**

Departmental Website: [http://www.le.ac.uk/chemistry/](http://www.le.ac.uk/chemistry/)

**Department Facilities**

**Instrumentation and specialist facilities**

Cutting-edge chemistry requires access to all sorts of specialised facilities. This includes modern instruments for chemical analysis. Knowledge and the use of these instruments is an important part of your training as a chemist.

The Department contains a wide variety of equipment, including numerous small instruments such as FTIR spectrometers and gas/liquid chromatographs (e.g., GC, GC/MS and HPLC), through to major specialised equipment such as high-field NMR spectrometers, atomic force microscopes, high-resolution mass spectrometers, and a X-ray diffractometer.

You will encounter these, and much more during your undergraduate studies. The Department also has extensive technical support from its own mechanical, electronic, and glassblowing workshops.

**Teaching laboratories**

The Department is equipped with spacious fully equipped teaching laboratories. In the summer of 2014 the teaching labs were expanded and refurnished. Different parts of the teaching laboratory now focus on specific areas of chemistry. For example, a section of the laboratory is setup specifically for Physical Chemistry experiments. This allows students to experience both synthetic and physical chemistry experiments in a given semester. This also results in better overlap between experiments and course modules enhancing the student learning experience. There are also instrument rooms which contains a variety of spectrometers (e.g., UV-Vis/FTIR/HPLC/GC) for routine undergraduate use.

First year students will have laboratory sessions in the undergraduate teaching lab. This is on the first floor of the George Porter building and is fully equipped with all items needed for level experiments.
Computers

Computer skills are vital in the modern world and will form an important part of your training. The university has over 850 networked PCs linked to a central server, which students will have access to. Furthermore, the department has WiFi so students can access the internet anywhere in the building.

An enormous range of software is accessible, all of which runs under Windows. This includes Office 2013, graphical analysis software, specialised chemistry programs (e.g., ChemDraw), and access to the internet and email (via your IT account).

There are PCs in many different locations on and around campus including the Department (Chemistry Computer Room on the second floor), the main library and the halls of residence.

The department has a colour and a black and white student printer. The colour student printer is located in the computer room on the second floor, the black and white student printer is on the ground floor next to the bus shelter.

Lecture theatres

The Chemistry Department houses three lecture theatres. These lectures are used by all Departments in the University.

Student Reading Room (2nd Floor)

A spacious student Reading Room provides a quiet working area for students. The Reading Room can be used by anyone; however, it is predominantly used by Chemistry students to complete tutorial problems sheets, write laboratory reports, or simply as a place to do some reading. The Reading Room also has a selection of text books available for student use. Please note that the reading room is centrally booked teaching space and at all times will be used for teaching activities by Chemistry and other departments.

Molecular Modelling Laboratory

The molecular modelling laboratory in the Department is an ideal space for holding seminars, tutorials or workshops sessions as well as a quiet study area for students.

The Molecular Modelling Laboratory can be booked out for student use. In order to book this please e-mail chemadmin@le.ac.uk or come into the main office during office hours (8am – 5pm) and the team will be happy to book this for you if possible.

Students are also welcome to use the foyer for group discussions although please ensure that you do not disturb the lecture theatres around the foyer.
Learn at Leicester

Whatever your subject or level of study, there are many, many different ways in which you can access academic advice and support. The Learn at Leicester webpage provides you with further details of this support, together with direct links to a wide range of resources and services to help you:

- Make the most of the Library
- Develop your IT skills
- Manage your own learning
- Improve your English language
- Get independent advice about your course
- Manage your student information
- Sharpen your mathematics and statistics skills
- Improve your ability to problem solve
- Improve your ability to work in teams
- Improve your ability to present with confidence

You can access all of this by visiting: www.le.ac.uk/learnatleicester

University Library

The Library is your gateway to high quality information relevant to your studies. Using it effectively contributes directly to your success.

The Library provides you with:

- access to a huge range of specialist digital and print information resources for your subject;
- help in finding and using information - online, face to face and by telephone;
- individual and group study space;
- PCs and wireless networking for your own device throughout the David Wilson Library;
- services for distance learners.

The Library is a shared resource for all members of the University. Please respect it and observe the Library regulations available at www.le.ac.uk/library/about.

To get started, visit www.le.ac.uk/library.

For information about your subject, please visit http://www2.le.ac.uk/library/find/subjects/chemistry
IT Services

Whilst studying at the University you will have a University IT account and email address. There are hundreds of University PCs available with Office 2013 and many specialist programs to help you with your studies.

Visit www.le.ac.uk/it4students for more information about:

- **Student email**: access your email and calendar anywhere; on your laptop or mobile device
- **Printing**: print from any device to a University printer
- **Microsoft Office**: available at no cost whilst you study at the University
- **IT Help**: visit the Help Zone in the Library, phone 0116 252 2253, ithelp.le.ac.uk for IT Self Service, web chat or email ithelp@le.ac.uk
- **IT Training**: attend our workshops in Word, PowerPoint and Excel
- **Wifi**: free access to eduroam wifi on campus, in student accommodation or at other universities
- **PCs on campus**: there are over 900 PCs available, with 350 located in the David Wilson Library (including 24/7 access during exam periods)
- **OneDrive**: the online storage location for all your files
- **Blackboard Virtual Learning Environment**: support and information for all your courses
- **Leicester Digital Library**: access to journals, databases and electronic books online

Student Learning Development

Studying for a degree is a stimulating, challenging and rewarding experience. In order to make the most of this experience, the University of Leicester provides a wide range of resources and services to support and enhance your academic development in areas such as essay-writing, critical thinking, independent learning and time-management. The Student Learning Development Team is here to help you develop the skills and abilities you need in order to succeed in your studies.

To find out more about how we can help you develop your academic skills and abilities, visit our website: www.le.ac.uk/succeedinyourstudies.

Students’ Union Education Unit (ED)

Education help and advice is provided by the Students’ Union for all students.

If you would find it helpful to talk to someone outside of your department, we offer a free, confidential service to help and advise you about where to go and what to do. If you wish to come and talk to us about your personal circumstances or academic worries, for example, exams or putting together an academic appeal, we will provide professional and friendly support.

You will find the Education Unit staff in the Students’ Union Building on the first floor, within the West Wing. Opening hours are 10.00 am to 4.00 pm, and you can either pop in or book an appointment by contacting us on the following details:

**Contact**: Students’ Union Education Unit (ED), Students’ Union (First Floor)
+44 (0)116 223 1132 | educationunit@le.ac.uk | http://leicesterunion.com/support/education

Online chat facilities are also available for appointments and drop in sessions.

Facebook – [https://www.facebook.com/talktoED](https://www.facebook.com/talktoED) (Drop in on Wednesdays, 3:30pm-4:30pm)
Skype - @ed_uocation1 (Drop in on Tuesdays, 9am-10am)
Learn a New Language with Languages at Leicester

There are many benefits to learning a new language. Not only could you enhance your career prospects and broaden your cultural horizons, but studies show that you could also improve your literacy skills, boost your memory, increase your attention span and even help to grow your brain!

Study with the Languages at Leicester Team on campus, and you will be taught by expert native tutors who are based within our School of Modern Languages, which has been ranked 3rd in the country in the University League Tables, The Guardian University Guide 2016.

We offer 16 different languages including Arabic, British Sign Language, Chinese, German, Korean and Spanish to name just a few, six levels of learning and two course lengths, so you can study in a way that suits you. Classes take place during evenings and Wednesday afternoons, as well as intensive ‘fast track’ courses on Saturday mornings.

Find out more about Languages at Leicester, including fees and term dates at: www.le.ac.uk/ml/lal.

The successful completion of a Languages at Leicester course will appear on your Higher Education Achievement Report (HEAR) when you graduate. For further details about the HEAR, please visit: www.le.ac.uk/hear.

Contact: Languages at Leicester +44(0)116 252 2662 | lalenquiries@le.ac.uk | www.le.ac.uk/ml/lal

Other University Facilities

English Language Training Unit (ELTU) http://www2.le.ac.uk/offices/eltu
Languages at Leicester http://www2.le.ac.uk/departments/modern-languages/lal
Victoria Park Health Centre http://www.victoriaparkhealthcentre.co.uk
University Chaplaincy & Prayer Rooms for students http://www2.le.ac.uk/institution/chaplaincy

University Regulations

Senate Regulations (www.le.ac.uk/sas/regulations) contain rules and other important information about being an undergraduate or taught postgraduate student at the University of Leicester. The Regulations are part of the formal contract between you and the University; you will have confirmed when completing registration that you will comply with procedures defined in the University’s Regulations.

The Quick Guide to Student Responsibilities (www.le.ac.uk/sas/regulations/responsibilities) summarises some of your most important responsibilities as a student at Leicester, as defined in detail in the Regulations. These responsibilities relate to:

- attendance
- submission of work by set deadlines
- term time employment (full-time students – Home/EU and International)
- illness or other circumstances impacting upon studies
- maintaining your personal details
- the additional responsibilities of international students

Failure to adhere to student responsibilities can have serious consequences and may lead to the termination of your studies.
Student Responsibilities

The University expects its students to behave responsibly and with consideration to others at all times. The University’s expectations about student behaviour are described in:

- the Student Charter
- the Regulations governing Student Discipline
- the Student Code of Social Responsibility
- the Code of Practice governing Freedom of Speech
- the University’s regulatory statement concerning Harassment and Discrimination

These can be found at www.le.ac.uk/senate-regulations

It is reasonable for teaching staff to expect students to:

- observe the University’s regulations and code of conduct;
- attend all classes and arrive on time;
- meet assessment deadlines and submit only original work for assessment; you will lose marks if you miss deadlines; see later for policy on cheating and plagiarism;
- register for modules and exams by the set deadline;
- keep a diary of appointments and classes;
- manage their own time and workload and use study periods in a disciplined way;
- inform the Department as soon as possible if you cannot attend a class or keep an appointment;
- make optimum use of the University's opportunities and resources.
- check e-mails, Blackboard, notice board and pigeon holes regularly for communication from staff;
- fill in module questionnaires to provide feedback.

Attendance and Engagement Requirements

Attendance and engagement with your course is an essential requirement for success in your studies. The University’s expectations about attendance are defined in Senate Regulation 4: governing student obligations (see www.le.ac.uk/senate-regulation4). Full-time students must reside in Leicester, or within easy commuting distance of the city, for the duration of each semester. You should attend all lectures, seminars, practical sessions and other formal classes specified in your course timetable, unless you have been officially advised that attendance at a particular session is not compulsory or you have received formal approval for absence. You are also expected to undertake all assessments set for you.

The University operates a Student Attendance Monitoring procedure. Your attendance will be monitored throughout the academic year and if sessions are missed without an acceptable explanation being provided to your department then neglect of academic obligations procedures will be initiated. This may result in your course of study being terminated.

If you are an international student and your course is terminated this will be reported to UK Visas and Immigration (UKVI), in line with University sponsor obligations.

Neglect of Academic Obligations

You are expected to attend all learning and teaching events which are timetabled for you. These include lectures, tutorials or practical classes. You are also expected to submit work within the deadlines notified to you. Persistent failure to attend taught sessions and/or to submit work, without good cause, will be considered to be a neglect of academic obligations. Departmental procedures for dealing with neglect are set out within the University’s regulations (see http://www.le.ac.uk/senate-regulation4 ‘Neglect of academic obligations’). In the most serious of cases of neglect the University has the right to terminate a student’s course.
Examination Regulations

If your course involves any exams you must ensure that you are familiar with the University's Examination Regulations (www.le.ac.uk/sas/assessments/examregs). These contain a variety of regulatory information and instructions relating to exams, including the rules governing:

- scheduling
- admittance
- student conduct
- permitted and prohibited items and clothing
- use of calculators and dictionaries
- absence due to illness
- cheating

You can also find information about exams in the Students’ Guide to Exams (www.le.ac.uk/sas/assessments/examsguide)
Degree Programmes and Module Information

Degree Courses
Chemistry (USA/Industry/EU)
Chemistry with Forensic Science (USA/Industry/EU)
Pharmaceutical Chemistry (Industry)

Modules, Semesters and Levels
The Degree courses listed above are based on 'Levels' corresponding to the three or four years of the BSc or MChem degree courses, respectively. They are modular in structure and comprise a series of Core and Optional Modules which are self-contained in one of the two semesters. The academic year is divided into two semesters.

[NOTE: There are no exams in January at Level 4]

Programme and Module Specifications
View the programme and module specifications for your course via www.le.ac.uk/sas/courses
In the programme specification you will find a summary of the aims of your course of study and its learning outcomes, alongside details of its teaching and learning methods and means of assessment. The programme specification also identifies the core modules that make up the course and any choice of optional modules. Each module has its own specification that formally records that module’s aims, teaching and learning methods, assessment components and their percentage weighting.

Attendance Requirements
Attendance is an essential requirement for success in your studies. The University’s expectations about attendance are defined in Senate Regulation 4: governing student obligations (see www.le.ac.uk/senate-regulation4). Full-time students must reside in Leicester, or within easy commuting distance of the city, for the duration of each semester. You should attend all lectures, seminars, practical sessions and other formal classes specified in your course timetable, unless you have been officially advised that attendance at a particular session is not compulsory or you have received formal approval for absence.

In addition to other attendance monitoring practices, departments will monitor international student attendance at two ‘checkpoints’ during each academic year, typically at a compulsory learning and teaching session appearing in course or examination timetables. Students will not normally be notified of checkpoint dates in advance. If you are an international student and you fail to meet attendance and/or checkpoint requirements this may result in the termination of your course and the subsequent reporting of this to UK Visas and Immigration (UKVI), in line with University sponsor obligations.
‘Swipe Green to be Seen’
A new way of registering your attendance at **timetabled taught events** has been introduced at the University. Most of our teaching spaces have card readers installed inside. When you attend a teaching event, all you need to do is touch your student ID card against one of the readers in the room until it turns green. This will register your attendance at this event. When you do this for the first time, this may take up to five seconds as your card is being activated.

You should attend all lectures, seminars, practical sessions and other formal classes specified in your course timetable. You’ll need to register your attendance by touching your student ID card against a card reader at all of these sessions (unless otherwise notified).

You can register your attendance up to 10 minutes before the start time of a teaching event. If you arrive late, please ensure you still touch your card against a reader.

For further information please see the following webpage [https://www2.le.ac.uk/offices/sas2/attendance-management/attendance-management-for-students?uol_r=36e30b25](https://www2.le.ac.uk/offices/sas2/attendance-management/attendance-management-for-students?uol_r=36e30b25)

**Coursework Submission**

You should make sure that you submit your assignments by their due date to avoid any marks being deducted for lateness. Penalties for late submission of coursework follow the University scheme defined in Regulations governing the assessment of taught programmes (see [www.le.ac.uk/senate-regulation](http://www.le.ac.uk/senate-regulation) or [www.le.ac.uk/sas/assessments/late-submission](http://www.le.ac.uk/sas/assessments/late-submission)).

**Change of Module**

Discuss your options with your personal tutor, or another appropriate member of staff in your department if you are considering a change of module. Changes of module require approval by your department and will only be allowed in certain circumstances.

See [www.le.ac.uk/sas/courses/transfermodule](http://www.le.ac.uk/sas/courses/transfermodule) for details of the procedures involved and deadlines that apply.

**Marking and Assessment Practices**

Student anonymity will be preserved during the marking of all formal examinations. Summative coursework (i.e. coursework that contributes to your module mark or grade) will be marked anonymously unless there are sound educational reasons for not doing so, or the type of assessment makes marking impractical.

Each programme at the University has one or more External Examiners, who are members of staff of other institutions that review the academic standards at the University and confirm that these are appropriate and comparable with other Universities.

The External Examiners for your courses are listed at: [www.le.ac.uk/sas/assessments/external/current-undergraduate](http://www.le.ac.uk/sas/assessments/external/current-undergraduate)
Feedback and the Return of Work from Staff

Coursework

The Department complies with the University’s policy for the return of marked coursework (see www.le.ac.uk/sas/quality/student-feedback/return-of-marked-work for details of the full policy:

General principles:

- Feedback and provisional grading on coursework will be returned within 21 days of the submission date;
- In exceptional circumstances where this is not possible, you will be notified in advance of the expected return date and the reasons for the longer turn-round time and where possible staff will provide some interim feedback: for example in the form of generic feedback to the class regarding common errors and potential areas for improvement.

Written feedback will be given for all tutorial, PBL and practical work either on a cover sheet or through Blackboard within 21 days of the submission date. To improve your performance you should act on this feedback. In exceptional circumstances where this is not possible, you will be notified in advance of the expected return date and the reasons for the longer turn-round time.

[For full details see http://www.le.ac.uk/sas/quality/student-feedback/return-of-marked-work]

At the end of all theory modules there will be an opportunity for you to comment on the difficulty of the course, quality of the lectures, handouts and associated workshops or tutorials. This information is used by the Department to improve the quality of the courses. The results will be fed back to the Student/Staff Committee in the following academic year.

Examinations

The Department complies with the University’s policy for the return feedback on examinations (see www.le.ac.uk/sas/quality/student-feedback/return-of-marked-work for details of the full policy:

General principles:

- Following the approval of the provisional results by examination boards, departments will make the results available to students within 14 days. Where appropriate this will include a breakdown at the level of the examination and coursework.
- Departments will arrange for feedback on examination performance to be provided.

Progression and Classification of Awards

The University’s system for the classification of awards and the rules of progression are defined in Senate Regulation 5: Regulations governing undergraduate programmes of study (www.le.ac.uk/senate-regulation5) Alternatively, refer to the Student and Academic Services website for information about degree classification and progression: www.le.ac.uk/sas/assessments/progression-ug

Any specific progression requirements for your course are stated in its programme specification (see www.le.ac.uk/sas/courses/documentation)
Referencing and Academic Integrity

Principles of academic integrity apply to the work of everyone at the University, staff and students alike, and reflect the University’s commitment to maintaining the highest ethical and academic standards. A key part of this is acknowledging where and when, in the process of producing your own work, you have drawn on the work of others. In practice, this means that the ideas, data, information, quotations and illustrations you use in assignments, presentations, reports, research projects etc. must be credited to their original author(s). This process of crediting the work of others is achieved through referencing (see the section below on ‘Referencing styles’). Failure to do this properly is to risk committing plagiarism: the repetition or paraphrasing of someone else’s work without proper acknowledgement.

What we mean by ‘plagiarism’, ‘self-plagiarism’ and ‘collusion’

Plagiarism is used as a general term to describe taking and using another’s thoughts and writings and presenting them as if they are our own. Examples of forms of plagiarism include:

- the verbatim (word for word) copying of another’s work without appropriate and correctly presented acknowledgement;
- the close paraphrasing of another’s work by simply changing a few words or altering the order of presentation, with or without appropriate and correctly presented acknowledgement;
- unacknowledged quotation of phrases from another’s work;
- the presentation of another’s concept as one’s own;
- the reproduction of a student’s own work when it has been previously submitted and marked but is presented as original material (self-plagiarism).

Collusion is where work is prepared or produced with others but then submitted for assessment as if it were the product of individual effort. Unless specifically instructed otherwise, all work you submit for assessment should be your own and must not be work previously submitted for assessment either at Leicester or elsewhere. For more detailed information on how the university defines these practices, see also: www.le.ac.uk/sas/assessments/plagiarism

The University regards plagiarism and collusion as very serious offences and so they are subject to strict penalties. The penalties that departments are authorised to apply are defined in the Regulations governing student discipline (see www.le.ac.uk/senate-regulation11 ‘Plagiarism and collusion: Departmental penalties for plagiarism and/or collusion).

Resources and advice to help you study with integrity and avoid committing plagiarism

Negotiating these various rules, regulations and conventions can sometimes be a challenge, especially if they are new or different from previous experiences of studying. Check the Student Learning Development website for guidance on how to manage your studies so that you meet the required standards of critical scholarship and academic integrity: www2.le.ac.uk/offices/ld/resources/study/plagiarism-tutorial

If you are in any doubt about what constitutes good practice, ask your personal/academic tutors for advice or make an appointment with Student Learning Development for individual advice. You can book an appointment online by visiting: www.le.ac.uk/succeedinyourstudies

One of the most important practices in ensuring the academic integrity of your work is proper referencing. The following section contains details of how to ensure your work meets the specific referencing requirements for the discipline(s) you are studying.
Referencing style

You must use a consistent referencing style when referring to books and other publications that you have read for your coursework. Most subject areas have a specific referencing style which you are required to use. If you are on a Joint or Major/Minor programme you may find that your subjects use different referencing styles and it is important that you use the correct ones. To find out which referencing style each department uses, and for information and help on each referencing style, please visit http://www.le.ac.uk/library/help/referencing.

Requirements differ on how to arrange bibliographies (complete list of all reference and other sources at the end of your coursework) and whether references are included within the word count for your coursework – please refer to any separate guidance provided on these points.

Mitigating Circumstances

The University recognises that students may suffer from a sudden illness or other serious event or set of circumstances which adversely affects their ability to complete an assessment or the results they obtain for an assessment. In such cases the mitigating circumstances regulations and procedures may be applied. These regulations are designed to ensure the fair and consistent treatment of all students.

You must keep your department(s) informed at all times of any personal circumstances that may impact upon your ability to study or undertake assessments. Tell your department(s) or Distance Learning Hub about any such circumstances at the time they occur. You need to fill out a mitigating circumstances form which can be found at the link below. You need to supply supporting documentation (e.g. a medical certificate) as soon as possible and no later than the deadline relevant to the assessment(s) affected. Normally, the deadline for submission of a mitigating circumstances claim will be no later than five working days after the assessment deadline to which it relates.

See www.le.ac.uk/sas/regulations/mitigation for full details of the mitigating circumstances regulations and procedures, including the University’s definition of a mitigating circumstance.

The Chemistry Department procedures for mitigating circumstances and absence from the University are described below (see also Blackboard site CH5001).

Absence from the University

Your attendance at workshops, practicals, tutorials and some other sessions (e.g. Problem Based Learning) is monitored and if you miss more than 3 sessions in a 2 week period you will be e-mailed to visit your personal tutor to explain your absence. Continued lack of attendance will be dealt with by the senior tutor, Professor Abbott, or the Head of Department. Serious lack of attendance could result in a Gross Neglect Warning which may result in the removal of the right to resit any exams you fail.

If you have any problem which is affecting your work or causing you to miss any of your commitments, you should discuss this with your personal tutor who will respect the confidentiality of your discussion. Your personal tutor may advise you to see a Student Counsellor or a Chaplain (see above). Students who are absent from the university are required to report this to the Department:

(a) if the illness leads to absence from classes at which attendance is compulsory (tutorials, workshops, laboratory sessions, assessments or university exams);

(b) where it might be a contributory factor in a failure to meet deadlines or to perform up to expectations in any academic assignment.

This should be done using the appropriate online form.

https://www2.le.ac.uk/departments/chemistry/current-students/ug/mitigating-circumstances-and-absence-reporting
Minor illness/absence for a period of up to five working days

_Students must self-certify absence by filling in the online form as soon as they return, giving details of the reason for the absence and submit any corroborating evidence._

**Illness/absence is of six or more days duration.**

In this case medical advice should be sought and a medical certificate obtained and submitted. Students are responsible for collecting medical certificates from the Victoria Park Health Centre (or their own GP) and supplying a copy to the Department. Students should fill in a form after 1 week and a second one when they return to the University.

**Serious or on-going medical problem**

If you have a serious or on-going medical condition it is up to you to decide (in consultation with your personal tutor and/or student counsellor) if you are fit to continue with your studies. The University does not allow us to continue making allowances for an on-going condition unless the condition worsens, _i.e. if you continue to study you are agreeing that you are fit to study and that the illness/condition is not significantly affecting your performance_. You always have the right to withdraw temporarily and restart your studies the following year if your condition has improved.

_You should fill in the appropriate form._

**Absence from University exams in January, May/June or September**

In this case a medical certificate is required regardless of the duration of the absence. The _form must be submitted before the end of Week following the exam period (Jan/June) or by the Monday immediately following the exam period in September._

_The examiners are unable to make allowance for your illness unless you fill in the form and submit appropriate documentation._

**Personal Support for Students**

**Departmental Student Support Arrangements**

From discussion of academic progress, to friendly advice on personal matters; personal tutors are there to provide support, advice and guidance on an individual level. Common topics for discussion may include course changes, study progress, module choices, exam results, career opportunities or more personal problems such as accommodation or financial difficulties. The Department’s personal tutor system operates in accordance with the **Code of Practice on Personal Support for Students**: [www.le.ac.uk/sas/quality/personaltutor](http://www.le.ac.uk/sas/quality/personaltutor)

**EqualOpportunities**

The Department’s Equal Opportunities officer is Professor Paul Cullis (_pmc@le.ac.uk_). If you would like to raise any concerns related to equal opportunities (ethnicity, gender, disability etc.) please contact Paul at the e-mail address above.
Athena SWAN

The Department of Chemistry was successful in achieving a Bronze Athena SWAN award in September 2013. This achievement shows the department’s commitment to advancing women’s careers in higher education and research in science, technology, engineering, maths and medicine (STEMM).

The beliefs underpinning the Athena SWAN Charter are:

- The advancement of science, technology, engineering, maths and medicine is fundamental to quality of life across the globe.
- It is vitally important that women are adequately represented in what has traditionally been, and is still, a male-dominated area.
- Science cannot reach its full potential unless it can benefit from the talents of the whole population, and until women and men can benefit equally from the opportunities it affords.

The good practice that arises from implementation of the Athena SWAN ethos is of benefit to everyone in higher education.

- Good practice is of benefit to all staff and students; bad practice adversely affects the careers of women more than men.
- Good practice does not target initiatives solely at women, processes that are transparent and fair are of benefit to everyone.

For further information on Athena SWAN please see the following webpage: http://www2.le.ac.uk/departments/chemistry/athena-swan-1

If you have any suggestions for embedding the Athena SWAN ethos in the Chemistry department, or would like to get involved in Athena SWAN activities, please contact the Chair of the departmental Athena SWAN committee, Dr Alison Stuart (amc17@le.ac.uk).

University Student Support Arrangements

Please note that the University of Leicester offers a holistic service to meet your needs in the major areas of student life, health and well-being, practical matters and learning and career development.

AccessAbility Centre

The Centre offers a range of services to all students who have specific learning difficulties, such as dyslexia, disabilities or long-term conditions including mental health which have a substantial day to day impact on their studies. Staff offer one to one support, the co-ordination of alternative examination arrangements and assistance with applications for the Disabled Students' Allowance. It is possible to be screened for specific learning difficulties and access to formal assessment is available. Students are means tested to see if they are eligible for assistance with the cost of formal assessments. The open access Centre acts as a resource base for students and staff and is a relaxed place for students to work. Its computers are equipped with specialised software for screen enlargement. Essay planning and speech output software is on the University network. The Centre has some specialised equipment (CCTV, enlarged keyboard, and chairs) and some for loan (chairs, writing slopes and digital recorders). Photocopying and printing facilities are also available. The Centre welcomes self-referrals as well as referrals from academic staff.

Contact: AccessAbility Centre, David Wilson Library
Tel/minicom: +44 (0)116 252 5002 | Fax: +44 (0)116 252 5513 | accessible@le.ac.uk | www.le.ac.uk/accessability

Please note that the departmental AccessAbility officer is Professor Paul Cullis (pmc@le.ac.uk), who would be happy to answer any questions you may have.
Student Welfare Centre
The Student Welfare Service offers wide ranging practical support, advice, and information for students. Financial advice is offered, with information on budgeting and funding. Specialised staff can advocate over late loans and other financial issues. Students can apply for hardship grants and loans through the Service.
Information, advice and guidance is available on finance issues and budgeting. In addition, students can apply for hardship awards and loans through the welfare service.
For international students, the Student Welfare Service coordinates The International Welcome Week in September and January. Expert immigration advice is available and students are strongly advised to renew their visas through the scheme provided by Student Welfare. Specialised Officers also support students who experience financial or personal problems.

Contact: Student Welfare Service, Percy Gee Building (First Floor).
Tel: +44 (0)116 223 1185 | Fax: 0116 223 1196 | welfare@le.ac.uk | www.le.ac.uk/welfare

Counselling and Wellbeing Service
This Service offers a range of expertise and support for the psychological aspects of health and wellbeing. Services on offer include

Student Counselling Support
Time-limited, free and confidential one-to-one counselling to help students find ways of dealing with academic-related or personal issues that may be affecting ability to study or engage with student life. Helping students to build on their skills to cope with the challenges of study, work and relationships through workshops.
For information see our website: www.le.ac.uk/counselling

Contact: Student Counselling Service
+44 (0)116 2231780 | counselling@le.ac.uk

Student Mental Wellbeing Support
Practical, emotional and skills based one-to-one support to students managing mental health issues whilst at the University. Helping students to build on their skills to cope with the challenges of study, work and relationships through workshops.

Contact: Student Support (mental wellbeing)
+44 (0)116 252 2283 | mentalwellbeing@le.ac.uk
www2.le.ac.uk/offices/ssds/student-support-mental-wellbeing

Student Healthy Living Service
The Student Healthy Living Service provides direction to health care and health related activity which will contribute to wellbeing and help students to enjoy a balanced life. Students should register for health care local to the University; The University works closely with the Victoria Park Health Centre where staff have expertise in student health. More information can be found on the Healthy Living Service website.

Contact: Student Healthy Living Service
+(0)116 223 1268 | healthyliving@le.ac.uk | go.le.ac.uk/healthyliving
Health Care and Registering with a Doctor

Illness can affect any one of us at any time and for this reason the University strongly advises you to register with a doctor in Leicester. The Victoria Park Health Centre (www.victoriaparkhealthcentre.co.uk) has expertise in student health and has provided medical care to the University’s students for many years. The Health Centre is located conveniently close to the main-campus and registration is free.

If when you come to University you are already under the care of a ‘specialised team’, have a known medical condition including mental health or waiting for an appointment it is still advisable to register at the Victoria Park Health Centre. Soon after arrival, make an appointment to discuss with one of the doctors who will then be in a better position to communicate with the relevant doctors and help you to manage your condition to avoid any unnecessary disruption to your studies. Please take with you information from your current doctor or consultant which includes diagnosis, current management, including medication (provide a certified English translation if the original is not in English). This is essential for international students as some conditions may be managed differently in this country, particularly in relation to medication which may be licensed differently and may need changing to something which is available to prescribe in this country. If you take medication for your condition you must bring 12 weeks supply with you to ensure continuity until the registration process is complete.

More information about registering with a doctor and other health and well-being services can be found at: http://www2.le.ac.uk/offices/healthy-living-for-students/new-students/uk-students
Careers and Skills Development

Career Development Service

With your drive and determination, the Career Development Service can help you develop the skills and abilities that will not only help get you to where you want to be after university, but will stay with you for life.

Career development at Leicester isn’t just about getting some work experience and writing a CV; we make sure that you get personal support to achieve your aspirations. We’re here for you from the moment you arrive, through to your graduation and beyond. We’ll give you the opportunity to try new things and to figure out what you want from your career—what it is that really drives, motivates and inspires you.

We’ll also help you identify your personal strengths and what you need to develop to be ahead of the crowd. Even if you’re not sure what it is you want to do yet, we can help you develop the skills and experience that you need to get that first job out of university, but also the ability to manage your own career development and succeed on whichever path you choose.

It’s your career development journey and you decide where it is that you want to go. By working with us you make sure that you’re giving yourself the best possible chance to get there. We’ve got the knowledge and resources to spur you on to success so, by working with us, you really will make the most of you!

As a Leicester student you’ll have access to MyCareers: https://mycareers.le.ac.uk, our career management system, by simply using your university username to login. This is the gateway to:

- Booking one-to-one appointments with our career consultants for support with career planning, job hunting, CVs and applications, and mock interviews
- Booking workshops, such as mock assessment centres and psychometric testing
- Meeting employers who are coming on campus
- Finding all the opportunities available exclusively for Leicester students such as paid internships, volunteering, and extra-curricular activities

If you are looking for part time work whilst studying, make sure you sign up to Unitemps, based in the Students’ Union, for opportunities on campus and in the city.

We’re here to support you throughout your time at university so make sure that you come and visit us and log-in to your MyCareers account to get started!

Contact the Career Development Service:

0116 252 2004 | careershelp@le.ac.uk | www.le.ac.uk/careers
@uolcds | fb.com/uolcds
Feedback from Students

Student Feedback Questionnaires

The Department values your feedback on all of our teaching activities and makes every effort to act upon it to improve the teaching experience for all of our students. You will have the opportunity to give your feedback on every module that you take in the Department through the end of module questionnaires which are made available on Blackboard. Your feedback from these questionnaires is considered by the module convenor during the annual course review which takes places over the summer and each convenor must propose a plan of action to deal with any substantial issues that may have been raised. The Departmental Learning & Teaching Committee oversees the process and ensures that appropriate changes are indeed made in response to feedback. A summary of the list of actions from the course review is made available to students through the Student Staff Committee (SSC) and Blackboard during semester 1.

We appreciate that sometimes students will want to raise specific issues during a module rather than wait until the questionnaire. You can do this through the SSC, your personal tutor and/or the year tutors or by contacting the Head of Teaching (Dr Handa) directly. We would encourage you to raise any potential issues through one of these channels as soon as possible so that we can respond quickly and take any necessary action. Any actions arising as a result will be reported back through the SSC and/or Blackboard.

Listed below are just some of the changes that we have made during the last two years specifically in response to student feedback.

(We have also made other changes to improve the student educational experience but the ones below were in response to issues raised through module questionnaires / the SSC / feedback to year tutors).

All Levels:

- Introduced lecture capture for the majority of core modules (for teaching events where rooms were equipped for lecture capture).
- Improved exam feedback – giving students a chance to look through their marked exam scripts.
- Tutorial feedback (Levels 1 & 2) – an opportunity for students to indicate difficult topics on the cover sheets.

Level 1:

- Introduced some additional revision sessions for students failing semester 1 modules.
- CH1003 (maths) - switched delivery from lecture followed by workshop to workshop then lecture, this allowed students to get help first and then review their answers in the lecture. Also provided detailed model answers for a representative selection of the problems.
- CH1002 & 1006 – lecture note booklets now provided.
- CH1007 – introduced group work practice problems & provided audio lectures to listen to before lectures.
- CH1031/32 – Moved parts of the introductory biology material from semester 2 to semester 1. Also reviewed material to provide more of a chemistry perspective on biochemistry topics.
Level 2:
CH2005 – answers to workshop questions now supplied.

CH2007 – increased the amount of time spent covering topics students indicated as particularly difficult and also updated lecture notes for these areas.

CH2009 – lectures notes for aromatic / heteroaromatic chemistry rewritten to improve presentation and content.

CH2013 – removed final exam from the assessment, careers activities moved earlier (to help those applying for industrial placements) & changed timing of continuous assessments to avoid clashes with other Level 2 assessments.

CH2023 - students allowed to work in groups for problem classes / continuous assessment (previously done independently).

CH2040 – lecture notes for Dr Evans part completely revamped and updated.

Level 2 practical – reviewed length and instructions for some experiments to ensure enough time for lunch breaks and suggested points where breaks could be taken.

Pharm Chemists - arranged for access to lecture captures for some Level 1 Biochemistry material to help with background for the BS2013 module.

Level 3:
CH3201 – introduced short videos of worked examples of spectroscopy problems.

CH3202 - practice B’board questions made available for the continuous assessment.

CH3203 – increased the fraction of the continuous assessment (now 100%) based on previous exam questions.

CH3204 – drop in / revision sessions arranged for after Easter.

BSc projects – introduced a formative feedback exercise for the practical element to allow students to gauge their performance against the marking criteria.

MChem practical – improved mark sheet & feedback forms for the Phys chem labs; simplified proformas for the synthetic techniques.

Industry students – put procedures in places to allow students to take end of semester examinations at their placement company and so avoid having to travel back to Leicester.
Level 4:

Changed programme specifications so that modules now run across the whole year. This has two consequences – students now have greater choice over module options (no longer restricted to 2 modules each semester) and also allows paced delivery of material throughout the year (with more time for assimilation).

Added two extra module choices to Level 4 (Bioinorganic Chemistry & Nanotechnology)

Introduced some module choice for Pharmaceutical Chemists (previously the programme specifications had none).

MChem projects – introduced a formative feedback exercise for the practical element to allow students to gauge their performance against the marking criteria.

CH4201 – introduced written answers to selected spectroscopic problems to allow for individual feedback (previously this was a group exercise with feedback at group level).

CH4202 – changed the continuous assessment to focus on unseen retrosynthetic problem solving with detailed individual feedback.

CH4203 – added two classes on calculations & numerical problems (practice for the unseen problems on the final exam).

CH4204 – introduced a new essay based continuous assessment to give students training and practice in analysis of research papers (helpful for the final exam).

CH4206 – some additional formative coursework introduced.

Student Staff Committees

Student representatives are invited to sit on the Student/Staff Committee (SSC), usually from each year group, one representative for each degree course. The Committee meets at least once each semester to discuss any issues about the courses or other matters of concern. If you wish any matters to be raised, please contact your year/course representative. Elections for student representatives are usually held by the Student Union, early in the first semester (or at the end of the previous year for returning students).

The Agenda for committee meetings are circulated by email to all members at least one week prior to the meeting date and minutes are circulated as soon as possible following.

For more information about the SSC please see the noticeboard in the George Porter foyer.

The terms of reference will be circulated to all representatives at the start of the year but are also located at: http://www2.le.ac.uk/offices/sas2/quality/codes/documents/sscommittees.pdf

To see the elected representatives for this year: https://www.leicesterunion.com/top-navigation/voice/academic-representation/current-representatives
Departmental Prizes
The following prizes are awarded at the end of year to Level 3 and Level 4 Chemistry undergraduates.

Best graduating student (BSc or MChem) - Hunter Medal
Top graduating BSc and MChem students - Dunlop Polymer Engineering Prizes
Best graduating student in Pharmaceutical Chemistry - Celltech Prize
Best graduating Chemistry with Forensic Science student - Treatt & Earthisol Plantations Prize
Best penultimate MChem student in Chemistry with Forensic Science - RSC Analytical Prize

Societies
ChemSoc is the department’s Chemistry society. ChemSoc organises regular social and academic events for anyone with an interest in Chemistry. Events include joint socials with other societies, the ChemSoc Easter Ball, curry nights, laser tag, quiz nights, post-exam celebrations and pre-exam relaxation. The ChemSoc chair for the 2016-17 academic year is Angus Hope (ah521@student.le.ac.uk). For further information on ChemSoc please see their noticeboard in the foyer.

Safety and Security
As part of your induction and when you first start using the department’s labs you will be given detailed safety and security information. Specific safety information is covered under ‘Laboratory Work’.

Problem Classes and Laboratory Information

Problem Classes
These will usually involve demonstrations or supervised learning and/or problem solving. You will often be expected to work in small groups. In addition these sessions will be used to provide an induction to skills training, e.g. writing and oral presentation skills.

Laboratory Work
Laboratory work is designed to make you familiar with practical methods available to the chemist, to give you confidence in your ability to use these methods and to keep proper records, and to give you an opportunity to handle experimental data. Doing practical work also helps you to appreciate the experimental basis on which theoretical concepts are founded and thus should enhance your understanding of these concepts. Later in the course you will also learn how to plan experiments to solve problems, and this will culminate in research projects at Level Three or Four.

Demonstrators in the laboratory are there to give advice about your practical technique and to help you to understand the other lessons which can be learned from each experiment. You will get the most benefit out of laboratory work only if you bring your difficulties to the attention of demonstrators. Although practical work is assessed, you will not be penalised for discussing your problems with demonstrators before you have finished an experiment. Furthermore, it is essential to hand in your practical reports/book for assessment on time.
You cannot proceed to the next level of the degree without passing the practical course. There are no resit practical examinations.

If you are ill and miss a practical session you must complete a mitigating circumstances form or you will be given zero for that session. If you miss several sessions through illness you will be offered the opportunity to catch up. If you do not complete at least 75% of your scheduled sessions, you will fail practical and your course will be terminated.

Sometimes it may happen that, through no fault of your own, an experiment may fail - for example through instrument breakdown. Should this occur, you should not be penalised either by scoring low marks or by having to spend extra time completing the experiment. You must explain immediately to the senior demonstrator on duty what has happened so that he/she can advise you on the correct course of action. This will vary with circumstances, but may (for example) involve giving you a sample with which to continue working or giving you specimen data to interpret. Whatever happens, you must record this in your completed laboratory report. Some of your practical work will be carried out with a partner, especially in Physical Chemistry. When this is so, it is not possible for both of you to carry out every technical or practical manipulation, but it is important, as with work done individually, that you observe and understand each part of the experiment. You must discuss the processing and the interpretation of data with your partner.

**Laboratory Books for recording your experiments**

A special notebook for recording your experiments is provided in your starter pack.

**Broken glassware**

If your glassware breakages total more than £50, you will be invoiced for breakages over and above this amount.

**Safety in the Chemistry Laboratories**

Every effort is made to teach you the hazards associated with handling chemicals. Special risks are identified in the laboratory manuals. For women who are pregnant or are anticipating pregnancy, it is essential that they see the University 'Guidance Notes for New or Expectant Mothers'. This booklet and advice can be obtained from the Students' Union Welfare Office.
Pregnancy

The Department has a duty of care for everyone working in the Chemistry buildings, however under current health and safety legislation pregnant workers are considered to be at special risk. The most important aspect for a student who becomes pregnant is to inform the Department as soon as their pregnancy is confirmed.

The Department’s primary advice to a student in this situation is to take temporary withdrawal from their degree course or defer their registration.

In exceptional cases the Department recognises this may not be practicable and will then consider each case on an individual basis. If the Department decides to allow the student to continue it will advise the student of the risks involved and will instigate the following procedures to minimise the risk.

- The Course Convener with co-operation from other staff as required will produce a full risk assessment of all the practical’s being undertaken by the student in the UG laboratory, assessing the implications to a pregnant worker.
- Further risk assessments (including COSHH) will also be undertaken of the chemicals you use and may come into contact with in your practical studies in the various laboratories you may work in.
- The completed risk assessment will be given to you and a copy will be retained by the Department for their records.
- If the Course Convener deems it necessary, a written protocol will be issued highlighting the procedures the student must follow.
- The written protocol will be issued to you and also held by the Department for their records.
- Where practicable further consideration will be given to other experimental work being carried out in the shared laboratories when you are present, any special advice regarding risk from other work will be communicated to you and a record held by the Department.

The Department will strive to minimise the risks you may encounter working in a shared UG laboratory, however all risks cannot be eliminated.

On receipt of the risks assessments and any special instructions from the Course Convener you will be required to sign a declaration that you agree to adhere to the risk assessments, follow any special instructions, have read and understood the course of action that the Department is taking to enable you to continue your studies while pregnant and that you have considered and accept the risk involved to you and your unborn child.

Personal Belongings

Your personal belongings are not covered by the University’s insurance. You are therefore advised to check whether your parents’ or family policies provide adequate protection. If not, private insurance arrangements should be made.

A lost property service operates from the Security Lodge, which is situated at the far end of the Fielding Johnson Building on Wyggeston Drive, University entrance No. 1.

Bicycles may be brought onto the main campus but must be placed in the cycle racks provided, and appropriate security measures taken to help to prevent theft and damage. For advice on preventing cycle theft and details of the University’s Coded Cycle Scheme visit: www.le.ac.uk/estates/facilities_&_services/security/CodedCycleScheme.html
Complaints and Academic Appeals Procedures

The University has robust systems in place governing the quality and standards of its degree programmes and your experience as a student here. We are confident that, like the vast majority of students here, you will enjoy and be satisfied with your course. In most instances your department will be able to resolve any issues that do occur but we recognise that this will not always be possible. For this reason, the University has official procedures that allow eligible cases to be formally reviewed.

Information about these procedures, including the relevant forms, can be found on the Student and Academic Services website: see [www.le.ac.uk/sas/regulations/appeals-complaints](http://www.le.ac.uk/sas/regulations/appeals-complaints). These pages should be read in conjunction with the University's [Regulations governing student appeals](http://www.le.ac.uk/senate-regulation10) and [Regulations governing student complaints](http://www.le.ac.uk/senate-regulation12).

Personal Tutors

Your personal tutor continues to be the same person as last year. **You are required to see your personal tutor in semester 1 and 2** (to discuss your PDP Skills portfolio). It is important to continue seeing her/him and you should feel free to turn to her/him if you have difficulties of any kind, and in particular you should discuss any circumstances which may affect your academic work or your enjoyment of University life.

[Dr Sandeep Handa is the Tutor with special responsibility for all level 4 students.]

Very occasionally, a student has wished to change personal tutor. Should you ever wish to do this, you should raise the matter with Dr Sandeep Handa, the Tutor with special responsibility for all fourth year students, or, if this is not possible with the Head of Department.

Student Skills Record/Personal Development Planning

During your course you will be expected to keep a record of your learning and skills development. This is useful in helping you identify your strengths and weaknesses. Many employers now ask to see this record. You should discuss this with your Personal Tutor.

Personal Development Planning (PDP) is a structured and supported process designed to give you the opportunity to reflect on your progress and plan for your future development. In doing so, it is hoped that PDP will better enable you to improve and enhance both your academic performance and your prospects for professional and career success after graduation. PDP will help you to:

- recognise the skills and abilities you are developing;
- identify areas for improvement and development; and
- think about how you can improve your employability and career prospects

In addition, Learning Development provides some more general information about what PDP is, and how you can engage with it: [www2.le.ac.uk/offices/id/personal-development-planning-pdp](http://www2.le.ac.uk/offices/id/personal-development-planning-pdp).
The Weighting of Modules for your Degree

For all degrees your performance in the first year does not count towards your overall mark. Your mark in years 2, 3 (and 4) counts towards your overall Degree classification as shown below.

<table>
<thead>
<tr>
<th>BSc degrees (3 year)</th>
<th>MChem degrees (including USA/Ind/EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Level 1 0%</td>
</tr>
<tr>
<td>Level 2</td>
<td>Level 2 20%</td>
</tr>
<tr>
<td>Level 3</td>
<td>Level 3 30%</td>
</tr>
<tr>
<td></td>
<td>Level 4 50%</td>
</tr>
</tbody>
</table>

Note: In order to qualify for the Hons degrees you must gain 120 credits each year (and average more than 40%). In order to gain credit in a module you must achieve at least 35% in that module (and average more than 40%).

<table>
<thead>
<tr>
<th>Average mark</th>
<th>Credits over final 2 years (see below for MChem)</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 credits or more failed</td>
<td>Fail</td>
</tr>
<tr>
<td>&gt; 70%</td>
<td>120 credits at 70% or better, failed modules &lt; 40 credits</td>
<td>1st</td>
</tr>
<tr>
<td>67-69</td>
<td>If not 120 credits &gt;70% or 40-45 credits failed</td>
<td>2.1</td>
</tr>
<tr>
<td>60-66</td>
<td></td>
<td>2.1</td>
</tr>
<tr>
<td>57-59</td>
<td>120 credits at 60% or better, failed modules &lt; 40 credits</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>If not 120 credits &gt;60% or 40-45 credits failed</td>
<td>2.2</td>
</tr>
<tr>
<td>50-56</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>47-49</td>
<td>120 credits at 50% or better, failed modules &lt; 40 credits</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>If not 120 credits &gt;50% or 40-45 credits failed</td>
<td>3rd</td>
</tr>
<tr>
<td>40-46</td>
<td></td>
<td>3rd</td>
</tr>
<tr>
<td>35-39</td>
<td>this is not an honours degree.</td>
<td>Pass</td>
</tr>
<tr>
<td>&lt;35</td>
<td></td>
<td>Fail</td>
</tr>
</tbody>
</table>

For MChem degrees the scheme is essentially the same except that years 2, 3 and 4 are considered; for promotion to the higher category students will need 180 credits (out of 360, i.e. years 2,3 and 4) in the higher category.

[Note: Candidates on a borderline may have a viva with the external examiners. For details of border-line categories, see http://www.le.ac.uk/academic/quality/Codes/examining/ ]
Module Assessment

Assessment of performance is relative to defined criteria, which means that your mark depends only on your performance and not on that of the rest of your class. The bulk of the assessment of each module consists of the end-of-semester exam. For details of the amount of continuous assessment and length of the exams see the individual module details (appendix).

Students must be available to attend examinations on any date within the formal assessment periods, including Saturdays.

Examinations

Finding out your exam marks

You will be able to see your exam results by logging onto MyStudentRecord. For Midsummer exams, marks will be available just before the end of term.

Calculators

Permitted calculators are the Casio FX83 and FX85 models. See http://www.le.ac.uk/sas/assessments/examsguide for the most up to date information.

Anonymity

Formal University end of semester exams are marked anonymously. You will need to take your student ID card with you to all exams, this has your candidate number on it. During the first semester you will be sent confirmation of modules for which you have registered. Ensure that you cross check this.

External moderation of examinations and degrees

All Level Three Module examination papers are scrutinised by one of three external examiners. These examiners may also see the student scripts and they are present at the final examiners' meeting at which degree classifications are decided. They also conduct oral (viva) examinations on students who are borderline between degree classifications.

The three external examiners this year are:

- Organic: Professor S. Flitsch (MIB)
- Inorganic: Professor P. Walton (York)
- Physical: Professor B. Binks (Hull)

The purpose of external examiners is to moderate the standard of the examination papers and their marking to ensure that degree classifications in Chemistry in Leicester are not out of line with similar degrees in other British Universities. The examiners have a three year term of service. They may make suggestions and criticisms on the degree course and standards which we are expected to respond to. Their active participation in the examination process helps to make Leicester University Chemistry degrees respected nationally.
Course Transcript

A Course Transcript is given to you when you are awarded your Degree. This lists all the modules you have taken, with the associated marks.

At the end of an academic year if you need a transcript you can order one at the following website http://www2.le.ac.uk/offices/sas2/studentrecord/transcripts/year

If you need information on your marks (for instance for an interview) before the end of an academic year please contact the administrative team in the front office or by e-mail to chemadmin@le.ac.uk and a letter with your marks to date can be produced. Please note that marks are subject to change before the end of the academic year and this letter will state this.

Provisional Exam dates

First semester: NOT APPLICABLE TO LEVEL 4
Second Semester: 15th May – 2nd June 2017

The Final Exam Board Meeting will take place during either Week 29 or Week 30. All students will be notified in plenty of time of the exact date of this Meeting in the event of potential viva voce examinations.

Private Study and Vacations

Time for private study is not timetabled, but it is the most important aspect of your work while you are at University. Private study includes the time you will need to spend consolidating your understanding of the information given during lectures (for instance by watching the lecture capture or reading a textbook). It is very important that you do this as the course proceeds and that you do not think that hasty revision just before a formal examination will be adequate. Study in the Christmas and Easter vacation periods are particularly important since examinations are held soon after your return.

Private study also includes reading round the subject and putting some flesh on the skeleton provided by the formal course. This means not only reading the recommended texts, but also thinking about them and questioning them, and making additional notes to supplement the lectures. On average you should be doing around two hours’ private study for each lecture. You should also read books of general scientific interest and periodicals such as the New Scientist and Scientific American. As the course progresses you will be, increasingly, reading more specialist chemical journals. You will find copies of most of the basic chemistry text books in the Main Library: you should explore this collection at an early stage.

Some students find it very productive to study together in groups of 3 or 4. This can generate a good work atmosphere, provide mutual support and an opportunity to help each other with difficulties and even supply an element of competition.

Assessment Deadlines

Almost all of the modules that you are taking will have some continuous assessment that contributes towards the final mark. These assessments can take a variety of forms e.g. tutorial work, practical reports, written assignments (some under exam conditions), Blackboard tests, presentations, poster exercises etc. During the course of the year you will need to meet numerous deadlines for submitting these assessments and will also need to plan your work accordingly such that you are prepared for any tests. To help you plan your time the Department will list the major assessment deadlines/dates of continuous assessment test at the start of each semester (available on Blackboard). You should note that the list of deadlines is only provisional and the actual date may change slightly (any changes will be communicated to you by the module convenor/lecturer), however you should find them useful when planning ahead.
## Level 4 Modules for Each Degree

All Level 4 modules run across the year with final exams taking place in the summer examination period.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
<th>Credits</th>
<th>Chem</th>
<th>Pharm</th>
<th>Forensic</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH4201</td>
<td>Advanced Structure Determination</td>
<td>15</td>
<td>O</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>CH4202</td>
<td>Advanced Synthetic Methods</td>
<td>15</td>
<td>O</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>CH4203</td>
<td>Earth System Science</td>
<td>15</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>CH4204</td>
<td>Green Chemistry</td>
<td>15</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CH4206</td>
<td>Cancer Chemistry</td>
<td>15</td>
<td>O</td>
<td>C</td>
<td>O</td>
</tr>
<tr>
<td>CH4207</td>
<td>Computational Chemistry</td>
<td>15</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>CH4208</td>
<td>Bioinorganic Chemistry</td>
<td>15</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>CH4209</td>
<td>Nanotechnology</td>
<td>15</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>CH4212</td>
<td>Advanced Forensic Science</td>
<td>15</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>CH4251</td>
<td>Chemistry Project Part 1</td>
<td>25</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>CH4252</td>
<td>Chemistry Project Part 2</td>
<td>25</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>CH4253</td>
<td>Chemistry Project Part 3</td>
<td>10</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>120</strong></td>
<td><strong>120</strong></td>
<td><strong>120</strong></td>
<td></td>
</tr>
</tbody>
</table>

The following choices apply with regard to Chemistry Options:

- **Chemistry** – any four options from those available
- **Forensic Chemistry** – any three options from those available
- **Pharmaceutical Chemistry** – any one option from those available
LEVEL 4 MODULES

The following pages contain a brief description of each module and the learning outcomes for these modules. These learning outcomes are only intended as a guide to the content of the course and the skills you will be expected to have gained by the end of the course.

The ILOs will provide you with an overview of the general competencies you should achieve by completing the module but they are not meant to be a detailed, itemised list of everything that appears in a module so should not be used as the basis of revision.

Similarly, not all learning outcomes will necessarily be tested.
Module CH4201  Advanced Structure Determination

Convenor: Prof. Hope  
Lecturers: Prof. Hope, Prof. Raven  
No. of sessions: 20 Both semesters  
Course credits: 15

Aims: The module continues the development of the theory and application of modern spectroscopic methods, especially resonance spectroscopies (NMR, ESR). Where possible, an interactive 'problem-solving' approach is used in dealing with the determination of structure and shape in synthetic chemistry. Problems will be set and discussed throughout the module.

Subject knowledge: at the end of this course students should:

- Be aware of the range of major spectroscopic techniques currently available to synthetic chemists and to recognise the analytical, structural and sterochemical information they each can provide.
- Be able to discuss the magnetic properties of nuclei and electrons, to summarise the main features (resonant frequencies, line intensities, lineshapes) and to describe the physical and chemical interactions that define these features.
- Be able to analyse complex NMR spectra and extract key data, selecting and making use of appropriate 1D and 2D NMR experiments in simplifying and assigning spectra fully.
- Be able to understand the significance of chemical shift and coupling data, and to be able to present these data clearly and concisely in line with current conventions.
- Be aware of techniques based on Correlation Spectroscopy, their uses, how and when they are applied and their limitations.
- Be aware of the importance of variation of temperature in the study of time-dependent processes using NMR spectroscopy, and to obtain data concerning equilibria and rates of reaction from VT NMR experiments.

Key Skills: at the end of this course students should be able to:

Obtain new information from textbooks and the worldwide web, describe and orally communicate relevant chemistry in workshops and problem sessions and discuss it with peers and teachers, solve problems.

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

Assessment: Examination (75%); 2 hours; group problem solving × 2 (25%).

The group problem solving will involve:

(a) interrogation of primary literature and presentation to peers;
(b) evaluation of spectroscopic data for an unknown material, presentation of scientific information from the analysis and discuss the results with peers.

The written examination assesses the understanding and application of the structural determination.

Recommended Texts


Akitt, J.W., NMR and Chemistry: an introduction to modern NMR spectroscopy, Chapman and Hall, 2000, [543.0877 AKI]

Atherton, N.M., Principles of Electron Spin Resonance, Ellis Horwood, 1993 [538.3 ATH]

Rieger, P.H., ESR: analysis and interpretation, RSC, 2007 [538.364 RIE]


Iggo, J.A., NMR Spectroscopy in Inorganic Chemistry, OUP, 1999 [543.0877 IGG]


Claridge, T.D.W., High Resolution NMR Techniques in Organic Chemistry, Pergamon, 1999 [543.66 CLA]

Berger, S., 200 and more NMR experiments: a practical course, Wiley, 2004 [544.67 BER]
Module CH4202  Advanced Synthetic Methods

Convenor:  Dr Handa
Lecturer: Dr Handa, Prof. Cullis
No. of lectures: 20 Both semesters
Course credits: 15

Aims: This module aims to provide students with the skills necessary to propose a synthetic plan for any molecule. The module will introduce students to the need for and the approaches by which selectivity can be introduced into the synthesis of target molecules. Major landmarks in the field of organic synthesis will be discussed to reinforce synthetic strategies and to give students a perspective of the subject.

Learning Outcomes:

Subject knowledge: at the end of this course students should be able to:

- Propose possible synthetic routes to almost any molecule.
- Use disconnections based on the carbonyl group as a foundation for synthetic planning.
- Explain and use the common atom approach, functional group addition and the synthesis of heterocyclic compounds.
- Explain the important factors controlling selectivity in commonly employed synthetic reactions.
- Apply chemo-, regio-, diastereo- and enantioselective reactions in the synthesis of molecules.
- The course provides a useful revision of the major synthetically useful reactions in organic chemistry.

Key Skills: at the end of this module students should be able to:

Obtain new information from text books, the world wide web and scientific articles/reviews.

Describe and discuss the common strategies employed in modern day organic synthesis and be able to apply these methods for the synthesis of unseen target molecules.

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

Assessment: Examination (75%) 2 hours; Continuous Assessment (25%).

Further reading

S. Warren, Designing Organic Syntheses, Wiley [547.2 WAR].
G. Proctor, Asymmetric Synthesis, Oxford Primer [547.2 PRO].
R. S. Ward, Selectivity in Organic Synthesis, Wiley [547.2 WAR].
P. R. Jenkins, Organometallic Reagents in Synthesis, Oxford primer [547.05 JEN].
K. C. Nicolaou, Classics in Total Synthesis, VCH [547.2 NIC].
Module CH4203 Earth System Science

Convenor: Dr Ball
Lecturers: Prof Monks (Chemistry); Dr Boesch (Physics); Prof Balzter & Dr Kaduk (Geography)
No. of lectures: 22 Both semesters
Course credits: 15

Aims:
Earth system science views the Earth as a synergistic physical system of interrelated phenomena, governed by complex processes involving the geosphere, atmosphere, hydrosphere and biosphere. Fundamental to the Earth system science approach is the need to emphasize relevant interactions of chemical, physical, biological and dynamical processes. Such processes extend over spatial scales from microns to the size of planetary orbits, and over time scales of milliseconds to billions of years. In building on the traditional disciplines to study the Earth, the “system approach” has become widely accepted as a framework from which to pose disciplinary and interdisciplinary questions, especially in relationship to the human influences exerted on the Earth system (e.g. climate change).

The aim of the course is to give students a contemporary view of Earth system science by looking at some of the important physical, chemical and biological processes occurring within the system, their inter-connectivity, and how together they determine the state of the Earth system.

The course has the following elements:

- **Introduction** [1 lecture]
- **Essential chemical and physical concepts** [2 lectures]: atmospheric lifetimes (residence times); source-transport-sink relationships; chemical kinetics; photochemistry.
- **The stratosphere** [2 lectures]: the structure of the atmosphere, stratospheric ozone, polar ozone depletion.
- **The troposphere** [4 lectures + 1 computer class]: atmospheric chemistry in “clean” (i.e. remote) and “polluted” regions; air pollutants; night-time chemistry; oxidising capacity of the atmosphere.
- **Earth system & societal issues** [4 lectures]: Earth system science; challenges of urbanisation; anthropogenic climate change; turning science into policy.
- **Remote sensing** [3 lectures]: satellite measurements of atmospheric composition; the physical principles and target gases.
- **Continuous assessment** poster presentation [2 sessions]: design/feedback session; poster show.
- **Problem classes** [2 sessions]: calculations & problems based on the course material
- **Revision classes** [2 sessions]: review of past exam papers.
Additionally, Chemistry students have the option to also attend teaching for a closely allied module in Geography (GY7104). This module concentrates on Land Surface Processes: e.g. the Carbon Cycle; interactions between the atmosphere / biosphere / ocean / soils; climate change – vulnerabilities, adaptation & mitigation. GY7014 provides a view of many of the issues covered in CH4203, but from a complementary “Geography” perspective.

**Learning Outcomes:** At the end of this module students should be able to:
Understand the basis of atmospheric chemistry and physics; the drivers and constrains on atmospheric composition; the concept of the Earth System as an integrative metaphor and the interacting processes therein.

**Key Skills:** at the end of this module students should be able to:
Obtain new information from textbooks, describe relevant chemistry and discuss it with peers and teachers, enhance presentation skills, solve problems.

**Methods:** Set text(s), lectures, example problems, database exercise, presentations and poster production.

As part of the continuous assessment, the following elements will be undertaken:

a) Poster on a current topic in Earth System Science
b) Quantitative problems worksheet and workshops (x2) to review solutions

**Assessment:** End of module examination (75%) 2 hours; Continuous Assessment (25%).

**Other information:**

**Recommended Texts**
Module CH4204  Green Chemistry

Convenor: Prof. Hope
Lecturers: Prof. Hope, Prof. Abbott
Number of lectures: 20  Both semesters
Course credits: 15

Aims:
This module aims to introduce students to wider, political/environmental, issues which impact upon the chemical industry, to illustrate how chemists wrestle with and solve these issues and to prompt the students to question how best to exploit their fundamental scientific knowledge.

Learning objectives
Subject knowledge: at the end of this module students should be able to:
• Appreciate and be able to apply core chemical principles to wider problems in industry, merchandising and commerce from an environmental, clean technology or Green chemistry perspective.
• Appreciate the impact of social, political, environmental and economic forces on the development and implementation of Greener chemical processes.
• Discuss the applicability, validity and application of metrics for the evaluation of chemical processes.
• Discuss specific alternatives to established processes, including alternative solvents, reactor design, renewable resources, atom efficient reactions, the design of safer (e.g. less toxic) chemicals, energy issues and full life cycle analysis.
• Discuss in detail specific examples of new, Green, approaches to genuine industrial scale chemical processes.

Key skills: at the end of this module students should be able to:
Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

Methods:  Set text(s), lectures, example problems, group problem solving workshops, marked work.
Assessment: Examination (50%); 1½ hours; interrogation of research papers by oral presentation and structured essay (2 x 25%).
The research paper interrogations assess structure, display materials, content, the ability to access, assimilate, assess, present and disseminate scientific information both orally and in writing. In addition, the ability to debate with peers will be evaluated.
The written examination assesses the understanding and application of the concepts and knowledge of Green chemical principles through analysis and interpretation of seen research publication.

Recommended Text(s)
Further reading
http://www.chemsoc.org/networks/gcn/educate.htm
http://www.epa.gov/opptintr/greenchemistry/index.htm
http://www.acs.org/portal/Chemistry?PID=acsdisplay.html&DOC=education\greenchem\index.html
http://chemistry.org/portal/Chemistry?PID=acsdisplay.html&DOC=greenchemistryinstitute\partners.html#electronic

Other information
This module may exploit chemical principles from all courses in levels 1-3, but will consider the chemistry of genuine industrial processes from a clean technology perspective incorporating economic, legislative and environmental factors.
Module CH4206 Cancer Chemistry

Convenor: Prof. Cullis
Lecturers: Prof. Cullis, Dr Blackburn
No. of lectures: 20 Both semesters
Course credits: 15

Aims: The course is directed at the role of chemistry in understanding and treating cancer.

Learning Outcomes:

Subject knowledge: at the end of this module students should:

- know from the chemical standpoint what cancer is, how it starts and how it can be controlled;
- know the meaning of the terms apoptosis, angiogenesis, metastasis and how small molecules control these processes leading to new treatments for cancer;
- know the key chemical processes involved in the development of cancer, including DNA damage by chemical carcinogenesis, and the key chemical reactions involved in DNA repair; bifunctional cancer drugs, DNA alkylation and crosslinking; radiation therapy of cancer.
- have a good appreciation of the main approaches to cancer drug discovery by a comparison between taxol, cis-platin and gleevec;
- be familiar with the principal techniques for biological assays, particularly methods for high throughput screening;
- appreciate the importance of genomics and proteomics in the field of drug discovery;
- understand the principles of combinatorial syntheses and the contribution of this field to the identification of lead compounds;
- know the key reactions of modern synthetic chemistry and hence be able to design and explain rationale synthetic routes to some modern cancer drug candidates
- be able to obtain new information from a variety of sources but in particular from primary research literature, be able to work independently or as part of a group, be able to propose solutions to problems.

Key skills: at the end of this module students should be able to:

Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

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

Assessment: End of semester examination, 2 hours (75%); coursework (25%).

Recommended course texts:

C. Avendano and J.C. Menedez, Medicinal Chemistry of Anticancer Drugs, Elsevier, 2008 [616.994061]
Module CH4207 Computational Chemistry

Convenor: Prof. Ellis

Lecturers: Prof. Ellis & Dr Yang

No. of lectures: 20 Both semesters

Course Credits: 15

Aims: The aim is to move away from the conventional formulaic approach to physical chemistry and instead to show you the power of a variety of computational techniques and procedures. You will be exposed to the practice of computational chemistry through a variety of demonstrations and mini-projects. You will also encounter some of the theoretical principles that underlie the computational methods, including formal molecular quantum mechanics.

Learning Outcomes: at the end of this module students should:

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

Key skills: at the end of this module students should be able to:

Appreciate what quantities can be readily and reliably calculated using computational chemistry and what cannot. You will be exposed to software and procedures readily used by many different types of chemist which will allow you to tackle problems in contemporary chemistry and beyond.

Methods: Lectures, computational demonstrations, mini-problem classes, and a longer term project.

Assessment: End of Semester Examination (2 hours) (50%); Continuous Assessment (50%)

Recommended course texts:

G. H. Grant, W. G. Richards, Computational Chemistry, Oxford University Press (OUP Primers) 1995 [542.8 GRA]
D. C. Young, Computational Chemistry: a practical guide for applying techniques to real world problems, Wiley, 2001 [542.85 YOU]
Module CH4208 Bioinorganic Chemistry

Convenor: Dr Lowe
Lecturers: Dr Lowe, Prof. Raven
No. of lectures: 20 Both semesters
Course credits: 15

Aims: The aim of this module is to use chemical principles to provide an appreciation of the diverse roles of metal ions in biological systems.

Learning Outcomes:

Subject knowledge: at the end of this module students should:

- Be able to describe the occurrence and function of metals and non-metals in biological systems.
- Be able to apply different spectroscopic and kinetic techniques to the study of metal ions in biological systems.
- Know how metal ion substitution and the study of model compounds can aid the understanding of complex metalloproteins.
- Be able to discuss electron transfer, oxygen transport and the role of various metal ions in biological systems.
- Be able to discuss the transport and storage of iron.
- Be able to discuss the role played by platinum compounds as anti-cancer therapies.
- Be able to discuss the use of radioisotopes for diagnostic imaging and as therapeutic agents.
- Be able to explain the key principles behind the use of photodynamic therapy.
- Be able to discuss the use of contrast agents in magnetic resonance imaging.

Key skills: at the end of this module students should be able to:

Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

Methods: Lectures, set texts and literature survey and directed learning.

Assessment: End of semester examination, 2 hours (75%); coursework (25%).

Further reading:

W. Kaim and B. Schwederski, Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life, [574-19214 KAI].
P.C. Wilkins and R.G.Wilkins, Inorganic Chemistry in Biology [547.19214 WIL].
The following texts cover more specific aspects of the course:
R.G. Wilkins, Kinetics and Mechanism of Reactions at Transition Metal Complexes, 2nd Edn, VCH. [546.6 WIL].
Module CH4209 Nanotechnology

Convenor: Dr Karim
Lecturers: Dr Karim, Prof. Piletsky, Prof. Ellis, Dr Yang, Dr Piletska, Dr Whitcombe

No. of lectures: 20 Both semesters

Course credits: 15

Aims: The aim of this module is to use expose students to some of the exciting concepts in modern nanoscience. The module will describe what is nanoscience and nanotechnology and will discuss some of the underlying principles focusing on number of topics ranging from nanoparticle synthesis, determination of the properties of nanoparticles and nanoclusters, MIPs and surface functionalization through to application in biotechnology.

Learning Outcomes:

Subject knowledge: at the end of this module students should:

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

Key skills: at the end of this module students should be able to:

Obtain new information from textbooks and the world wide web, critically evaluate primary research literature, obtain and review key background information, present and discuss findings with peers and teachers, solve problems.

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

Assessment: End of semester examination, 2 hours (75%); coursework (25%).

Reading list


Module CH4212 Advanced Forensic Science

Convenor: Prof. Hillman
Lecturers: Prof. Hillman (Chemistry), Dr Thomas (Archaeology), Dr Elliott (Law), Mr Hartshorne (Law), Guest lecturers

No. of lectures: 20 Both semesters
Course credits: 15

Aims: Lawyers, forensic scientists and other fact investigators spend considerable time engaged in the gathering and organisation of "evidence" that will be presented at trial. The aim of this module is to learn how diverse scientific methods are applied by practitioners of forensic science in the acquisition, interpretation and presentation of physical, biological and other evidence. By combining selected activities from the fields of forensic archaeology and the law of evidence with the experience of forensic science practitioners, the module aims to develop the ability to visualize the full train of events from searching for evidence through to its presentation in court. Topics to be covered will include the trial rules of evidence admissibility, legal relevance, direct and circumstantial evidence, burdens and standards of proof, and forensic toxicology.

Learning Outcomes:

Subject knowledge: at the end of this module students should be able to:
- Appreciate the contributions of scientific analysis to aspects of specialist investigations, selected from digital evidence, fire and explosion investigation, pathology, toxicology and vehicle/accident investigation;
- Apply archaeological methodology to the field of criminal investigation, including: the application of geophysical techniques and landscape analysis in the search for buried remains, excavation of buried remains, analysis of human skeletal remains (applied physical anthropology), archaeological science for information gathering at the scene of a crime;
- Have an awareness of the judicial and police frameworks in the UK and the role of the forensic archaeologist within those systems;
- Understand central concepts within the law of evidence relating to the admissibility of evidence;
- Understand the rules relating to the burdens and standards of proof within trial proceedings;
- Understand the rules relating to the exclusion of illegally and/or improperly obtained evidence;
- Understand the special roles of expert forensic witnesses in the Anglo-American legal systems.

Key skills: at the end of this module students should be able to:
- Obtain new information from diverse scientific and legal sources;
- Describe the role and limitations of investigative techniques in solving forensic problems;
- Discuss these techniques and the information they provide with specialist and non-specialist audiences;
- Design solutions to investigative problems;
- Assess the evidential value of recovered items and facts;
- Give an oral presentation on evidence location, analysis, interpretation or presentation in court;
- Work productively as part of a group;
- Apply laboratory-based knowledge to the location, collection and assessment of evidence from a crime scene.
- Apply the rules that govern the presentation of evidence in court;
- Apply the rules governing the special role of expert forensic witnesses.
Methods:
Lectures, seminars, directed reading, group work, laboratory work, primary literature critique.

Assessment:
Law and (partial) archaeology components by in course assignments (involving essay/report writing and presentations) (60%); special topics and (partial) archaeology by examination at end of semester (40%): 1½ hrs.

Other Information:
Topics to be covered by the participation of expert practitioners may vary according to availability of external speakers.

Recommended Texts
Module CH4251/2/3 Chemistry Project Parts 1, 2 & 3

Convenors: Dr Handa

No. of Weeks: 22, Course credits: 60 (2 × 25/1 × 10)

Aims:
The aim of this module is to give students experience of doing research as part of an active research group within the Department. The module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work.

Learning Outcomes:

Subject knowledge: at the end of this module students should have:
• the experience of doing research as part of an active research group within the department;
• the module aims to teach or reinforce skills such as planning, organisation and record keeping, literature searching, practical laboratory skills, data analysis, report writing, oral presentation skills and team work.
• Part one will mostly involve the practical, experimental part of the project. The second part involves the data analysis, writing a report, including a summary of the relevant literature, and giving an oral presentation, and an oral examination.

Key Skills: at the end of this module students should be able to:
Record, analyse and present data in an appropriate formats.

Methods: Lectures, workshops, practical classes with appropriate demonstration.

Assessment: Continuously assessed laboratory work (25 credits); project report (25 credits); oral exam and presentation (10 credits).

Structure of the module:
First semester: Weeks 1-11: practical work (min 20 hours per week)
Week 12-13: “exam weeks” – All Level 4 exams are in summer and so you should continue with practical work (full time) during these weeks.
You will also present a literature paper during this first semester – this is not assessed.
You should plan your project report and discuss this with your supervisor before the Christmas vacation and start writing your report during the vacation.
In week 12 you should give your supervisor some sections of your report (introduction - up to 5 pages; results and discussion - up to 5 pages; experimental - up to 2 pages). Your supervisor will give you feedback on these sections.
Second semester: Weeks 13-22: practical work (all practical must end here)
During this period you should continue writing your report based on the feedback you obtained from your supervisor (your supervisor will give you feedback on a further 5 pages of your report as necessary). Do not leave report writing until the Easter vacation as this will interfere with your exam revision.
Week 21-22: oral presentation (note: do not worry about including all your results, particularly those obtained in the last week or two)
Week 23: hand in final project report.
Oral exams will take place during Weeks 23-24.

[NB any changes to the above dates will be communicated via Blackboard]
Handing in Reports

You should hand in two bound copies of your report to the Departmental office. There will be binding facilities available to students before the deadline. One copy will be returned to you after it has been assessed. You will also be required to submit an electronic copy via Blackboard. You should also hand in your lab book(s) and all your data directly to your supervisor.

Experimental Work

General Laboratory Work

- Wear safety glasses and protective clothing at all times in the laboratory.
- Use gloves where necessary, but do not handle any apparatus (especially communal apparatus) with contaminated gloves and remember to wash gloves in soap and water before removing them.
- Use a fume cupboard where appropriate. Discuss safety precautions with your supervisor or a demonstrator before working with materials which may pose any hazard to you or to others and complete any necessary COSHH forms.
- All hazardous materials should be stored safely and waste material disposed of properly. Waste solvents should go into the correct waste solvent residues bottle. Chemicals should only go down the sink if they have been made safe. Toxic materials should be disposed of according to recognised procedures (see manufacturer's recommendations).
- Do not dispose of smelly or toxic materials in the open laboratory.

Before starting an experiment make sure you are clear about:

- The aim and scale of the experiment and the correct apparatus for the job.
- The correct procedures for operating equipment, e.g. spectrometers.
- The properties of the reagents, solvents and products (as far as possible) in the interests of safety (using agreed written risk assessment procedures).
- The properties of the reagents and solvents involved and to ensure that appropriate experimental conditions are chosen (e.g. dry conditions/inert atmosphere for water-sensitive materials).
- The full literature procedure (for known experiments).
- How to work up the reaction and isolate the product.
- How to deal with any accidental spillage and how to dispose safely of any unwanted residues.

Remember: if in doubt, ask!

Day-to-day writing up and recording of spectroscopic data

Use a hard-backed notebook for laboratory use and have it in the laboratory at all times. Write down all relevant information (see below) at the time. Don't use filter papers and other scraps of paper for recording data and don't try to carry information in your memory to 'write up later'. Your laboratory notebook need not be a work of art (it is a working notebook), but it should be legible to any reader. You should hand in your lab notebook along with any spectra or other raw data as an appendix to your report (see later).

Note the date at the start of each new day and record what you plan to do and why. (Experiments may be repeated [for a specific reason] and the conditions may vary).

Record important information as discussed above.

Note if any other data is acquired e.g. an NMR spectrum: give each spectrum a code number and record this in your notebook.
Your Project Report

This section offers some guidelines regarding length and format of the report. No scheme will be equally appropriate to all projects, however, the following is a useful general guide. You should aim the report at a chemically-aware reader but you should not assume specialist knowledge which you have learnt during the project.

The report should be word processed according to the following criteria:

- Pages should be numbered.
- The setting for margins should be: top and bottom 2.00cm; left margin 2.5cm; right margin 1.5cm
- using 12pt Times Roman font and 1.5 line spacing.
- Paragraphs have the first line indented by 1.00cm but are not separated by a blank line.
- Citations of references and any notes should be represented in the text by superscripted numbers. The list of references and notes appears at the end of the text under the major heading 'REFERENCES'.
- The reference list has a hanging indent of 1.00cm.
- Chemical structure diagrams should be drawn using ChemDraw which is available on the Network.

Guidelines on length:

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>less than 1 side</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>8-15 sides* (inc. diagrams)</td>
</tr>
<tr>
<td>RESULTS AND DISCUSSION</td>
<td>15-35 sides (inc. diagrams)</td>
</tr>
<tr>
<td>EXPERIMENTAL</td>
<td>7-15 sides</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>see below</td>
</tr>
<tr>
<td>Suggested length</td>
<td>30-70 sides (inc. diagrams) Δ</td>
</tr>
</tbody>
</table>

* For Physical Chemistry projects and others which are very technique based, the introduction may include a discussion of the theory involved, in which case, this section may be larger with a corresponding reduction in one of the subsequent sections. However, it is not anticipated that the treatments and derivations available in standard texts should be included. When the theory and application is unique to the experiment the report should develop key points.

For projects involving synthetic chemistry, the experimental section may be longer.

Δ Reports that exceed this upper limit will have marks deducted. It is important that you learn to write concisely.

Abstract

This should be a summary of less than one side.

Introduction

This section should include a clear statement of the aims of the project. It should also contain a summary of relevant work that has already been published so that the project work can be put in context. Your supervisor will have told you of some relevant papers to read but you must augment these with your own search of the literature.
Results and Discussion

A description and discussion of what you did (but without experimental detail unless this is crucial); distinguish between important information, which needs to be in this section, and routine data which belong in the experimental section. A block diagram of key equipment is often valuable for technique-based projects. Describe the results obtained and the proposed implications thereof. Where appropriate, give an indication of how you identified products and proved the proposed structures (including key spectroscopic data and explanations where necessary, but not routine data). A summary of your conclusions and recommendations for future work (especially the work you would like to do next if you had the time!) should be included.

The results section should not generally include the raw data e.g. spectra, unless absolutely essential. The raw data should be analysed and the resulting information reported e.g. for NMR spectra the chemical shift values should be reported but the actual spectrum does not need to be bound into the report; for kinetics projects, a plot of the experimental points would be expected but not a copy of each spectrum from which the information was obtained. Nevertheless, all the raw data and your laboratory notebook should be presented as an appendix (usually in a separate envelope folder or perhaps on disc if more appropriate). This allows the sources of derived parameters such as rate constants, equilibrium constants etc. to be available to the reader. The key steps in derivation of these parameters should be explained carefully with any assumptions being clearly indicated. Take care to define all terms and symbols and use proper units and dimensions. Where experiments produce quantitative data you should comment on their statistical significance e.g. precision and accuracy and sources of errors.

All compounds and spectra should be numbered for ease of reference.

Experimental

Write a clear, complete and concise account of your experimental work. If you found it necessary to repeat a reaction a number of times, write out the procedure in the most successful case and comment on (or if necessary, tabulate) variations in conditions/results in other cases. Avoid unnecessary repetition.

Include all the data necessary to report your work, i.e. weights, volumes, yields, reaction times, temperatures, purity of reagents, m.p., b.p., etc. Where appropriate, quote literature data on known compounds for comparison or compare measured quantities e.g. enthalpies, emfs with published data.

References

The number of references may vary considerably for each project e.g. in a relatively new area there may not be many references whereas for a well-established area there may be many more. Some areas may be well reviewed in the literature thereby reducing the number of individual references that need to be cited. You will be asked questions about the literature in your oral exam.

Number literature references as they appear in the text. List these at the end of your report using accepted abbreviations for journal titles, (see instructions for authors in RSC journals) viz. Authors' names (initials, surname), journal abbreviation (in italics), year, volume number (in bold), starting page number, e.g.


Oral Exam

The oral exam will test your understanding of the research you have done in your project, including relevant literature, as well as background theory. **You may well be asked questions to which you do not know the answer, you will often be prompted to think about the problem and suggest a possible answer. Not knowing the answers to some questions does not necessarily mean you will do poorly.**