

Programme Specification

Chemistry by Research (2017-18)

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

| | |
|---|--|
| Awarding Institution | University of Southampton |
| Teaching Institution | University of Southampton |
| Mode of Study | Full-time |
| Duration in years | 1 |
| Accreditation details | None |
| Final award | Master of Science (MSc) |
| Name of award | Chemistry by Research |
| Interim Exit awards | Postgraduate Certificate in Higher Education Postgraduate Diploma in Higher Education |
| FHEQ level of final award | Level 7 |
| UCAS code | |
| Programme code | 5004 |
| QAA Subject Benchmark or other external reference | Chemistry 2007 |
| Programme Lead | Guy Denuault (gd) |

Programme Overview

Brief outline of the programme

This Masters of Science in Chemistry by Research is a one year course beginning in October each year and is intended for participants with high quality first degrees in chemistry or a closely related subject.

This programme provides training in chemical research and involves both lecture based modules and a one year-long research project that constitutes 66 per cent of the assessment. In addition to modules which enhance knowledge in chemistry, participants are offered training with regard to safety in the laboratory and to improve their professional skills, such as data analysis and presentation and oral presentations for example.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles.

Learning and teaching

The Taught Component

Learning and teaching methods will include:

- Staff-led lectures, tutorials, workshops, seminars and demonstrations;
- Directed reading in terms of summary texts and primary scientific literature;
- Student-led seminars and presentations (verbal and poster) and contributions to regular research group meetings;
- Exposure to technical reports, including literature searches and surveys;
- Independent (supported) project work in the research environment on a research problem that could realistically lead to results publishable in the peer reviewed literature;
- Regular meetings about research work with the supervisory team, with the lead academic as the key provider of guidance;
- Engagement with written assignments and other activities associated with the coursework component of the subject and skills component of study;
- Revision for written examinations that are a ubiquitous aspect of the MSc qualification.

The Research Project

Your research project will enable you to explore an aspect of cutting-edge chemistry which will be an area that you will have specified as of interest to you during your application procedure. At the start of Semester 1, the specific project topic will be agreed with your academic research supervisor. During the project preparation stage, you will plan the research project, in consultation with your academic supervisor, and estimate the time to be spent on each element of the plan. In addition you will carry out a preliminary literature review of your area of research before arriving at a clear judgement of your overall objectives and how they will build on the current level of knowledge in your area of research. An MSc level research project should realistically offer the opportunity of producing results that would be of a standard to publish in the peer reviewed literature. You will present an overview containing these elements to your project supervisor or your nominated Southampton advisor at an early stage in your time in Southampton. Subsequently there will be regular weekly meetings with either your supervisor or advisor throughout the remainder of the project. You will write quarterly reports of research progress, which will be assessed in writing by the supervisor and advisor. This will allow your progress to be discussed and reviewed against the objectives each quarter. Furthermore, throughout the year you will present your results to group meetings and student-led scientific meetings. At the end of the research period, you will present a summary of the research findings to your supervisor and advisor and this, as well as the previous quarterly reports, will be used to plan your dissertation.

Assessment

Taught component

Your taught component will be assessed by a mixture of examination and coursework. All your chemistry and skills centred learning is taken at FHEQ Level 7 (which maps to CHEM6XXX modules). The exams will be designed to ensure that you have (a) achieved the learning outcomes of each module and (b) the level of sophistication of your understanding. Coursework will also be designed to test that you have met the learning outcomes specified. The proportion of coursework and exam will be that which is judged to most suit your engagement with the content of the course as well as judging your level of understanding. Most scientific modules are assessed by examination while more skills based courses tend towards a higher proportion of coursework.

Past examination papers are available through the library website www.soton.ac.uk/library/resources/index.html under 'exam papers online' and also on the Staff/Student Liaison Blackboard site under the appropriate heading. These assessment methods predominantly judge your achievements against the outcomes noted in 'Student Knowledge and Understanding' (examination based) and 'Transferable/general skills' (coursework based).

Research component

The research component will be assessed on the basis of the practical outcomes of your project work and on your ability to communicate these, and your background understanding, through the authorship of a scientific dissertation. This will be assessed independently by one Southampton academic examiner and another academic from a Department of Chemistry outside Southampton. The latter can require that a viva voce (verbal examination) is also conducted if they are not satisfied that a fair assessment can be completed on the basis of the dissertation alone.

You will also be required to maintain a laboratory notebook and to create a suitable archive and organisation of

your research results. These primary sources of information will be reviewed throughout the duration of your research project and will be part of the final assessment.

You will be required to produce short quarterly reports describing your progress throughout the year. These will be reviewed and feedback provided in a suitable timeframe to allow for your development in advance of the next report. The outcomes of these reviews do not contribute to the final grade. However, past experience clearly demonstrates that a high standard of performance in these regular reports greatly assists in the preparation of a high quality final dissertation.

Special Features of the programme

Specific training is provided in chemical safety.

Written and presentation skills, which are developed through the scientific writing and presentation skills module followed by the dissertation project.

Please note: As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's [programme validation process](#) which is described in the University's [Quality handbook](#).

Educational Aims of the Programme

The aims of the programme are to:

- Provide advanced knowledge in a particular area within the field of modern chemical research;
- Provide an opportunity to work in a research environment in state-of-the-art laboratories;
- Develop knowledge and research skills applicable to a career in research and development in the chemical industry and/or further training in the academic environment.

You can specialise in a research area of your choice, within one of our main research groups:

- Characterisation and Analytics
- Chemical Biology, Diagnostics and Therapeutics
- Computational Systems
- Education
- Electrochemistry
- Functional Organic, Materials and Supramolecular Chemistry
- Magnetic Resonance
- Organic Chemistry: Synthesis, Catalysis and Flow

Programme Learning Outcomes

Knowledge and Understanding

On successful completion of this programme a student will have knowledge and understanding of:

- A1. The ability to address and resolve a research problem in the chosen specialist area
- A2. Skills in critical evaluation of primary and review scientific literature and the ability to develop your knowledge and understanding on the basis of this evaluation;
- A3. An awareness of current research issues and potential impact of the outcomes of work in your chosen research area.

Subject Specific Intellectual and Research Skills

On successful completion of this programme a student will be able to:

- B1. Play a strong part as a researcher in a team in chemical industry;
- B2. Be able to develop research strategies for solving problems in the chosen research area;
- B3. Find, read, understand and explain scientific publications related to the chosen area of research.

Transferable and Generic Skills

On successful completion of this programme a student will be able to:

- C1. make effective use of printed and on-line catalogues, websites and databases to locate relevant technical information;
- C2. gather knowledge and understanding through critical reading of research material;
- C3. apply such knowledge and understanding to specialist problems in chemical research;
- C4. communicate specialist technical information in written and verbal forms to a variety of audiences;
- C5. balance the need for independent research with the importance of making effective contributions to the work of the scientific team;
- C6. develop and apply technical skills in the independent resolution of sophisticated theoretical problems;
- C7. develop an awareness of good laboratory practice and safety issues in a modern research laboratory.

Programme Structure

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

Part I

Typical course content

The MSc by Research programme is of 12 months duration. The research component is a feature of your studies throughout this entire period. The taught part of the programme is confined within two teaching semesters (October to January followed by February to June). Each semester includes twelve weeks of study followed by two weeks of examinations in which any end of module assessments will take place.

The MSc in Chemistry by Research qualification requires that you complete study which accumulates a total of 90 ECTS (ECTS = European Credit Transfer Scheme). This is broken down into a research project leading to a dissertation (60ECTS) and a taught component (30ECTS).

The practical phase of your research project will be completed from October until July of the following year. Although you will have been preparing your dissertation throughout this period it is anticipated that the majority of July and August will involve a concentrated period of dissertation preparation with a limited amount of laboratory work being completed.

Your theory and skills modules will be confined to the two semester teaching periods mentioned above. You will have a free choice of modules (subject to them being relevant to a MSc qualification in chemistry and being at the appropriate academic level) but will be guided by a strong recommendation to keep an equal balance of modules between Semester 1 and 2 where at all possible. It will be possible to have a more concentrated period of study in either Semester 1 or 2 with the approval of your project supervisor and the Director of the MSc programme.

Programme details

Southampton Chemistry has a long tradition of running an annual programme of lectures specifically aimed at postgraduate students and in this respect we are ahead of the field. University regulations reflect national recommendations by placing an increasing stress on skills training, in particular transferable skills to supplement the advanced knowledge courses. MSc students are expected to attend a number of lecture courses in advanced knowledge, skills and, of course, safety during their study.

Part I Compulsory

| Code | Module Title | ECTS | Type |
|----------|--|------|------------|
| CHEM6133 | Scientific writing and presentation skills for Chemistry MSc 2017-18 | 7.5 | Compulsory |

Part I Optional

You may select 18.75 ECTS worth of modules from appropriate CHEM FHEQ Level 7 modules.

Detailed module descriptions including the breakdown of coursework and examination elements for each module are available online at <http://www.southampton.ac.uk/chemistry/undergraduate/modules.page>

(where an indicative list of options can be found. We cannot guarantee to offer every option each year);

Part I Optional Part 1 Optional

The modules listed are the recommended options are subject to availability. Should you wish to select an alternative this will require the approval of the Director of Programmes. Such approval may be sought by emailing sochem@soton.ac.uk

| Code | Module Title | ECTS | Type |
|----------|---|------|----------|
| CHEM6109 | Advanced Bioorganic Chemistry 2017-18 | 3.75 | Optional |
| CHEM6094 | Advanced Inorganic Chemistry for MChem 2017-18 | 7.5 | Optional |
| CHEM6095 | Advanced Organic Chemistry (Bioorganic) for Year 4 MChem with 1YP and Year 3 MChem with Maths/MChem with Medicinal Sci. 2017-18 | 7.5 | Optional |
| CHEM6096 | Advanced Physical Chemistry for Year 4 MChem with 1YP and Year 3 MChem with Maths or Medicinal Sciences 2017-18 | 7.5 | Optional |
| CHEM6126 | Advanced Spectroscopy and its applications 2017-18 | 3.75 | Optional |
| CHEM6141 | Advanced Topics in Inorganic Chemistry 2017-18 | 7.5 | Optional |
| CHEM6137 | Atoms, Molecules and Spins: Quantum Mechanics in Chemistry and Spectroscopy 2017-18 | 7.5 | Optional |
| CHEM6119 | CV and Interview Skills 2017-18 | 3.75 | Optional |
| CHEM6128 | Data-Driven Science 2017-18 | 3.75 | Optional |
| CHEM6110 | Electrochemistry 2017-18 | 3.75 | Optional |
| CHEM6106 | Functional Framework Materials 2017-18 | 3.75 | Optional |

| | | | |
|----------|---|------|----------|
| CHEM6022 | Introduction to Electrochemistry 2017-18 | 7.5 | Optional |
| CHEM6125 | Mass Spectrometry: Theory and Application 2017-18 | 7.5 | Optional |
| CHEM6130 | Materials Characterization by X-Ray Diffraction 2017-18 | 3.75 | Optional |
| CHEM6092 | Medicinal Chemistry for MChem 2017-18 | 7.5 | Optional |
| CHEM6136 | Modelling in Electrochemistry 2017-18 | 3.75 | Optional |
| CHEM6124 | NMR Spectroscopy: Theory and Application 2017-18 | 7.5 | Optional |
| CHEM6113 | Nuclear Magnetic Resonance Spectroscopy 2017-18 | 3.75 | Optional |
| CHEM6103 | Sustainable Chemistry 2017-18 | 7.5 | Optional |
| CHEM6108 | Synthesis of Natural Products and Pharmaceuticals 2017-18 | 3.75 | Optional |
| CHEM6123 | X-ray Diffraction: Theory and Application 2017-18 | 7.5 | Optional |

Progression Requirements

The programme will follow the University's regulations for [Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes](#) or the University's regulations for [Progression, Determination and Classification of Results: Standalone Masters Programmes](#) as set out in the General Academic Regulations in the University Calendar: <http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.

- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support and counselling. Support includes daily Drop In at Highfield campus at 13.00 – 15.00 (Monday, Wednesday and Friday out of term-time) or via on-line chat on weekdays from 14.00 – 16.00. Arrangements can also be made for meetings via Skype.
- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia).
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career and Employability services, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
- Other support that includes health services (GPs), chaplaincy (for all faiths) and 'out of hours' support for students in Halls and in the local community, (18.00-08.00)
- A Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- Receive an induction that will introduce you to all our teaching and learning resources you will interface with during your degree as well as ensuring you understand the regulations which govern your study;
- Have a personal research supervisor who will advise on choice of taught modules and can provide pastoral support (this is the primary source of support for your research);
- Have an allocated academic advisor who can provide an alternative and independent view on your progress. This member of staff will also be your internal examiner at the end of the research programme;
- Receive individually tailored guidance from academic staff delivering the taught components of your programme. Each module has an academic coordinator who would be the first point of contact in the event of needing academic support;
- Be able to obtain additional support from the senior staff involved in the MSc Programme. These include the Director of the MSc degree and the Director of Programmes.
- Have a personal e-mail account, web access, specialist software relevant to your work and IT support from the University i-Solutions team;
- Attend group meetings in the selected research group and research seminars given by visiting speakers.

Administrative staff in the Faculty Student Office support both staff and students in the administration of postgraduate teaching within Southampton Chemistry. This is normally your first port of call for issues relating to the administration of your programme (e.g. registration, timetables, module courses, coursework submission, sickness and absence, examinations, etc.).

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme.
- Acting as a student representative on various committees, e.g. Staff/Student Liaison Committees, Faculty Programmes Committee, Chemistry Educational and Quality Committee, OR providing comments to your student representative to feed back on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation.
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group.

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty.

- Programme validation, normally every five years.
- External examiners, who produce an annual report.
- Accreditation approval processes carried out by the Royal Society of Chemistry.
- A national Research Assessment Exercise (our research activity contributes directly to the quality of your learning experience).
- Institutional Review by the Quality Assurance Agency.

Further details on the University's quality assurance processes are given in the [Quality Handbook](#).

Criteria for admission

The University's Admissions Policy applies equally to all programmes of study. The following are the typical entry criteria to be used for selecting candidates for admission. The University's approved equivalencies for the requirements listed below will also be acceptable.

Typical entry requirements

The normal entry requirement is at least an upper second class honours BSc degree or an equivalent standard in other qualifications approved by the University in Chemistry, or a closely related subject. Non-UK applicants will usually have completed 4 years or more in higher education. Students who have achieved a lower second honours degree will only be admitted in exceptional circumstances. At interview you will need to be able to demonstrate that your first degree prepares you for the modules available within your area of interest, for example organic chemistry modules assume a knowledge of organic reactions and their mechanisms.

The degree must have had a minimum chemistry content of 50%. Closely related subjects are: biochemistry, physics, polymer science, environmental sciences, material science, mathematics. Applicants must elect one of the 4 research sections (Computational Systems Chemistry, Electrochemistry, Molecular Diagnostics and Therapeutics, Magnetic Resonance and Molecular Assembly, Function and Structure) within which they wish to further their interest.

Candidates who do not hold any of the above qualifications, but who have relevant professional experience may be eligible for admissions, but are advised to contact the Admissions Tutor prior to applying.

As part of your application you will need to identify a research supervisor in the area of chemistry in which you wish to specialise. The selection process will involve close scrutiny of your academic credentials in a process that will include an interview (via Skype for students not available to come to Southampton). The whole process is supported by a Post Graduate Admissions Administrator who remains in touch with students throughout the application process.

A minimum standard of English Language is required. You will need a band C pass in one of the tests listed at:

<http://www.southampton.ac.uk/studentadmin/admissions/admissions-policies/language.page>

Further information on language support can be found at:

http://www.southampton.ac.uk/international/entry_reqs/english_language.shtml

This page contains specific entry requirements for this course. Find out about equivalent entry requirements and qualifications for your country.

Recognition of Prior Learning (RPL)

The University has a [Recognition of Prior Learning Policy](#)

Students are accepted under the University's recognition of prior learning policy; however, each case will be reviewed on an individual basis.

English Language Proficiency

The table below sets out the English proficiency requirements for this programme in terms of the IELTS test. We accept a range of other English proficiency tests including TOEFL and Cambridge Advanced/Proficiency. For full details of the recognised tests and the equivalent requirements in those tests please see www.southampton.ac.uk/admissions-language.

| Overall | Reading | Writing | Speaking | Listening |
|---------|---------|---------|----------|-----------|
| 6.5 | 5.5 | 5.5 | 5.5 | 5.5 |

Career Opportunities

Employability is about more than just getting a job. We believe in helping our students gain the necessary experience for a future career, along with the skills to identify opportunities and make the most of them. It is reassuring to know that Chemistry degrees are third only behind Medicine and Dentistry as the degree which offers the highest financial return over the term of the graduate's career, but the rewards of a Chemistry degree lie at a deeper personal level and not just in terms of financial return.

During your year here you will have the opportunity to broaden your options by meeting employers, getting involved in volunteering activities, work placements and much more.

A significant proportion of our graduates decide to go into research by taking a PhD qualification, most of them staying in Southampton. But careers in industry and commerce are available even in the toughest economic times.

There are also research and teaching opportunities and the options to branch out into other fields such as medicine, pharmaceuticals, even finance, and the law and science journalism. This is because chemistry gives you the confidence to take on so many varied challenges in life.

With a Chemistry degree from the University of Southampton your career path will be limited only by the level of your commitment and determination.

External Examiner(s) for the programme

Name: Professor Michael Hardie - University of Leeds

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing

to discuss their own performance in assessment should contact their Personal Academic Tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook.

Appendix 1:

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme also have to pay for:

Additional Costs

| Type | Details |
|---------------------------------|---|
| Software Licenses | All software is provided |
| Hardware | It is advisable that students provide their own laptop or personal computer, although shared facilities are available across the University campus. |
| Computer discs or USB drives | Students are expected to provide their own portable data storage device. |
| Stationery | You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc.). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile. |
| Textbooks | <p>Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source.</p> <p>Some modules suggest reading texts as optional background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.</p> |
| Approved Calculators | Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo. |
| Lab Coats | One laboratory coat and a pair of safety spectacles are provided at the start of the programme to each student. If these are lost the student must replace them at their own expense. |
| Equipment and Materials | All laboratory equipment and materials are provided |
| Printing and Photocopying Costs | <p>Where possible, coursework such as essays; projects; dissertations is likely to be submitted on line. However, there are some items where it is not possible to submit on line and students will be asked to provide a printed copy. Current University printing costs can be found at http://www.southampton.ac.uk/isolutions/students/printing-for-students.page</p> <p>Please Note: Paper sizes not recognised by the printing devices will prompt you to select the size and then charge a minimum of 50p per black and white copy and a maximum of £1 per colour copy.</p> <p>You can pay for your printing by using the money loaders or by using print copy payment service by going to https://www.printcoppayments.soton.ac.uk/</p> <p>Please remember that we are unable to refund any credit that has not been used by the end of your course, so please consider this when topping up your printing/copy account</p> <p>You will be given a printing allowance towards the costs of printing lecture handouts and/or practical scripts of £10 per Semester</p> |

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| | <p>The University Print Centre also offer a printing and copying service as well as a dissertation/binding service. Current printing and copying costs can be found at http://www.southampton.ac.uk/printcentre/copyrooms/service.page</p> <p>They also provide a large format printing service, e.g. Academic posters. Details of current costs can be found at http://www.southampton.ac.uk/printcentre/exhibition/academicposters.page ?.</p> |
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In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

| Module Code | Module Title | Knowledge and Understanding | | | Subject Specific Intellectual and Research Skills | | | Transferable and generic skills | | | | | | |
|-------------|--|-----------------------------|---|---|---|---|---|---------------------------------|---|---|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| CHEM6086 | MSc Research Project | x | x | x | x | x | x | x | x | x | x | x | x | x |
| CHEM6133 | Scientific writing and presentation skills for Chemistry MSc | | x | | | | x | x | x | x | x | | | |