UNIVERSITY OF LEICESTER

# Programme Specification (Undergraduate)

**For students entering in 2017/18**
**Date amended: Feb 2019**

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

BSc Chemistry F100
BSc Chemistry with a Year in Industry*

BSc Chemistry with Forensic Science F1F4
BSc Chemistry with Forensic Science with a Year in Industry*

BSc Pharmaceutical Chemistry F154

BSc Pharmaceutical Chemistry with a Year in Industry*

* - selected when on course

[BSc Chemistry with a Year Abroad; BSc Chemistry with Forensic Science with a Year Abroad & BSc Pharmaceutical Chemistry with a Year Abroad are also *exit awards only* for students failing to progress on the equivalent MChem programmes – see MChem programme specifications]

## 2. Awarding body or institution:

University of Leicester

## 3. a) Mode of study:

Full time

### b) Type of study:

Campus based

## 4. Registration periods

The normal period of registration is three years (four years for degrees with a year in industry or students coming through the STEM foundation route; five years if both).

The maximum period of registration is five years (six years for degrees with a year in industry or students coming through the STEM foundation route).

## 5. Typical entry requirements:

A-level ABB or equivalent and GCSE Maths grade A

## 6. Accreditation of Prior Learning:

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

## 7. Programme aims:

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

- To train students in the practical skills necessary for the safe manipulation of chemicals
- To generate interest in, and understanding of, the wider role of chemistry in society e.g.

health, industry

- To enable students to develop independent learning skills as well as the experience of working as part of a team
- To stimulate intellectual development, develop powers of critical analysis and ability to solve problems
- To enhance written and oral communication skills
- To provide students with training in mathematical techniques and IT skills
- To introduce student to chemical research methodology through carrying out a research project
- To introduce students to a some topics of current chemical research
- To equip students with the knowledge and generic skills for employment or further training in R&D, science based industry and establishments, education, and for training at management levels in other professions.

In addition for the "with a Year in Industry" variants:

- To provide students with an experience of the application of chemistry and professional skills in an industrial environment and to reinforce knowledge through its use in different environments.

**Additional aims and objectives for related degrees**

Chemistry with Forensic Science

- To provide an understanding of the requirements of a forensic investigation from evidence collection through to court proceedings.
- To provide an understanding of the different types forensic evidence and the techniques for forensic analysis and the limitations and reliability of some of these methods

Pharmaceutical Chemistry

- To provide a broad understanding of ideas central to biochemistry
- To provide a broad understanding of the processes involved in development of new drugs including drug design, discovery, mode of action and production

## 8. Reference points used to inform the programme specification:

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

## 9. Programme Outcomes:

| Intended Learning Outcomes | Teaching and Learning Methods | How Demonstrated? |
|---|---|---|
| ***(a) Discipline specific knowledge and competencies*** | | |
| **(i) Mastery of an appropriate body of knowledge** | | |
| Memorization and understanding of basic chemistry theory across all 3 main areas of chemistry* (organic, inorganic and physical) and model problems, practical techniques. | Lectures, Specified Reading, Workshops, Tutorials. Practicals, Computer aided learning | Written exams, tutorial work |
| Detailed knowledge of selected topics in at least 2* of the broad areas of Chemistry | Lectures, Directed Reading, Workshops, Tutorials, project supervision, computer aided learning | Written exams, |
| Specific to Chemistry with Forensic Science:<br>Knowledge of forensic methods of evidence collection and analysis and the British criminal justice system} | Lectures, workshops, tutorials, practicals | Written exams, practical reports |
| Specific to Pharmaceutical Chemistry:<br>Knowledge and understanding of biochemistry | Lectures, workshops, tutorials, practicals | Written exams |
| Knowledge of processes of drug discovery | Lectures, workshops, tutorials | Written exams |

| Intended Learning Outcomes | Teaching and Learning Methods | How Demonstrated? |
|---|---|---|
| **(ii) Understanding and application of key concepts and techniques** | | |
| Ability to apply chemical concepts in new situations e.g. ability to predict physical and chemical properties by comparison with analogues.<br>Ability to apply logic and chemical knowledge to make deductions based on (limited) evidence<br>Practical demonstration of experimental method. Professional use of standard equipment, knowledge of safety procedures | Supervised laboratory work<br>Lectures<br><br>Problem solving, 3rd yr Project | Lab samples, associated data, lab-notebooks and reports<br>Written examinations<br>Assessed problems, Project report |
| **(iii) Critical analysis of key issues** | | |
| Critical analysis of chemical information<br>Summarise key findings of scientific papers. Abstract writing. Knowledge of limitations of theory in some areas<br><br>Specific to Chemistry with Forensic Science:<br>Ability to analyse forensic evidence and appreciate reliability of conclusions | Progressively, particularly year 3 theory modules and 3rd year project<br><br>Problem based learning | Written examinations, Laboratory notebooks, Project report<br><br>Assessed exercises, project |
| **(iv) Clear and concise presentation of material** | | |
| Presentation of chemical information in appropriate formats<br>Participation in scientific discussion<br>Short seminar | Lectures, tutorials, Project supervision Workshop/ group exercises | Laboratory notebooks<br>Project reports<br>Group presentations<br>Project presentation |
| **(v) Critical appraisal of evidence with appropriate insight** | | |
| Experimental method<br>Project design | Lectures, practical classes<br>Project supervision | Written examinations<br>Project reports |
| **(vi) Other discipline specific competencies** | | |
| Response to questioning<br>Short seminar<br>Extended seminar | Tutorials,<br>Group project supervision<br>Project supervision | Oral assessment (vivas)<br>Presentation assessment |
| ***(b) Transferable skills*** | | |
| **(i) Oral communication** | | |
| Response to questioning<br>Short seminar<br>Extended seminar | Tutorials,<br>Group project supervision<br>Project supervision | Oral assessment (vivas)<br>Presentation assessment |
| **(ii) Written communication** | | |
| CVs<br>Laboratory notebook<br>Report writing<br>Science communication | CV induction<br>Lecture, example<br>Writing workshops<br>Workshop | Assessed lab-notebook<br>Project reports<br>Assessed essays |

| Intended Learning Outcomes | Teaching and Learning Methods | How Demonstrated? |
|---|---|---|
| **(iii) Information technology** | | |
| Basic IT skills<br>Use of spreadsheets<br>Basic word processing<br>Use of Chemical Software, e.g. drawing or molecular modelling | Workshops<br>Lab data analysis<br>Projects<br>Lab and Project reports | Assessed tasks<br>Project report<br>Laboratory assessment and projects |
| **(iv) Numeracy** | | |
| Use of analytical and graphical methods | Practice throughout course | Written examinations, project reports |
| **(v) Team working** | | |
| Scientific discussion<br>Organization, time management, recognition of individual strengths | Group problem solving<br>Group projects, Business Game | Group assessment (outcomes and oral questioning) |
| **(vi) Problem solving** | | |
| Ability to solve chemical problems. | Lectures, problem workshops, group work, projects | Marked problems, Exams, Group work assessment, project assessment |
| **(vii) Information handling** | | |
| Gather, retrieve and manipulate chemical evidence and information from a variety of sources and be able to analyse and use it to support a chemical argument | Labs, projects, chemical abstracts exercise, problem workshops | Marked problems, Exams, Group work assessment, project assessment |
| **(viii) Skills for lifelong learning** | | |
| Study skills<br>Time management<br>Commercial awareness<br><br>Information retrieval<br>For students undertaking an industrial placement:<br>Cultural Integration | Resource based learning<br>lab–work and projects<br>careers advice, lectures from visiting industrialists, business game<br>library exercises<br>Industrial Experience | Open note exams<br>Meeting deadlines<br><br>project assessment |

*****For Pharmaceutical Chemistry (PC) there is less coverage of inorganic and physical chemistry, from year 3 onwards, the detailed knowledge is in organic chemistry and pharmaceutical chemistry (PC).

**10. Progression points:**

Students must pass all the practical modules in year 1 and 2 or their programme will be terminated. In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course

Transfer to MChem degrees: Students may be permitted to transfer onto an MChem degree at the end of the first year if they average more than 50% across the first year examinations and assessments. Students may only transfer at the end of the second year if they achieve an average of 58%* or higher across their second year examinations and assessments, and have no re-sits following the midsummer examinations.

* Students scoring less than 58% will only be considered in exceptional circumstances.

Transfer between different degrees: Transfer from BSc Pharmaceutical Chemistry to BSc or MChem Chemistry or from BSc Chemistry with Forensic Science to BSc or MChem Chemistry is allowed at the end of the 1st year (and in exceptional cases at the end of the 2nd year) but transfer the other way i.e.

BSc Chemistry to BSc Pharmaceutical Chemistry or BSc Chemistry to BSc Chemistry with Forensic Science is only allowed at the start of the 1st year (within the first two weeks of the first semester). Note: any transfer from BSc to MChem is subject to the additional requirements set out above.

**11. Scheme of Assessment**

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

**12. Special features:**

Small group tutorials, group problem solving, research based projects, links with industry, problem and context-based learning.

Placements
Students undertake a year in industry between the second and third years of their programme. Progression onto the Year in Industry placement preparation module will require a first year credit weighted average of 55%. Students who undertake the placement preparation module, but do not obtain a placement or do not satisfactorily complete (attendance, participation and completion of set tasks) the placement year will be transferred to the standard degree programme.
As a condition of the 'with Industry' programme, students are required to undertake preparatory training during the second year of their degree.

Students are responsible for securing their own placement but will receive support in this from the Career Development Service.

Once in placement, students will need to register their University 'attendance' by logging on to a dedicated Blackboard site once a week. In the course of the placement the student will receive one or two visits from a member of staff. The second 'visit' can be in the form of a Skype call. Should a student secure an overseas placement both visits will typically be delivered via a Skype call.

While in placement, students will be required to complete an online log. The placement log requires students to undertake reflective activities which are marked on a pass/fail basis. This, together with the final summative reflective report, constitutes the assessment for the placement year. Students have to submit the final report within one month of finishing the placement, and are allowed to resubmit once if required.

If a student fails to secure a placement or does not meet the academic progression requirements they will be transferred to the non-industry variant of their degree programme.

**13. Indications of programme quality**

All BSc degrees were accredited by the RSC in Jan 2016

**14. External Examiners**

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

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

**Appendix 2: Module specifications**

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

**Appendix 3: Skills matrix**

**BSc CHEMISTRY**

**FIRST YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH1000 | CHEMICAL PRINCIPLES | | 15 |
| CH1002 | ORGANIC STRUCTURES AND FUNCTIONAL GROUPS | | 10 |
| CH1003 | MATHS FOR CHEMISTS | | 10 |
| CH1041 | CHEMISTRY SPECIAL TOPICS PART 1 | | 15 |
| CH1061 | CHEMISTRY PRACTICAL PART A | | 15 |
| | | **Semester Total** | **65** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH1008 | ORGANIC REACTIVITY AND MECHANISM | | 10 |
| CH1006 | COORDINATION CHEMISTRY | | 10 |
| CH1007 | THERMODYNAMICS & KINETICS | | 10 |
| CH1042 | CHEMISTRY SPECIAL TOPICS PART 2 | | 10 |
| CH1062 | CHEMISTRY PRACTICAL PART B | | 15 |
| | | **Semester Total** | **55** |

*Note*: CH1003 and CH1061 are both year-long modules.

**SECOND YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2005 | BIFUNCTIONAL MOLECULES | | 10 |
| CH2007 | PHYSICAL CHEMISTRY OF COLLOIDS | | 10 |
| CH2010 | MOLECULAR SPECTROSCOPY | | 10 |
| CH2071 | CHEMISTRY PRACTICAL PART A | | 15 |
| CH2013 | SCIENCE COMMUNICATION AND CAREER SKILLS PART 1 | | 5 |
| **Optional Modules** | | | |
| | 10 CREDITS SELECTED FROM: | | |
| CH2023 | MATERIALS SCIENCE | | 10 |
| CH2040 | INTRODUCTION TO ANALYTICAL CHEMISTRY | | 10 |
| | | **Semester Total** | **60** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2006 | ORGANOMETALLIC CHEMISTRY | | 10 |
| CH2009 | CHEMISTRY OF RINGS | | 10 |
| CH2011 | KINETICS AND MECHANISM | | 10 |
| CH2072 | CHEMISTRY PRACTICAL PART B | | 20 |
| **Optional Modules** | | | |
| | 10 CREDITS SELECTED FROM: | | |
| CH2021 | POLYMER CHEMISTRY | | 10 |
| CH2041 | BIOANALYTICAL CHEMISTRY | | 10 |
| | | **Semester Total** | **60** |

*Note*: CH2013 is a year-long module.

**THIRD YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH3251 | CHEMISTRY PROJECT (PART 1) | | 20 |
| CH3201 | ADVANCED ORGANIC CHEMISTRY | | 15 |
| CH3202 | ADVANCED INORGANIC CHEMISTRY | | 15 |
| CH3200 | CHEMISTRY GENERAL SKILLS | | 5 |
| | | **Semester Total** | **55** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH3252 | CHEMISTRY PROJECT PART 2 | | 20 |
| CH3207 | INDUSTRIAL CHEMISTRY | | 15 |
| CH3206 | ADVANCED ANALYTICAL CHEMISTRY | | 15 |
| **Optional Modules** | | | |
| 15 CREDITS SELECTED FROM: | | | 15 |
| CH3203 | ADVANCED PHYSICAL CHEMISTRY | | 15 |
| CH3204 | BIOLOGICAL CHEMISTRY | | 15 |
| CH3205 | METALS IN ORGANIC SYNTHESIS | | 15 |
| | | **Semester Total** | **65** |

*Note*: for all third year BSc chemistry projects in all degrees, it is expected that a proportion of the work for Part II, credited in the second semester, will be carried out in the first semester.
CH3200 and CH3207 are both year-long modules.

---

**BSc CHEMISTRY WITH FORENSIC SCIENCE**

---

**FIRST YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | **Credits** |
|---|---|---|
| CH1000 | CHEMICAL PRINCIPLES | 15 |
| CH1002 | ORGANIC STRUCTURES AND FUNCTIONAL GROUPS | 10 |
| CH1003 | MATHS FOR CHEMISTS | 10 |
| CH1030 | INTRODUCTION TO FORENSIC SCIENCE | 10 |
| CH1063 | CHEMISTRY PRACTICAL (FORENSIC) PART A | 10 |
| LW1173 | ANALYSING THE ENGLISH LEGAL SYSTEM | 10 |
| **Semester Total** | | **65** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH1008 | ORGANIC REACTIVITY AND MECHANISM | | 10 |
| CH1006 | COORDINATION CHEMISTRY | | 10 |
| CH1007 | KINETICS AND THERMODYNAMICS | | 10 |
| CH1030 | INTRODUCTION TO FORENSIC SCIENCE | | 5 |
| CH1064 | CHEMISTRY PRACTICAL (FORENSIC) PART B | | 10 |
| LW1174 | LAW, JUSTICE & SOCIETY | | |
| | | **Semester Total** | **55** |

*Note*: CH1003, CH1030 and CH1063 are year-long modules.

**SECOND YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2005 | BIFUNCTIONAL MOLECULES | | 10 |
| CH2007 | PHYSICAL CHEMISTRY OF COLLOIDS | | 10 |
| CH2010 | MOLECULAR SPECTROSCOPY | | 10 |
| CH2040 | INTRODUCTION TO ANALYTICAL CHEMISTRY | | 10 |
| CH2071 | CHEMISTRY PRACTICAL PART A | | 15 |
| CH2013 | SCIENCE COMMUNICATION AND CAREER SKILLS PART 1 | | 5 |
| | | **Semester Total** | **60** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2006 | ORGANOMETALLIC CHEMISTRY | | 10 |
| CH2009 | CHEMISTRY OF RINGS | | 10 |
| CH2011 | KINETICS AND MECHANISM | | 10 |
| CH2041 | BIOANALYTICAL CHEMISTRY | | 10 |
| CH2072 | CHEMISTRY PRACTICAL PART B | | 20 |
| | | **Semester Total** | **60** |

*Note*: CH2013 is a year-long module.

**THIRD YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH3251 | CHEMISTRY PROJECT PART 1 | | 20 |
| CH3201 | ADVANCED ORGANIC CHEMISTRY | | 15 |
| CH3202 | ADVANCED INORGANIC CHEMISTRY | | 15 |
| CH3200 | CHEMISTRY GENERAL SKILLS | | 5 |
| | | **Semester Total** | **55** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH3212 | FORENSIC SCIENCE | | 15 |
| CH3252 | CHEMISTRY PROJECT PART 2 | | 20 |
| CH3206 | ADVANCED ANALYTICAL CHEMISTRY | | 15 |
| **Optional Modules** | | | |
| 15 CREDITS SELECTED FROM | | | |
| CH3203 | ADVANCED PHYSICAL CHEMISTRY | | 15 |
| CH3204 | BIOLOGICAL CHEMISTRY | | 15 |
| CH3205 | METALS IN ORGANIC SYNTHESIS | | 15 |
| | | **Semester Total** | **65** |

*Note*: for all third year BSc chemistry projects in all degrees, it is expected that a proportion of the work for Part II, credited in the second semester, will be carried out in the first semester.
CH3200 is a year-long module

**BSc PHARMACEUTICAL CHEMISTRY**

**FIRST YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH1000 | CHEMICAL PRINCIPLES | | 15 |
| CH1002 | ORGANIC STRUCTURES AND FUNCTIONAL GROUPS | | 10 |
| CH1003 | MATHS FOR CHEMISTS | | 10 |
| CH1031 | PHARMACEUTICAL CHEMISTRY SPECIAL TOPICS PART 1 | | 10 |
| CH1061 | CHEMISTRY PRACTICAL PART A | | 15 |
| | | **Semester Total** | **60** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH1008 | ORGANIC REACTIVITY AND MECHANISM | | 10 |
| CH1006 | COORDINATION CHEMISTRY | | 10 |
| CH1007 | KINETICS AND THERMODYNAMICS | | 10 |
| CH1032 | PHARMACEUTICAL CHEMISTRY SPECIAL TOPICS PART 2 | | 15 |
| CH1062 | CHEMISTRY PRACTICAL PART B | | 15 |
| | | **Semester Total** | **60** |

*Note*: CH1003 and CH1061 are both year-long modules.

**SECOND YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2005 | BIFUNCTIONAL MOLECULES | | 10 |
| CH2010 | MOLECULAR SPECTROSCOPY | | 10 |
| CH2013 | SCIENCE COMMUNICATION AND CAREER SKILLS PART 1 | | 5 |
| CH2007 | PHYSICAL CHEMISTRY OF COLLOIDS | | 10 |
| CH2073 | CHEMISTRY PRACTICAL (PHARMACEUTICAL) PART A | | 10 |
| BS2513 | PHYSIOLOGY AND PHARMACOLOGY 1 | | 20 |
| | | **Semester Total** | **65** |

**SEMESTER 2**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH2009 | CHEMISTRY OF RINGS | | 10 |
| CH2006 | ORGANOMETALLIC CHEMISTRY | | 10 |
| CH2011 | KINETICS AND MECHANISM | | 10 |
| CH2041 | BIOANALYTICAL CHEMISTRY | | 10 |
| CH2074 | CHEMISTRY PRACTICAL (PHARMACEUTICAL) PART B | | 15 |
| | | **Semester Total** | **55** |

*Note*: CH2013 is a year-long module.

**THIRD YEAR MODULES**

**SEMESTER 1**

| **Core Modules** | | | **Credits** |
|---|---|---|---|
| CH3201 | ADVANCED ORGANIC CHEMISTRY | | 15 |
| CH3202 | ADVANCED INORGANIC CHEMISTRY | | 15 |
| CH3251 | CHEMISTRY PROJECT PART I | | 20 |
| CH3200 | CHEMISTRY GENERAL SKILLS | | 5 |
| | | **Semester Total** | **55** |

**SEMESTER 2**

| **Core Modules** | | **Credits** |
|---|---|---|
| CH3252 | CHEMISTRY PROJECT PART II | 20 |
| CH3204 | BIOLOGICAL CHEMISTRY | 15 |
| CH3205 | METALS IN ORGANIC SYNTHESIS | 15 |
| CH3211 | PHARMACEUTICAL CHEMISTRY | 15 |
| | **Semester Total** | **65** |

*Note*: for all third year BSc chemistry projects in all degrees, it is expected that a proportion of the work for Part II, credited in the second semester, will be carried out in the first semester.
CH3200 is a year-long module

BSc PROGRAMMES WITH INDUSTRY

Students may elect to undertake an industrial placement during their third year of study.

FIRST AND SECOND YEAR MODULES
As for the relevant named BSc degree.

THIRD YEAR MODULES
The third year of the course will be spent carrying out a project in an industrial placement. The work will be assessed on a pass/fail basis on the basis of a project report and a record of achievement. The marks from this year will not be included in the final degree assessment.

FOURTH YEAR MODULES
As for the 3rd year of the relevant named BSc degree.
Following successful completion of the year in industry, and satisfactory completion of the programme requirements (as defined by the University Scheme of Assessment) students shall be eligible to be considered for the award of a BSc in the relevant named area 'with a year in industry'.