UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

For students entering in 2018/19
Date amended: July 2017

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, sustainability
- 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 investigation
- To introduce students to a range 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, the techniques for forensic analysis and the limitations and reliability of some of these methods.

Pharmaceutical Chemistry

- To provide a broad understanding of the chemistry that underpins central areas of 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 Benchmarking Statement for Chemistry 2014
- University of Leicester Learning and Teaching Strategy 2016-2020
- University of Leicester Periodic Developmental Review Report
- External Examiners' reports (annual)
- University Employability Strategy
- Destinations of Leavers from Higher Education (DLHE) survey
- Royal Society of Chemistry accreditation guidance

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Discipline specific knowledge and competencies		
(i) Mastery of an appropriate body of knowledge		
Typical students should be able to: recall and apply the basic concepts of chemistry theory across all 3 main areas of chemistry* (inorganic, organic & physical) and related mathematics; solve structured and unseen model problems; conduct experiments and apply practical techniques. Typical students should have detailed knowledge of selected topics in at least 2* of the broad areas of chemistry (organic, inorganic, physical and analytical).	Lectures; tutorials; specified & directed reading; problem classes; problem-based learning; open ended group work; laboratory practical classes; research projects; computer aided learning.	Written examinations; assessed coursework including – tutorial problems, computer tests, oral presentations; assessed practical work and reports.
Specific to Chemistry with Forensic Science: knowledge of forensic methods of evidence collection and analysis and the British criminal justice system.	Lectures; specified & directed reading; laboratory practical classes.	Written examinations; assessed coursework including – written work, essays, practical reports, oral presentations
Specific to Pharmaceutical Chemistry: knowledge and understanding of biochemistry; knowledge of processes of drug discovery. *For Pharmaceutical Chemistry there is less coverage of physical chemistry, in year 3, the detailed knowledge is in organic chemistry and pharmaceutical chemistry.	Lectures; specified & directed reading; laboratory practical classes.	Written examinations; assessed coursework including – written work, essays, oral presentations.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(ii) Understanding and application of key concepts and techniques		
Typical students should be able to: apply chemical concepts in new situations (e.g. ability to predict physical and chemical properties by comparison with analogues); apply logic and chemical knowledge to make deductions based on (limited) evidence; solve familiar and unfamiliar chemistry related problems; design, construct and conduct chemical experiments using standard equipment and following safe procedures; use computer programs to retrieve & analyse data; describe and discuss the accumulation of scientific evidence.	Lectures; tutorials; specified & directed reading; problem classes; problem-based learning; open ended group work; laboratory practical classes; research projects; computer aided learning.	Written examinations; assessed coursework including – tutorial problems, computer tests, oral presentations; assessed practical work and reports.
(iii) Critical analysis of key issues		
Typical students should be able to: critically appraise physical & chemical information and discuss its limitations; draw quantitative conclusions from sample data; summarise key findings of scientific papers; critically assess and compare scientific theories. Specific to Chemistry with Forensic Science: ability to analyse forensic evidence and appreciate reliability of conclusions.	Lectures; tutorials; problem-based learning; problem classes, open ended group work; laboratory practical classes; research projects; computer aided learning.	Written examinations; practical & projects reports; oral presentations; assessed practical work; assessed computer exercises.
(iv) Clear and concise presentation of material		
Typical students should be able to: present scientific ideas, data and results in a variety of (appropriate) forms e.g. reports, seminars, posters, papers etc; use appropriate software for presenting and modelling chemical structures and systems; participate in scientific discussion and debate.	Lectures, tutorials; problem-based learning; group based problem classes; open ended group project work; laboratory practical classes; research projects.	Laboratory notebooks; practical and project reports; oral presentations; assessed practical work including lab samples & associated data; assessed computer exercises; tutorial work

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(v) Critical appraisal of evidence with appropriate insight		
Typical students should be able to discuss and implement experimental methodology; collect and critically analyse data; draw valid inferences from data in a variety of settings; discuss and criticize scientific literature.	Tutorials; problem-based learning; lectures; open ended group project work; laboratory practical classes; research projects.	Written examinations; reports; oral presentations; assessed practical work; assessed computer exercises; assessed problems; project assessments.
(vi) Other discipline specific competencies		
Typical students should be able to: discuss, design and implement scientific experiments; competently use a range of standard laboratory equipment; describe and adhere to laboratory safety procedures; describe and discuss some areas of current research in chemistry	Tutorials; problem-based learning; research projects.	Written reports; oral presentations; assessed practical work; written examinations.
(b) Transferable skills		
(i) Oral communication		
Typical students should be able to: describe and discuss scientific concepts to a variety of audiences; give reasoned arguments in response to chemical questions.	Tutorials; problem-based learning; group problem solving classes; research projects.	Oral presentations and questioning (including projects)
(ii) Written communication		
Typical students should be able to write concise and clear scientific reports (including abstracts), laboratory notebooks & reports and project summaries; write CVs; clearly discuss some areas of current research in chemistry in written form.	Tutorials; problem-based learning; laboratory practical classes; CV writing workshop; research projects.	Written lab-notebooks, project and laboratory reports; assessed CVs; assessed coursework including essays, written examinations.
(iii) Information technology		
Typical students should be able to: use spreadsheets, word processing and presentation facilities; use basic IT skills to access chemical information from online databases; use mathematical packages for data analysis; use chemistry specific software such as drawing or molecular modelling packages.	Problem classes; research projects; literature based coursework exercises; laboratory practical classes	Assessed IT tasks; laboratory/project assessments; practical and project reports; assessed problems.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(iv) Numeracy		
Typical students should be able to: use analytical and graphical methods; analyse data; solve numerical problems involving e.g. calculus, linear algebra.	Lectures; group problem solving classes; problem-based learning; research project; laboratory practical classes.	Written examinations; practical and project reports; oral presentations; assessed practical work; assessed problems
(v) Team working		
Typical students should be able to: discuss concepts and formulate plans working with peers; recognise individual strengths within a team; organise time and tasks coherently between group members; produce joint reports/presentations.	Group problem solving classes, coursework & projects; problem-based learning; research projects.	Group assessment (outcomes and oral questioning); project assessment.
(vi) Problem solving		
Typical students should be able to: analyse problems; plan and implement projects; apply chemistry knowledge and problem solving ability to novel applications; solve unfamiliar numerical problems.	Lectures; tutorials; problem-based learning; laboratory classes; open ended group work; research projects.	Assessed examinations; assessed problems; group work assessment; project assessments.
(vii) Information handling		
Typical students should be able to: gather, retrieve and manipulate chemical information and data from a variety of sources, analyse & use it to support a chemical argument; describe and discuss the scientific method; present data in various forms (e.g. tabular and graphical); access, search and appraise articles in scientific journals/literature.	Lectures, tutorials; problem-based learning; laboratory and project supervision; group problem solving classes; research projects.	Assessed examinations; assessed problems; project and laboratory reports; oral presentations;.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(viii) Skills for lifelong learning		
Typical students should be able to: plan and undertake projects involving elements of independent research; access, search and appraise scholarly articles; collect and analyse data; search for and pursue employment and/or further study opportunities; work effectively in teams; work to deadlines managing their time effectively.	Laboratory classes & research projects; careers / skills training sessions; lectures from visiting speakers	Open note assessments; meeting deadlines; Project assessments; written examinations; assessed CVs;
Students taking an industrial placement year will also appreciate the cultural environment of different businesses.	Experience with industry.	Reflective coursework exercises.

10. Progression points:

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

Practical & project requirements: Modules CH1205, CH2204, CH3261 & CH3262 must be passed **at the first attempt**, except at the discretion of the Board of Examiners who may ask students to resubmit one or more assessed coursework elements where it is possible for students to achieve a pass mark for the module by improving their mark in individual coursework elements. There are no resit opportunities for non-mitigated missed practical work. Practical modules CH1205 & CH2204 also have a requirement of at least 75% attendance (and completion) of scheduled *laboratory* sessions; if this is not achieved then the module will be automatically failed. A limited number of additional "catch-up" sessions may be provided for students who have accepted mitigation for non-attendance.

Transfer to MChem degrees: Students may be permitted to transfer onto a MChem degree during their 2nd year if their final credit weighted average for year 1 is greater than 50%.*

* An internal deadline will be set by the Department during Year 2 for such transfers; this will be clearly communicated to all Year 2 students.

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). Transfer from 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 semester 1). 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, student-centred learning, 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 degrees were accredited by the Royal Society of Chemistry in Jan 2016
Academic Review
External examiners reports
Destinations of Leavers from Higher Education (DLHE) survey

14. External Examiner(s) reports

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

Appendix 1: Programme structure (programme regulations)

Appendix 2: Module specifications

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

Appendix 3: Skills matrix

BSc Chemistry

YEAR 1

SEMESTER 1

Core modules		Credits
CH1200	GENERAL CHEMISTRY	15
CH1206	SCIENTIFIC METHOD & PRINCIPLES OF ANALYTICAL CHEMISTRY	15

SEMESTER 2

Core modules		
CH1207	CHEMISTRY OF THE REAL WORLD	15

YEAR-LONG

Core modules		
CH1201	INTRODUCTORY ORGANIC CHEMISTRY	15
CH1202	INTRODUCTORY INORGANIC CHEMISTRY	15
CH1203	INTRODUCTORY PHYSICAL CHEMISTRY	15
CH1204	CHEMISTRY KEY SKILLS & MATHS	15
CH1205	INTRODUCTORY PRACTICAL CHEMISTRY	15
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 2

SEMESTER 1

Core modules		Credits
CH2200	SPECTROSCOPY THEORY & PRACTICE	15
CH2207	POLYMER & MATERIALS CHEMISTRY	15

SEMESTER 2

Core modules		
CH2206	ANALYTICAL CHEMISTRY IN PRACTICE	15

YEAR-LONG

Core modules		
CH2201	ORGANIC CHEMISTRY	15
CH2202	INORGANIC CHEMISTRY	15
CH2203	PHYSICAL CHEMISTRY	15
CH2204	PRACTICAL CHEMISTRY & KEY SKILLS	30
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 3

SEMESTER 1

Core modules		Credits
CH3201	ADVANCED ORGANIC CHEMISTRY	15

CH3202	ADVANCED INORGANIC CHEMISTRY	15
CH3261	BSC PROJECT PRACTICAL	15

SEMESTER 2

Optional modules:* 3 from

CH3203	ADVANCED PHYSICAL CHEMISTRY	15
CH3204	BIOLOGICAL CHEMISTRY	15
CH3205	METALS IN SYNTHESIS	15
CH3206	ADVANCED ANALYTICAL CHEMISTRY	15
CH3208	ADVANCED MATERIALS CHEMISTRY	15

(* At least <u>one</u> of CH3203 or CH3206 <u>must</u> be taken)

YEAR-LONG

Core modules

CH3260	BSC GENERAL PAPER & KEY SKILLS	15
CH3262	BSC PROJECT REPORT	15
		Total 120

The year-long modules will be suitably delivered weighted to ensure approx. 60 credits in each semester.

BSc Chemistry with Forensic Science

YEAR 1

SEMESTER 1

Core modules		**Credits**
CH1200	GENERAL CHEMISTRY	15
CH1206	SCIENTIFIC METHOD & PRINCIPLES OF ANALYTICAL CHEMISTRY	15

SEMESTER 2

Core modules

CH1208	INTRODUCTORY FORENSIC SCIENCE I	15

YEAR-LONG

Core modules

CH1201	INTRODUCTORY ORGANIC CHEMISTRY	15
CH1202	INTRODUCTORY INORGANIC CHEMISTRY	15
CH1203	INTRODUCTORY PHYSICAL CHEMISTRY	15
CH1204	CHEMISTRY KEY SKILLS & MATHS	15
CH1205	INTRODUCTORY PRACTICAL CHEMISTRY	15
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 2

SEMESTER 1

Core modules		**Credits**
CH2200	SPECTROSCOPY THEORY & PRACTICE	15
CH2208	INTRODUCTORY FORENSIC SCIENCE II	15

SEMESTER 2

Core modules

CH2206	ANALYTICAL CHEMISTRY IN PRACTICE	15

YEAR-LONG

Core modules

CH2201	ORGANIC CHEMISTRY	15
CH2202	INORGANIC CHEMISTRY	15
CH2203	PHYSICAL CHEMISTRY	15
CH2204	PRACTICAL CHEMISTRY & KEY SKILLS	30
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 3

SEMESTER 1

Core modules		**Credits**
CH3201	ADVANCED ORGANIC CHEMISTRY	15
CH3202	ADVANCED INORGANIC CHEMISTRY	15
CH3261	BSC PROJECT PRACTICAL	15

SEMESTER 2

Core modules

CH3212	FORENSIC SCIENCE	15

Optional modules:* 2 from

CH3203	ADVANCED PHYSICAL CHEMISTRY	15
CH3204	BIOLOGICAL CHEMISTRY	15
CH3205	METALS IN SYNTHESIS	15
CH3206	ADVANCED ANALYTICAL CHEMISTRY	15
CH3208	ADVANCED MATERIALS CHEMISTRY	15

(* At least <u>one</u> of CH3203 or CH3206 <u>must</u> be taken)

YEAR-LONG

Core modules

CH3260	BSC GENERAL PAPER & KEY SKILLS	15
CH3262	BSC PROJECT REPORT	15
		Total 120

The year-long modules will be suitably delivered weighted to ensure approx. 60 credits in each semester.

BSc Pharmaceutical Chemistry

YEAR 1

SEMESTER 1

Core modules		Credits
CH1200	GENERAL CHEMISTRY	15
CH1206	SCIENTIFIC METHOD & PRINCIPLES OF ANALYTICAL CHEMISTRY	15

SEMESTER 2

Core modules		
CH1209	INTRODUCTORY PHARMACEUTICAL CHEMISTRY	15

YEAR-LONG

Core modules		
CH1201	INTRODUCTORY ORGANIC CHEMISTRY	15
CH1202	INTRODUCTORY INORGANIC CHEMISTRY	15
CH1203	INTRODUCTORY PHYSICAL CHEMISTRY	15
CH1204	CHEMISTRY KEY SKILLS & MATHS	15
CH1205	INTRODUCTORY PRACTICAL CHEMISTRY	15
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 2

SEMESTER 1

Core modules		Credits
CH2200	SPECTROSCOPY THEORY & PRACTICE	15
BS2013	PHYSIOLOGY & PHARMACOLOGY	15

SEMESTER 2

Core modules		
CH2206	ANALYTICAL CHEMISTRY IN PRACTICE	15

YEAR-LONG

Core modules		
CH2201	ORGANIC CHEMISTRY	15
CH2202	INORGANIC CHEMISTRY	15
CH2203	PHYSICAL CHEMISTRY	15
CH2204	PRACTICAL CHEMISTRY & KEY SKILLS	30
		Total 120

Delivery of the year-long modules will be weighted towards semester 2 to ensure approx. 60 credits is delivered in each semester.

YEAR 3

SEMESTER 1

Core modules		**Credits**
CH3201	ADVANCED ORGANIC CHEMISTRY	15
CH3202	ADVANCED INORGANIC CHEMISTRY	15
CH3261	BSC PROJECT PRACTICAL	15

SEMESTER 2

Core modules		
CH3211	PHARMACEUTICAL CHEMISTRY	15
Optional modules: 2 from		
CH3203	ADVANCED PHYSICAL CHEMISTRY	15
CH3204	BIOLOGICAL CHEMISTRY	15
CH3205	METALS IN SYNTHESIS	15
CH3206	ADVANCED ANALYTICAL CHEMISTRY	15
CH3208	ADVANCED MATERIALS CHEMISTRY	15

YEAR-LONG

Core modules		
CH3260	BSC GENERAL PAPER & KEY SKILLS	15
CH3262	BSC PROJECT REPORT	15
		Total 120

The year-long modules will be suitably delivered weighted to ensure approx. 60 credits in each semester.

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'.

BSc PROGRAMMES WITH A YEAR ABROAD

These are only available as exit awards for students on the corresponding MChem programmes who fail parts of their 3rd year abroad. Details can be found on under the MChem programme specifications.