UNIVERSITY OF LEICESTER

Programme Specification (Undergraduate)

Date amended: June 2017

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

BSc Chemistry F100

2. Awarding body or institution:

University of Leicester

3. a) Mode of study:

Full time

b) Type of study:

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

4. Registration periods

The normal period of registration is four years

The maximum period of registration is six years

5. Typical entry requirements:

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

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

6. Accreditation of Prior Learning:

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

7. Programme aims:

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

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

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

8. Reference points used to inform the programme specification:

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

9. Programme Outcomes:

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

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(iii) Critical analysis of key issues		
Typical students should be able to: critically appraise physical and chemical information, and discuss its limitations; summarise key findings of scientific papers; draw quantitative conclusions from sample data; critically assess and compare scientific theories	Progressively through the programme, particularly in the 4th year. Lectures; Problem Classes; Tutorials; Laboratory Practical Classes; Group projects; Computer aided learning; Project supervision.	Written exams; assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(iv) Clear and concise presentation of material		
Typical students should be able to: present scientific ideas, data and results in a variety of (appropriate) forms, e.g. reports, seminars, posters; use chemical software, e.g. drawing, molecular modelling; participate in scientific discussion and debate.	Tutorials, Laboratory Practical Classes; Group projects; Problem classes; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(v) Critical appraisal of evidence with appropriate insight		
Typical students should be able to: discuss and implement experimental methodology; collect and critically analyse data; draw valid inferences from data; interrogate and discuss scientific literature.	Tutorials, Laboratory Practical Classes; Group projects; Problem classes; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.
(vi) Other discipline specific competencies		
Typical students should be able to: respond to questioning; give a short seminar.	Tutorials: Group project supervision; Project supervision	Tutorial work; project assessment.
(b) Transferable skills		
(i) Oral communication		
In English, typical students should be able to: give reasoned arguments in response to chemical questions; give a short seminar on a chemical topic	Tutorials; Group work; Group project supervision; Project supervision	Tutorial work; Oral project presentations and examinations
(ii) Written communication		
In English, typical students should be able to: write abstracts, tutorial and problem class work, lab notebooks, lab reports and project dissertation; communicate scientifically.	Lectures; Tutorials; Practical classes; Group work; Writing workshops; Project supervision.	Assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; assessed essays; tutorial work; project assessment.
(iii) Information technology		
Typical students should be able to: use mathematical packages for data analysis; use spreadsheets, presentation and word processing facilities; use scientific software packages, e.g. drawing or molecular modelling.	Problem classes; Practical classes; Group work; Project supervision	Assessed practical work; assessed computer exercises; project assessment.
(iv) Numeracy		
Typical students should be able to: use analytical and graphical methods; use calculus in Chemistry and Chemical Engineering; analyse data; solve numerical problems.	Progressively throughout course.	Written exams; assessed practical work, including lab samples, associated data, lab notebooks and reports; assessed computer exercises; assessed problems; tutorial work; project assessment.

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

10. Progression points:

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

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

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

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

11. Scheme of Assessment

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

12. Special features:

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

13. Indications of programme quality

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

14. External Examiners

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

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

Appendix 2: Module specifications

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

Appendix 3: Skills matrix

APPENDIX 1

BSc CHEMISTRY

FIRST YEAR MODULES

SEMESTER 1

Core Modules		**Credits**
EL0001	ENGLISH FOR GENERAL ACADEMIC PURPOSES	45
CH1280	ADVANCED MATHEMATICS I	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

MILITARY THEORY AND TRAINING

MORAL CULTIVATION AND BASIC LAW

PHYSICAL EDUCATION I

SEMESTER 2

Core Modules		**Credits**
EL0005	ENGLISH FOR SPECIFIC ACADEMIC PURPOSES	15
CH0061	INTRODUCTION TO CHEMISTRY	30
CH1281	ADVANCED MATHEMATICS II	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

CHINESE MODERN CONTEMPORARY HISTORY AND SITUATION POLICY

PHYSICAL EDUCATION II

SEMESTER 3

Additional Non-Credit Bearing Modules

ENGINEERING TRAINING

COLLEGE STUDENT MENTAL HEALTH AND HEALTH EDUCATION

SECOND YEAR MODULES

SEMESTER 1

Core Modules

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

Additional Non-Credit Bearing Modules

PRINCIPLE OF MARXISM AND THEORY OF SOCIALISM

SEMESTER 2

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

Additional Non-Credit Bearing Modules

COLLEGE COMPUTING

SEMESTER 3

Additional Non-Credit Bearing Modules

COGNITION PRACTICAL

THIRD YEAR MODULES

SEMESTER 1

Core Modules		**Credits**
CH2200	SPECTROSCOPY THEORY AND PRACTICE	15
CH2202	INORGANIC CHEMISTRY	15
CH2204	PRACTICAL CHEMISTRY AND KEY SKILLS A	15
CH2880	PRINCIPLES OF CHEMICAL ENGINEERING AND PRACTICAL I	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 1

ENGINEERING DRAWING

SEMESTER 2

Core Modules		**Credits**
CH2201	ORGANIC CHEMISTRY	15
CH2203	PHYSICAL CHEMISTRY	15
CH2205	PRACTICAL CHEMISTRY AND KEY SKILLS B	15
CH2881	PRINCIPLES OF CHEMICAL ENGINEERING AND PRACTICAL II	15
	Semester Total	**60**

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 2

ELECTROTECHNICS

SEMESTER 3

Additional Non-Credit Bearing Modules

PRODUCTION PRACTICAL

FOURTH YEAR MODULES

SEMESTER 1

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

Additional Non-Credit Bearing Modules

GENERAL OPTIONAL COURSE 3

SEMESTER 2

Core Modules		**Credits**
CH3851	CHEMISTRY PROJECT (PART 1)	30
CH3852	CHEMISTRY PROJECT (PART 2)	15
Optional Modules (ONE OF)		
CH3205	METALS IN SYNTHESIS	15
CH4207	COMPUTATIONAL CHEMISTRY	15
	Semester Total	**60**

Programme Specification Appendix 3

Skills Matrix: F100 Chemistry

Date amended: 17th May 2017

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

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