

# PROGRAMME SPECIFICATION

**Programme Code:** S364100AY

**Programme Title:**

Chemistry

**Awarding Institution:**

Queen's University Belfast

**Teaching Institution:**

**Programme Accredited By:**

Accredited by the Royal Society of Chemistry.

**Final Award:**

MSci

**UCAS Code:**

F105

**QAA Benchmarking Group:**

Chemistry (2007) - Stages 1, 2, 3

## **Educational Aims of Programme**

The overall aims of this undergraduate programme are to offer a high quality, supportive teaching and learning environment that gives students the opportunity to:

1. Understand the core principles of chemistry with a strong emphasis on Academic Excellence and professional development.
2. Progress directly from the MSci to graduate level employment in the both the chemical industry, and non-chemistry related industries or alternatively progress to postgraduate study or research.
3. Prepare for eligibility for professional recognition and the status "Chartered Chemist" through full membership of the Royal Society of Chemistry.
4. Enhance employability skills including the ability to work in a team, written and oral presentation skills, numeracy and preparation for self motivated lifelong learning, professional development and service to society.
5. Develop professional skills within an academic setting through a dedicated research project.

## **Criteria for Admission (Subject Specific Requirements) to Programme**

The minimum entry requirement is normally **ABB** at A Level or equivalent if entry is from UCAS into level 1, to include Chemistry and one other physical science and / or maths.

Candidates who do not meet the above academic requirements will be considered on an individual basis where there is evidence of experience in a relevant area, or be offered entry into the BSc programme at Chemistry, and can subsequently transfer should the appropriate internal criteria be matched.

International candidates require, at least a British Council IELTS qualification scored at a standard of 6.5. TOEFL scores are accepted with thresholds of: 577 (paper); 233 (computer).

NB For current general University requirements go to <http://www.qub.ac.uk/ado>

### Additional Relevant Information

Stages one, two and three of this programme are benchmarked against the QAA benchmarks for the subject area.

The programme is subject to the University General Regulations, which can be found at:

<http://www.qub.ac.uk/directorates/AcademicStudentAffairs/AcademicAffairs/>

### For Further Information refer to

The School website: <http://www.ch.qub.ac.uk/education.html>

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### Programme Structure, Levels, Modules and Credits

Module assessments have the following characteristics:

- Assessment criteria are linked to learning outcomes for each module.
- A wide range of assessment methods is used.

#### Stage 1

Students must take 120 CATS points. All modules are compulsory except modules CHM1015 and CHE1006 which require different levels of mathematical ability.

	Status	Code	Title	Pre-Requisites	CATS	STATUS
	Compulsory	CHM1011	Basic Chemistry 1	A level Chemistry	20	LIVE
	Compulsory	CHE1001	Chemical Engineering1(i)		20	LIVE
	Compulsory	CHM1010	Physical Theory		10	LIVE
	Optional	CHM1015	Skills for physical Chemistry		10	LIVE
	Optional	CHE1006	Chemical Engineering1(ii)	A-level Maths	10	LIVE
	Compulsory	CHM1012	Organic Chemistry 1		20	LIVE
	Compulsory	CHM1013	Inorganic Chemistry 1		20	LIVE
	Compulsory	CHM1014	Physical Chemistry 1		20	LIVE

**Stage 2**

Students must take 120 CATS points. All modules are compulsory.

	<b>Status</b>	<b>Code</b>	<b>Title</b>	<b>Pre-Requisites</b>	<b>CATS</b>	<b>STATUS</b>
	Compulsory	CHM2002	Structural Chemistry	CHM1011 CHM1012	20	LIVE
	Compulsory	CHM2005	Quantum Theory, Spectroscopy and Bonding	CHM1011 CHM1012	20	LIVE
	Compulsory	CHM2003	Organic Chemistry 2	CHM1011 CHM1012	20	LIVE
	Compulsory	CHM2004	Inorganic Chemistry 2	CHM1011 CHM1012	20	LIVE
	Compulsory	CHM2001	Physical Chemistry 2	CHM1011 CHM1012	20	LIVE
	Compulsory	CHM2006	Industrial and Green Chemistry		20	LIVE

**Stage 3**

Students must take 120 CATS points. All modules are compulsory.

	<b>Status</b>	<b>Code</b>	<b>Title</b>	<b>Pre-Requisites</b>	<b>CATS</b>	<b>STATUS</b>
	Compulsory	CHM3015	Advanced Practical Work in Chemistry		40	LIVE
	Compulsory	CHM3001	Inorganic Chemistry 3	CHM2004	20	LIVE
	Compulsory	CHM3002	Organic Chemistry 3: Structure and Reactivity	CHM2003	20	LIVE
	Compulsory	CHM3003	Physical Chemistry 3	CHM2001/5	20	LIVE
	Compulsory	CHM3005	Options in Chemistry		20	LIVE

#### Stage 4

Student must take 120 CATS points: CHM4001 and CHM4007 (80 CATS points) plus two other optional modules (more options may become available).

Status	Code	Title	Pre-Requisite	CATS	STAT US
Compulsory	CHM4001	Chemical Research Project		60	LIVE
Optional	CHM4002	Advanced Physical Chemistry: Kinetics and Quantum Theory	CHM3002 CHM3033	20	LIVE
Optional	CHM3002	Organic Chemistry 3: Structure and Reactivity	CHM2003	20	LIVE
or	CHM4002	Advanced Organic Synthesis	CHM3002	20	LIVE
Optional	CHM4005	Advanced Inorganic Chemistry	CHM3001 CHM3031	20	LIVE
or	CHM3001	Inorganic Chemistry 3	CHM2004	20	LIVE
Optional	CHM4006	Options in Applied, Technical and Macromolecular Chemistry	CHM2006	20	LIVE

#### Awards, Credits and Progression of Learning Outcomes

##### Examinations / Assessment

The program is governed by general university regulations. All students are required to undertake 120 CATS points of modules per year. Most modules in the programme consist of a combination of theory and compulsory laboratory exercises. The theory is assessed by a combination of tutorials, workshops and by examination. The formal Stage 1 and 2 examinations will take place at the end of the semester in which the course is delivered. All taught courses at Stages 3 and 4 will be examined in May / June so as not to interfere with the research project in January / February. Laboratory work is assessed by the quality of the work and results produced as well as by the quality of written reports on the experiments. The overall pass mark for all modules is 40 % but students will be allowed to pass on a 35% theory mark so long as their overall mark is greater than 40%. Coursework and project work will be assessed according to defined conceptual equivalents in line with those stated within QUB assessment policies.

##### Awards and progression

Students will be allowed to proceed from Stage 1 to Stage 2 when they have passed the equivalent of five Stage 1 modules, to include CHM1011, CHM1012 and CHM1013. Any outstanding Stage 1 modules must be cleared before entry to Stage 3.

Students who have not passed a Stage 1 or 2 module examination at the first sitting must attempt the examination again in August of that year, or the next available opportunity. Students with failed laboratory based coursework will be required to repeat the coursework the following year. All repeated coursework and examinations will be awarded a maximum mark of 40%. Students are only permitted four attempts at Stage 1 and Stage 2 examinations.

Students will be allowed to proceed from Stage 2 to Stage 3 when they have passed at least five Stage 2 modules and no outstanding failed Stage 1 modules. Students who have failed modules at Stage 2 and/or have not gained a course average of 55% will be transferred to the BSc Chemistry Programme.

Students can elect to transfer to the BSc programme at all stages as required.

There are no opportunities to repeat Stage 3 or Stage 4 assessment procedures. Students who fail to achieve an average mark of 55% at Stage 3 will be offered a BSc in Chemistry at the discretion of the Schools examination board if appropriate.

The weighting between years follows the standard University regulations for a 4 year degree at:  
Entry 2008 or before: Stage 2 – 12.5%, Stage 3 – 37.5%, Stage 4 – 5- %  
Entry 2009 or after: Stage 1 – 5%, Stage 2 – 15%, Stage 3 – 30%, Stage 4 – 50%.  
The predominance rule will be used to decide classifications at borderlines.

The degree will be classified in accordance with the University General Regulations, Study Regulations and Mark Scales. For an MSci qualification, only first and second class degrees will be awarded.

### **Learning Outcomes: Knowledge and Understanding**

On successful completion of this programme students will have gained:

1. A conceptual understanding of the fundamental aspects of organic, inorganic and physical chemistry.
2. Knowledge of the characteristic chemistry and properties of the elements and group relationships and trends within the periodic table.
3. Knowledge of chemical bonding, shape and structure.
4. Familiarity with the chemistry of functional groups and major synthetic pathways in organic chemistry.
5. Knowledge of the principles of thermodynamics and kinetics, including catalysis and the mechanistic interpretation of chemical reactions.
6. An awareness of the major techniques used in structure elucidation including spectroscopy and in chemical analysis.
7. Sustainable practices and Green Chemistry.
8. Appreciation of major contemporary issues at the forefront of chemistry.
9. The ability to integrate the above concepts necessary to reach a broad and balanced understanding of chemistry.
10. The ability to apply chemical concepts to other areas of science, technology, and industry and appreciate the importance of chemistry in these wider contexts.

### **Teaching and Assessment Methods: Knowledge and Understanding**

Acquisition of subject knowledge is achieved mainly through lectures supported by independent study. Regular seminars and occasional workshops are used to reinforce the ideas introduced in lectures, particularly in the core subject areas, emphasising the use of core knowledge to solve problems. The majority of the taught courses at Stages 1, 2 and 3 contain a mixture of assessment procedures, with a summative written examination providing not less than 50% of the course. Continuous assessment of course material include a variety of assessment procedures, depending on the subject matter including small group tutorials, assessed workshops, written essays, laboratory practicals, open and close book tests and presentations (at the higher Stages)

### **Learning Outcomes: Subject-specific Skills**

On successful completion of this programme students will have gained:

1. Experience of scientific methodology.
2. Practical laboratory chemistry skills (knowledge of common apparatus and procedures).
3. Understanding of practical synthetic chemistry procedures.
4. A working knowledge of a range of analytical instrumentation.
5. Data analysis and processing techniques.
6. Skills in ensuring safe working practices in the laboratory and COSHH legislation.
7. Practical experience of handling hazardous materials.
8. Database and literature searching techniques.

### **Teaching and Assessment Methods: Subject-specific Skills**

Practical marks account for about 25% of the final degree mark. Laboratory classes and exercises are integrated with the lecture courses in Stages 1 and 2 and provide a very wide range of learning

situations. These are graded by continuous assessment and marks are awarded for the quality of the results and the manner in which they are presented. Both pre- and post-laboratory reports are required on all experiments at Stages 1 and 2. The final year project is assessed by continuous assessment and from an extensive word processed project report (dissertation) including a comprehensive literature review, to the standard of that expected in the current chemical literature. The final year research project, triple module weighting, is assessed by a combination of continuous assessment, a written report, and an oral presentation. The report is double marked and a moderation committee examines the reports, and reviews their marks for consistency, prior to forwarding to the examination board.

### **Learning Outcomes: Cognitive Skills**

On successful completion of this programme students will be able to:

1. Solve previously 'unseen' problems across the full breadth of chemistry.
2. Develop and use reflective practices to provide practical solutions by experimentation.
3. Read, understand and assimilate new information and subsume acquired knowledge into a concise manner and within various settings.
4. Critically review and reflect upon their work.
5. Make value judgments on information in the public domain.

### **Teaching and Assessment Methods: Cognitive Skills**

These are developed and assessed through the practical and project modules as described above. A weekly, small group tutorial scheme, (Stages 1, 2 and 3) requires written work to be submitted prior to the tutorial, allows students to develop their understanding of the subject area, gain confidence and has regular feedback.

### **Learning Outcomes: Transferable Skills**

On successful completion of this programme students will be able to:

1. Effectively exert generic problem-solving skills.
2. Apply developed generic and subject specific IT skills (spreadsheets, word-process, structure drawing and modelling etc.).
3. Demonstrate numeracy and literacy skills.
4. Time manage and prioritise workloads.
5. Work within a team based environment and employ interpersonal skills, gained through participation in group projects.
6. Work effectively within an industrial setting.

### **Teaching and Assessment Methods: Transferable Skills**

- The majority of these are reviewed and revised from induction through the personal tutor and PDP programme.
- Communication, team and problem-solving skills are practised via tutorials.
- Numeracy and statistical analysis are constantly practised throughout the programme in practical reports.
- Students exercise these throughout the course through the normal assessment of course material, and explicitly marked in the final year project.
- Presentation skills are developed as the programme progresses, with a team poster presentation at Stage 1 through to a twenty minute presentation on their projects at Stage 3 and 4 to a peer group and staff panel.

### **Quality Arrangements**

The programme will be subject to the normal quality assurance procedures:

- Annual Programme Review.
- Review of individual units will be done following completion of each module.
- Students will form part of the review teams.
- Student views also will be sought through 'Student Evaluation of Units' forms and Student Evaluation of Teachers' forms.

- Students on the programme will be represented on the Chemistry School Staff Consultative Committee.
- Students on the Programme will be provided with a Personal Tutor from the Chemistry Academic staff.