PROGRAMME SPECIFICATION

Programme Code:
TBA

Programme Title:
Chemical Biology (Formerly Chemical Enzymology)

Awarding Institution:
Queen's University Belfast

Teaching Institution:

Programme Accredited By:
To potentially be accredited by the Royal Society of Chemistry.

Final Award:
Master of Science.

UCAS Code: n/a

QAA Benchmarking Group: n/a

Educational Aims of Programme
The MSc programme aims at providing an interdisciplinary understanding and bridge between undergraduate programmes in molecular biology, biochemistry, pharmacy and chemistry leading to an understanding of the relevant processes involved in drug discovery and the development of biological assays for basic research, medical diagnosis and disease treatment. Concepts such as molecular recognition, enzyme kinetics, in silico drug design and advanced applied organic synthesis will be addressed. The programme emphasises and develops critical thinking skills necessary to approach effective research, alongside subject-specific knowledge and laboratory skills using modern instrumentation and techniques thereby providing students with a high level of practical competence and an appropriate knowledgebase in preparation for either a career in the pharmaceutical, fine chemical and analytical industries or study towards a PhD at the interface between chemistry and the biological sciences in a high quality supportive learning environment that enables students to:

- Appreciate how biological systems work from a chemical perspective.
- Understand the stages required in modern drug design and biological assays.
- Appreciate the roles of each of the specific disciplines as practiced in the pharmaceutical industry and in academia.
- Achieve a high level of competence and experience through training in advanced organic synthesis, chemical analysis, enzymology or biochemistry.
- Prepare to move directly to graduate level employment in the chemical / pharmaceutical industry, or in a non-chemistry related industry.
- Prepare for eligibility for the professional recognition and the status “Chartered Chemist” through full membership of the Royal Society of Chemistry (subject to accreditation).
- 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.
- Undertake original research through successful completion of a substantial piece of research in a chosen field of study within the subject area of chemical biology.

Criteria for Admission (Subject Specific Requirements) to Programme

The minimum entry requirement is normally a Second Class BSc degree in Chemistry, Pharmacy or Biochemistry or closely allied subject. (The Schools providing the course delivery reserve the right to review degree programmes of applicants to ensure suitability to enter the programme).

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.

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

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
Director of Education: Dr Nick Fletcher
School of Chemistry and Chemical Engineering
Queen's University, Belfast BT7 1NN
N Ireland
Tel: +44 28 9097 5418
Email: candce@qub.ac.uk

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.

Programme Details

Students must take and pass modules to the value of 180 CATS points to be awarded the Master of Research. The programme will comprise 4 taught optional modules each worth 20 CATS points, two from both the first and second semesters. Students will be permitted to select from a range of **existing** modules, which can change depending on availability. Other options offered in different schools can readily be substituted into this if appropriate.

	Status	**Code**	**Title**	**Pre-Requisites**	**CATS**	**STATUS**
	Compulsory	CHM8018 (Or equivalent in the appropriate School)	Research Project*	CHM8016	60	LIVE
	Semester 1					
	Compulsory	CHM8015	Critical Thinking, Literature Review and Research Preparation.		20	LIVE

	Optional	CHM8012	Synthesis of Biological Molecules	BSc in Chemistry	20	LIVE
	Optional	BBC8039	Protein Structure and Function		20	LIVE
	Optional	CHM80XX	Introduction to Organic Synthesis	Level 1 organic chemistry	20	TBA
	Compulsory	CHM8016	Methods in Research		20	LIVE
	Optional	CHM8014	Drug Design and Molecular Modelling		20	LIVE
	Optional	CHM8017	TBA		20	
	Optional	PMA8XXX	TBA		20	

* The project module can be taken in any of the participating Schools, and will be allocated to the project code within the School to ensure FTE's are appropriately allocated.

Awards, Credits and Progression of Learning Outcomes

Examination/Assessment
Students must pass 120 CATS points of taught modules on the programme and complete a Dissertation (60 CATS points) to be eligible for the degree of a Master of Science (Chemical Biology). The pass mark for all taught modules and the dissertation is 50%.

Students who fail one or more taught modules are permitted one further attempt to pass at the next available opportunity for a maximum mark of 50%.

Students must obtain 120 CATS points in the taught modules before undertaking a dissertation. All dissertations will be assessed by internal examiners and the external examiner.

The dissertation must be submitted within 12 months of first enrolment for full-time students, and for part-time students, within three years of first enrolment.

There is no resubmission permitted for the individual dissertation.

The degree will be classified in accordance with the University General Regulations, Study Regulations, Mark Scales.

Candidates who pass all the taught modules but who fail to achieve a mark of at least 50% in the dissertation shall be eligible for the award of Postgraduate Diploma of Science (Chemical Biology).

Candidates who pass all the taught modules but who fail to submit a dissertation shall be eligible for the award of Postgraduate Diploma of Science (Chemical Biology).

For Master's Degrees, a pass with distinction will be awarded only when the following three conditions have been satisfied; an overall average of 70+ is achieved and a mark of 70+ is achieved in the dissertation module and an average of 65+ is achieved in the other modules.

Learning Outcomes: Knowledge and Understanding
On successful completion of this programme students will have gained:

1. Experience in working at the interface between chemistry and biology.

2. An awareness of typical reagents and transformation used in modern chemistry, and biological systems.
3. An appreciation of organic synthesis and analytical chemistry.
4. An understanding of enzymology and quantification of compound's activity in biological systems.
5. An awareness molecular modelling.
6. Information relevant to an area of current research/interest leading towards new biological assays, medical diagnosis and disease treatment.
7. An understanding of the difference between theoretical considerations and practical options.
8. The skills required to produce a high quality chemistry dissertation that should potentially lead to publication in the scientific literature.
9. The use of primary scientific literature as a tool to aid research.
10. An understanding as to how modern techniques are applied to drug discovery.

Teaching and Assessment Methods: Knowledge and Understanding

Acquisition of subject specific knowledge is achieved mainly through lectures supported by independent study. Regular seminars and occasional workshops are used to reinforce the ideas introduced in lectures, emphasising the use of core knowledge to solve problems. The majority of the taught courses contain a mixture of assessment procedures, with a summative written examination providing not less than 50% of the ~~course~~assessment. 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. The practical courses and research project will be assessed through coursework, literature reviews, quality of laboratory records, oral presentation and final project dissertation.

Learning Outcomes: Subject-specific Skills

On successful completion of this programme students will have gained:

1. Enhanced laboratory skills.
2. The ability to design an appropriate experiment to achieve publishable data (such as yields, purity, product identification through analytical methods etc.)
3. Analytical skills including a range of modern instrumentals including NMR, UV / vies and IR spectroscopy, mass spectrometry and chromatography.
4. Experience in enzyme kinetics: enzyme assay; data acquisition; data validation
5. Enhanced scientific written and oral communication skills.
6. Skills in working with subject specific literature and database searching tools and associated software.
7. Skills in the use of a range of subject specific software such as Gaussian etc.
8. Knowledge and awareness of Health and Safety legislation and the ability to ensure safe working practices in a laboratory environment.
9. Proficiency in the implementation of COSHH.

Teaching and Assessment Methods: Subject-specific Skills

- Critical Thinking, Literature Review and Research Preparation will be through a series of guidance lectures, including issues of health and safety, risk management, ethics in research, assessment of published literature, and research case studies from recent publications. The course will be assessed through coursework, including an oral presentation on a project plan, written report on a research paper and an in depth literature review on a selected topic. The literature review will be marked by both the principle and second supervisor. Presentations will be marked by a minimum of three academics in line with published conceptual equivalent marking criteria.

- Practical skills will be taught through informal tutoring within a research group, in a laboratory setting. Students will be encouraged to practice the procedure prior to assessment and assessed through the successful demonstration of key procedures critical to the area of work of the student's project.
- In both of the above to courses, students will be encouraged to undertake a self-evaluation and re-iterative exercises to ensure effective learning and adoption of key skills and safe working practices.

Learning Outcomes: Cognitive Skills

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

1. Critically review their work, as well as that reported by others, as available in the public domain.
2. Read, understand and assimilate new information and subsume acquired knowledge into a concise format.
3. Reflect on experimental outcomes and use this in relation to overcoming research orientated problems.
4. Demonstrate problem solving skills in a research environment.
5. Identify and assess risk within a working environment.

Teaching and Assessment Methods: Cognitive Skills

- The final element of the course is the undertaking of a piece of world leading research. Students will be affiliated with a research group from the outset of the programme, drawing on the expertise of competent and trained researchers to undertake the key skills discussed above. The success of the programme is dependent on the training, instruction and implementation of a research orientated project, through a clear demonstration and awareness of laboratory related issues including safe working practices and a training in the techniques essential to produce publication quality work. Each student will be supported through the allocation of a Principle and a Second supervisor, who are charged with mentoring the student, maintaining the quality of the research outputs, monitoring the learning outcomes and eventually assessing the work.
- Students are required to have an assessment meeting during the early stages of the project to determine viability of the research, the ability to orally communicate targets, the research objectives and the learning outcomes of the work, contributing 10% to the project mark. The final assessment of the project work will be through a presentation (20% of the marks) and through a marked dissertation and associated materials (e.g. lab books). Assessment will be in accordance with the following criteria;
    - Maintenance of Lab books.
    - Appropriate use of Literature.
    - Experimental Description.
    - Demonstration of Publication Quality Results.
    - Intellectual Input to Project.
    - Discussion/Interpretation.
    - Overall Presentation

Learning Outcomes: Transferable Skills

On successful completion of this programme students will have gained the following transferrable skills:

1. Effective problem-solving skills.

2. Generic and subject specific IT skills (spreadsheets, word-processing, structure drawing and modelling etc.).
3. Effective written and oral communication skills.
4. Health and safety awareness.
5. Good numeracy and literacy skills.
6. Expertise in searching and abstracting information from primary literature
7. Time management and personal prioritisation skills.
8. Experience in team working and developed interpersonal skills, through participation in group projects.
9. Critical thinking through the validation of information (personal and literature data) and the correlation of experimental data with knowledge leading to farther research.

Teaching and Assessment Methods: Transferable Skills

- Communication, team and problem-solving skills are practised via research team meetings.
- Numeracy and statistical analysis are constantly practised throughout the day to day research objectives.
- Students exercise these throughout the course through the normal assessment of course material, and explicitly marked in the project.
- Presentation skills are developed as the programme progresses, with a team poster presentation and a twenty minute presentation on their projects at several stages in the programme 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 / project supervisor from the Academic staff in the appropriate School. In addition, a second supervisor / marker will be allocated.