

Faculty of Life Sciences

Programme Specification

Programme title: Cancer Drug Discovery

Academic Year:	2018-19
Degree Awarding Body:	University of Bradford
Partner(s), delivery organisation or support provider (if appropriate):	N/A
Final and interim award(s):	[Framework for Higher Education Qualifications (FHEQ) level 7] MSc Postgraduate Diploma Postgraduate Certificate
Programme accredited by (if appropriate):	N/A
Programme duration:	1 year full time
QAA Subject benchmark statement(s):	N/A
Date of Senate Approval:	
Date last confirmed and/or minor modification approved by Faculty Board	June 2017

Introduction

Based upon a greater understanding of the molecular aspects of cancer progression, new opportunities for chemical intervention in this disease have emerged. Medicinal chemists provide the expertise required in translating that understanding to the identification of suitable chemical entities, and to the process of optimisation that ultimately leads to the discovery of new cancer medicines. This programme is designed to provide students with a 'state of the art' education in modern cancer drug discovery, which meets the demand of employers in pharmaceutical industry and has a strong track record in graduates progressing to employment in the field or PhD study.

Opportunities to learn the latest innovations in drug discovery, including computer-aided drug design and techniques in drug synthesis as well as electronic data management are provided in the programme. In addition, an extended project in drug discovery will not only provide students with first-hand experience of the

challenges in original research, but also gives students an opportunity to put into practice the knowledge gained.

This programme is run by the Institute of Cancer Therapeutics which is situated in purpose built facilities at the heart of the University campus. The Institute has an international reputation as a centre of excellence and a track record in drug discovery. It is a multidisciplinary organisation incorporating a broad spectrum of skills ranging from chemistry through preclinical studies to early clinical trials, being one of the few centers nationally that has all the necessary research tools and expertise in-house to progress anticancer medicines and biomarkers from concept to the clinic.

For career progression within this sector a postgraduate qualification is highly desirable. For the pursuit of this type of programme, a degree qualification, usually in chemical or biological sciences, is required. The programme promotes advanced scholarship within specialised areas concomitant with the development of key transferable skills (in IT, communication, research and analysis) and practical research techniques.

The programme uses a range of teaching strategies to promote independent study and research; to develop a systematic and critical understanding of the drug discovery process; and to enhance autonomous learning and personal transferable skills. This programme will facilitate the development of the skills required for careers in academia, industry or for further research. Enhancement of independent learning skills during the programme will equip students with the skills to succeed as lifelong learners.

Programme Aims

The programme is intended to:

- A1 Enable students to develop a systematic understanding and critical awareness of, and skills in, selected disciplines within the field of cancer biology and pharmacology.
- A2 Enable students to develop practical skills in selected disciplines within the field of drug discovery.
- A3 Develop within the context of cancer drug discovery, a comprehensive understanding of communication, research and scientific method.
- A4 Provide a strong knowledge base in the theory, experimental methods, legislative regulations, and practical skills of chemistry and biology, and their application in cancer drug discovery.
- A5 To provide learning opportunities to enable students to think critically and to further develop as an autonomous and lifelong learner.
- A6 Further develop students' ability in a range of personal and key skills.
- A7 Provide a supportive educational environment, which meets the needs of students from a variety of backgrounds.

Programme Learning Outcomes

To be eligible for the award of Postgraduate Certificate at FHEQ level 7, students will be able to:

- LO1 Critically evaluate specialized areas of cancer drug discovery.
- LO2 Critically evaluate scientific literature and communicate scientific data.
- LO3 Write and interpret scientific reports.
- LO4 Critically evaluate and appraise experimental laboratory techniques relevant to the process of drug discovery.
- LO5 Demonstrate critical thinking through ability to independently: recognise, define and prioritise problems.
- LO6 Demonstrate critical thinking through ability to independently: analyse, interpret, objectively evaluate and prioritise information and data, recognising its limitations.
- LO7 Critically evaluate the process of drug discovery including sources of leads, protocols for lead optimisations, criteria for drugability, routes for commercial exploitation of drug agents.
- LO8 Critically evaluate the contribution of specialist fields to drug discovery, e.g. critically evaluate pre-clinical screening strategies in vitro and in vivo and develop a preclinical screening cascade OR Critically analyse a therapeutic target and current therapeutic approaches in cancer drug discovery OR Critically evaluate specialized areas of safety pharmacology.
- LO9 Develop autonomy in the learning required for continuing professional development; apply skills in; time-management, presentation, written communication and problem-solving.

Additionally, to be eligible for the award of Postgraduate Diploma at FHEQ level 7, students will be able to:

- LO10 Critically evaluate the success and failures of the anticancer drug discovery process through a study of case histories.
- LO11 Effectively communicate their understanding of research to different audiences eg poster presentation and oral presentation.
- LO12 Demonstrate a conceptual understanding of research and scientific method through the ability to independently and critically evaluate methodology, and formulate conclusions based on complete and incomplete data

Additionally, to be eligible for the award of Degree of Master at FHEQ level 7, students will be able to:

LO13 Demonstrate self-direction and originality in implementing a research project.

LO14 Plan, design and execute practical investigations, from the problem recognitions stage through to the evaluation and appraisal of results and findings.

LO15 Make decisions in complex and unprecedented situations

LO16 Exercise initiative and personal responsibility

LO17 Communicate and interact with professionals from other disciplines through scientific debate and written reports.

Curriculum

The Postgraduate Diploma is studied over two semesters, each comprising of 60 Credits studied as two 20 Credit modules in each semester and a linked (10+10 Credits) module across both semesters. The programme is designed as a core curriculum amounting to 20 Credits in semester 1 and 20 Credits in semester 2. A further 20 Credits in each semester is studied from optional curriculum offered by ICT and other Faculty of Life Sciences schools. The Masters programme follows on from this and incorporates an additional 60 Credit research project. The Postgraduate Certificate is available as a fall back qualification for students who choose to leave the course before completing the Postgraduate Diploma.

Postgraduate Certificate

FHEQ Level	Module Title	Type (Core/ Option/ Elective)	Credits	Semester (s)	Module Code
7	Principles of Drug Discovery	Core	20	1	INC7014-B
7	Practical Skills in Research	Option	10+10	1&2	INC7018-B
7	Critical Appraisal of a Current Topic in Cancer Therapeutics and Toxicology	Option	10+10	1&2	INC7017-B
7	Toxicology and Safety Pharmacology	Option	20	1	INC7005-B
7	Molecular Basis of Cancer & Cancer Therapy	Option	20	1	INC7002-B
7	Preclinical Models for Drug Evaluation.	Option	20	1	INC7001-B

Students will be eligible to exit with the award of Postgraduate Certificate if they have successfully completed 60 credits and achieved the award learning outcomes.

Postgraduate Diploma

FHEQ Level	Module Title	Type (Core/Option/Elective)	Credits	Semester (s)	Module Code
7	Principles of Drug Discovery	Core	20	1	INC7014-B
7	Practical Skills in Research	Core	10+10	1&2	INC7018-B
7	Critical Appraisal of a Current Topic in Cancer Therapeutics and Toxicology	Core	10+10	1&2	INC7017-B
7	Toxicology and Safety Pharmacology	Option	20	1	INC7005-B
7	Molecular Basis of Cancer & Cancer Therapy	Option	20	1	INC7002-B
7	Preclinical Models for Drug Evaluation.	Option	20	1	INC7001-B
7	Case Studies in Drug Discovery	Core	20	2	INC7011-B
7	Molecular Mechanisms of Toxicity	Option	20	2	INC7009-B

Students will be eligible to exit with the award of Postgraduate Diploma if they have successfully completed at least 120 credits and achieved the award learning outcomes.

Degree of Master

FHEQ Level	Module Title	Type (Core/Option/Elective)	Credits	Semester (s)	Module Code
7	Principles of Drug Discovery	Core	20	1	INC7014-B
7	Practical Skills in Research	Core	10+10	1&2	INC7018-B
7	Critical Appraisal of a Current Topic in Cancer Therapeutics and Toxicology	Core	10+10	1&2	INC7017-B
7	Toxicology and Safety Pharmacology	Option	20	1	INC7005-B

7	Molecular Basis of Cancer & Cancer Therapy	Option	20	1	INC7002-B
7	Preclinical Models for Drug Evaluation.	Option	20	1	INC7001-B
7	Case Studies in Drug Discovery	Core	20	2	INC7011-B
7	Chemical Toolbox for Drug Discovery	Option	20	2	INC7016-B
7	Molecular Mechanisms of Toxicity	Option	20	2	INC7009-B
7	Cancer Therapeutics Research Project	Core	60	3	INC7019-E

Students will be eligible for the award of Degree of Master if they have successfully completed at least 180 credits and achieved the award learning outcomes.

Learning and Teaching Strategy

A wide variety of teaching methods appropriate to the learning outcomes of the individual modules are employed throughout the programme, and are supported by the virtual learning environment provided by the University. Students will experience lectures from ICT research/teaching staff and visiting clinicians and industrial researchers, small group workshops, one-to-one tutorials and practical classes. Students will also attend the Institute of Cancer Therapeutics Research Seminar programme. Self-directed independent learning forms a significant component at MSc level; students will be supported to develop the attributes and skills needed for life-long learning and continued professional development. Directed private study will involve students in a variety of activities, which include directed reading of selected textbooks and specified source literature, use of the virtual learning environment (directed Web-based materials), report writing, preparing presentations to deliver to peers, and other assignments.

Some learning outcomes (LO) are focussed on particular modules. For example, LO4 and LO7 are mainly developed in Practical Skills in Research module and Principles of Drug Discovery modules, respectively; LO10 in Case Studies module; LO1 in Principles of Drug Discovery module; LO8 in one of the semester 1 optional modules; LO2 and LO3 in Critical Appraisal module. Acquisition of some learning outcomes (LO5, LO6, LO9, LO11-17) will occur gradually and cumulatively through a number of modules employing a mix of lectures, laboratory investigations, coursework, workshops, individual project work and independent research guided by module tutors. Key skills for working as a research professional are embedded in the curriculum and some modules develop or consolidate and assess one or more of the key skills. The MSc Research Project will allow students to demonstrate all skills and knowledge developed through the year, and its completion is essential to demonstrate mastery of LO13-18.

Assessment Strategy

A range of assessment methods are used, supported by formative (low stakes) assessments to allow students to practice skills and knowledge before final summative assessment at the end of a module or course. Written examinations are used to test LO1, LO4, LO6, LO7, LO8 and LO10. A range of types of coursework are also used to assess these and other learning outcomes, including essays of varying length, such as a molecular mechanism written report, a preclinical drug safety profile report, and a critical evaluation of pre-clinical models written report; preparation of portfolios of reports on experimental work and reflective statements, assessment of students' laboratory and transferable skills and professionalism during the project period; as well as PowerPoint presentations such as journal club presentations, drug profile presentation, a preclinical drug safety profile presentation, and a poster presentation. The final MSc project is assessed by dissertation, viva voce examination and on professional performance to conducting research, and allows students to demonstrate achievement of all learning outcomes developed as part of the PGC/PGD taught programme, and more specifically, achievement of LO13-17 required for the MSc degree.

Assessments have been arranged through the programme to ensure a balanced load in each semester, and there are no clashing deadlines.

More detailed description of the way that learning is related to assessment in the modules that make up this programme can be found in the module descriptors

Assessment Regulations

This Programme conforms to the standard University Regulations which are available at the following link:

<http://www.bradford.ac.uk/aqpo/ordinances-and-regulations/>

Admission Requirements

The University welcomes applications from all potential students and most important in the decision to offer a place is our assessment of a candidate's potential to benefit from their studies and of their ability to succeed on this particular programme. Consideration of applications will be based on a combination of formal academic qualifications and other relevant experience.

The standard entry requirements for the programme are as follows:

An Honours degree or equivalent in a chemical or biological discipline, at 2.2 classification or above. Applicants whose first language is not English will need to demonstrate proficiency in English in accordance with University Regulations. For further details, see <http://www.bradford.ac.uk/international/before-you-apply/english-language-requirements/>

Applications are welcome from students with non-standard qualifications or significant relevant experience.

Recognition of Prior Learning

If applicants have prior certificated learning or professional experience which may be equivalent to parts of this programme, the University has procedures to evaluate and recognise this learning in order to provide applicants with exemptions from specified modules or parts of the programme.

Minor Modification Schedule

Version Number	Brief description of Modification	Date of Approval (Faculty Board)
1		