

## Faculty of Life Sciences

### Programme Specification

**Programme title: MSc Cancer Drug Discovery**

Academic Year:	2019-20
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:	12 months full time
QAA Subject benchmark statement(s):	N/A
Date last confirmed and/or minor modification approved by Faculty Board	April 2019

**Please note:** This programme specification has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but changes may occur given the interval between publishing and commencement of teaching. Any change which impacts the terms and conditions of an applicant's offer will be communicated to them. Upon commencement of the programme, students will receive further detail about their course and any minor changes will be discussed and/or communicated at this point.

### 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 the pharmaceutical industry and has a strong track record in graduates progressing to employment in the field or to 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 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 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.
- LO7 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:

- LO8 Critically evaluate the success and failures of the anticancer drug discovery process through a study of case histories.
- LO9 Effectively communicate their understanding of research to different audiences e.g. poster presentation.
- LO10 Critically evaluate pre-clinical screening strategies in vitro and in vivo and develop a preclinical screening cascade.

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

- LO11 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.
- LO12 Demonstrate self-direction and originality in implementing a research project.
- LO13 Safely plan, design and execute practical investigations, from the problem recognitions stage through to the evaluation and appraisal of results and findings.
- LO14 Make decisions in complex and unprecedented situations.
- LO15 Exercise initiative and personal responsibility.

LO16 Communicate and interact with professionals from other disciplines through scientific debate and written reports.

## Curriculum

The MSc in Cancer Drug Discovery programme consists of 120 taught credits (60 credits in each of Semesters 1 & 2) and a substantial 60 credit research project.

Module Code	Module Title	Type	Credits	Semester	FHEQ Level
INC7014-B	Principles of Drug Discovery	Core	20	1	7
LIS7018-B	Practical Skills in Research	Core	20	1	7
LIS7022-B	Critical Appraisal	Core	20	1	7
INC7001-B	Preclinical Models for Drug Evaluation	Core	20	2	7
INC7011-B	Case Studies in Drug Discovery	Core	20	2	7
INC7016-B	Chemical Toolbox for Drug Discovery	Option	20	2	7
INC7009-B	Molecular Mechanisms of Toxicity	Option	20	2	7
BIS7011-B	Innovation in Life Science Industry: From Concept to Market Place	Option	20	2	7

## Postgraduate Certificate

Students will be eligible to exit with the award of Postgraduate Certificate in Cancer Drug Discovery if they have successfully completed 60 credits and achieved the award learning outcomes LO1-LO7 in the above modules.

## Postgraduate Diploma

Students will be eligible to exit with the award of Postgraduate Diploma in Cancer Drug Discovery if they have successfully completed at least 120 credits and achieved the award learning outcomes LO1-LO10 in the above modules.

## Degree of Master

In addition to the modules outlined above:

Module Code	Module Title	Type	Credits	Semester	FHEQ Level
INC7019-E	Cancer Therapeutics Research Project	Core	60	3	7

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* and *Principles of Drug Discovery* modules, respectively; LO8 and LO9 in *Case Studies* module; LO1 in *Principles of Drug Discovery* module; LO10 in *Preclinical Models for Drug Evaluation* modules; LO2 and LO3 in *Critical Appraisal* module. Acquisition of some learning outcomes 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 LO11-16.

## Assessment Strategy

A range of assessment methods are used, supported by formative 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, and LO8. 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 students' approach 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 LO11-16 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)
2	Updates to align sem 1 curriculum with MRes to enable student transfer	April 2019