

MSc Cancer Drug Discovery Programme Specification

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| Academic Year: | 2024/25 |
| 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 | March 2024 |

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 (ICT) 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 centres 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 specialised areas of cancer drug discovery.
- LO2 Critically evaluate scientific literature and communicate scientific data.
- LO3 Write and interpret scientific reports.
- LO4 Demonstrate knowledge of experimental laboratory techniques relevant to the process of drug discovery.
- LO5 Demonstrate critical thinking through ability to independently: recognise limitations and strengths in research data and approaches.

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 elements of pre-clinical screening strategies in vitro and in vivo.

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

LO13 Make decisions in complex and unprecedented situations.

LO14 Exercise initiative and personal responsibility.

LO15 Communicate and interact with scientific professionals through scientific debate and written reports.

Curriculum (September Start)

| FHEQ Level | Module Code | Module Title | Type | Credits | Semester |
|------------|-------------|---|------|---------|----------|
| 7 | NEW | Principles of Drug Discovery | Core | 30 | 1 |
| 7 | NEW | Research Skills for Postgraduate Students | Core | 30 | 1 |
| 7 | INC7001-B | Preclinical Models for Drug Evaluation | Core | 20 | 2 |
| 7 | INC7011-B | Case Studies in Drug Discovery | Core | 20 | 2 |
| 7 | INC7009-B | Molecular Mechanisms of Toxicity | Core | 20 | 2 |
| 7 | INC7019-E | Cancer Therapeutics Research Project | Core | 60 | 3 |

Curriculum (January Start)

| FHEQ Level | Module Code | Module Title | Type | Credits | Semester |
|------------|-------------|---|------|---------|----------|
| 7 | INC7001-B | Preclinical Models for Drug Evaluation | Core | 20 | 2 |
| 7 | INC7011-B | Case Studies in Drug Discovery | Core | 20 | 2 |
| 7 | INC7009-B | Molecular Mechanisms of Toxicity | Core | 20 | 2 |
| 7 | NEW | Principles of Drug Discovery | Core | 30 | 3 |
| 7 | NEW | Research Skills for Postgraduate Students | Core | 30 | 3 |
| 7 | INC7019-E | Cancer Therapeutics Research Project | Core | 60 | 1 |

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 LO1-LO7.

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 LO1-LO10.

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 LO1-LO15.

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 ICT 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.

Acquisition of 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 LO11-15.

Assessment Strategy

A range of assessment methods are used, supported by formative assessments to allow students to practise 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 written assignments of varying length, such as a molecular mechanisms laboratory report, a critical appraisal essay, a preclinical drug safety profile report, and a critical evaluation of pre-clinical models written report; preparation of portfolios of reports on experimental work, as well as oral presentations such as journal club presentations, drug profile presentation, a preclinical drug safety profile presentation, and poster presentations. 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 LO11-15 required for the MSc degree.

Assessments have been arranged through the programme to ensure a balanced load in each semester.

A 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 Postgraduate Assessment Regulations which are available at:

<https://www.bradford.ac.uk/regulations>

Admission Requirements

We take into consideration a number of factors when assessing your application. It's not just about your grades; we take the time to understand your personal circumstances and make decisions based on your potential to thrive at university and beyond. 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 <https://www.bradford.ac.uk/international/entry-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 |
| 3 | Updates to enable the programme to start Jan 21 instead of Sept 20 as a one off | October 2020 |
| 4 | Specification reformatted and made accessible. | February 2021 |
| 5 | Update to delivery periods to revert to Sept 21 start | June 2021 |
| 6 | Annual changes for 2021 academic year | June 2021 |
| 7 | Annual changes for 2022 academic year | March 2022 |
| 8 | Reintroduction of Jan start for 2023/4 onwards | February 2023 |
| 9 | Annual changes for 2023 academic year | May 2023 |
| 10 | Removal of LIS7018-B, LIS7022-B, change to credit value of Principles of Drug Discovery module, new Research Skills module | March 2024 |
| 11 | Annual changes for 2024 academic year | April 2024 |