

Faculty of Life Sciences

Programme Specification

Programme title: Master by Research (MRes)

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] MRes in Cancer Drug Discovery Postgraduate Diploma in Research (Cancer Drug Discovery) Postgraduate Certificate in Cancer Drug Discovery MRes in Cancer Pharmacology Postgraduate Diploma in Research (Cancer Pharmacology) Postgraduate Certificate in Cancer Pharmacology MRes in Drug Toxicology & Safety Pharmacology Postgraduate Diploma in Research (Drug Toxicology & Safety Pharmacology) Postgraduate Certificate in Drug Toxicology & Safety Pharmacology MRes in Pharmaceutical Technology Postgraduate Diploma in Research (Pharmaceutical Technology) Postgraduate Certificate in Research (Pharmaceutical Technology) MRes in Molecular & Cell Biology Postgraduate Diploma in Research (Molecular & Cell Biology) Postgraduate Certificate in Research (Molecular & Cell Biology) MRes in Chemical Biology Postgraduate Diploma in Research (Chemical Biology) Postgraduate Certificate in Research (Chemical Biology)

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

Master by Research (MRes) is a one-year research focused postgraduate programme run by the Faculty of Life Sciences. It provides training for working in a professional environment, or in preparation for a PhD. The programme places a strong emphasis on developing laboratory based research skills and expertise. A six month research component in the programme provides a strong opportunity to acquire skills and to put them into practice by carrying out cutting edge research with a real-world impact.

The main aim of the programme is to provide a student experience organised around research-engaged learning where the classroom and lab are 'sites' of the production and application of new knowledge. To achieve this, the curriculum is designed around the principle of 'spiral learning' where core skills, knowledge, and competences are reinforced and developed as the student moves chronologically and sequentially through the programme. The approach to assessment for learning is not only aligned to both the spiral curriculum and the principle of research-engaged learning, but also is authentic in the sense of encompassing the disciplinary and professional skills that students will need to pursue careers in the associated scientific and academic fields.

The programme achieves its aims by providing a central core of modules in the first Semester which are designed to train students in widely used laboratory techniques, research methodology, and in critical analysis and thinking. This is complemented with a module in a chosen specialist subject, including cancer drug discovery, cancer pharmacology, molecular and cell biology, chemical biology, drug toxicology and safety pharmacology, and pharmaceutical technology. During this period, students gain knowledge of cutting edge research at the Faculty and either choose or suggest a research project plan. In Semesters 2 and 3, students will join research laboratories within the Faculty, where they are trained in specialist laboratory techniques and conduct their chosen research. The large research element in this postgraduate programme enables students to undertake substantial and ambitious projects, some of which will result in publications in high impact scientific journals.

The MRes project modules' assessments are designed to work together to provide real skills needed in research active scientists. For example, in Semester 2, students

are tasked with writing a communication journal manuscript based on their initial results and to submit a scientific abstract for a poster. In Semester 3, students prepare and present their poster at the Faculty-wide Research Open Day, to which all University's internal and external stakeholders are invited. Students also join other students in the cohort, to form an editorial board, set criteria and then peer-review the manuscripts prepared in Semester 2. Employability, and skills that enhance it, are a strong feature running through the curriculum design. For example, in Semester 2 students attend a workshop about writing their CV and in Semester 3 they participate in a mock job/PhD interview based on their CV.

Additionally, there are a number of other specialist workshops in Semester 2. During these workshops students work as part of a team to solve problems set by the workshop leader, on subjects and skills that directly inform the conduct of research such as, health and safety, and statistical analysis. Throughout the curriculum, and specifically through these workshops, the programme instils self-reflection and teamwork in students.

Through these mechanisms, the MRes programme meets the demands of employers and students at postgraduate level, and prepares its graduates for progression to employment in their chosen field or to PhD study.

The scientists at the Faculty of Life Sciences are situated in laboratories at the heart of the University campus. The members of the Faculty have an international reputation in diverse fields like cancer sciences, pharmaceutical technology, chemical biology, drug discovery and skin and regenerative medicine sciences. Research in our faculty is multidisciplinary, incorporating a broad spectrum of skills ranging from chemistry to engineering, to preclinical investigation of drugs. The Faculty has excellent facilities exemplified by a £3M Analytical Centre and purpose built laboratories at the Institute of Cancer Therapeutics.

To be admitted to the programme, students must already have a first degree qualification in a scientific discipline, usually biology, chemistry, medicine, pharmacy or related disciplines. 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, and enhance autonomous learning and transferable personal skills. This programme will facilitate the development of the skills students require for careers in academia and industry.. Enhancement of independent learning skills during the programme will equip students with the competence to succeed as lifelong learners.

Programme Aims

The programme is intended to:

- A1 Enable students to develop a systematic understanding and critical awareness of key and specialised research skills, practical methodologies and laboratory techniques for research in life sciences.
- A2 Develop an ability to collate scientific information and critically appraise scientific data and research methodology.
- A3 Give students an advanced knowledge of principles underpinning their chosen field of specialism.
- A4 Develop skills in scientific communication, research design and scientific methods.

- A5 Develop students' ability in a range of personal, transferable and key skills.
- A6 Enable students to think critically and to further develop as autonomous and lifelong learners.
- A7 Enable students to develop as advanced experimental researchers in their chosen field within life sciences;
- A8 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 scientific literature and communicate scientific data.
- LO2 Write and interpret scientific reports.
- LO3 Critically evaluate and appraise experimental laboratory techniques.
- LO4 Demonstrate an advanced knowledge of the key principles underpinning their specialist field.
- LO5 Demonstrate critical analysis through ability to independently analyse, interpret, objectively evaluate and prioritise information and data, recognising its limitations.
- LO6 Develop the autonomy in 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:

- LO7 Safely plan, design and execute practical investigations, from the problem recognition stage through to the evaluation and critical appraisal of results and findings.
- LO8 Demonstrate self-direction and originality in implementing a research project.
- LO9 Demonstrate critical thinking through ability to independently recognise, define and prioritise problems and formulate solutions.
- LO10 Effectively describe objectives and achievements of a research plan to different audiences e.g. scientific abstract, technical summary and lay statement.
- LO11 Demonstrate initiative and personal responsibility in conducting research.
- LO12 Make decisions in complex and unpredictable situations.
- LO13 Work as part of a team to achieve a specific goal.

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

LO14 Demonstrate a conceptual understanding of research and scientific method through ability to independently evaluate methodology critically, formulate conclusions based on complete and incomplete data and suggest further work.

LO15 Effectively communicate and interact with experts in their field in different formats, including poster and oral presentations and dissertation writing.

Curriculum

Postgraduate Certificate

FHEQ Level	Module Title	Module Code	Credits	Semester	MRes in Cancer Drug Discovery	MRes in Cancer Pharmacology	MRes in Drug Toxicology	MRes in Pharmaceutical Technology	MRes in Molecular & Cell Biology	MRes in Chemical Biology
7	Practical Skills in Research	LIS7018-B	20	1	Core	Core	Core	Core	Core	Core
7	Critical Appraisal	LIS7022-B	20	1	Core	Core	Core	Core	Core	Core
7	Principles of Drug Discovery	INC7014-B	20	1	Core	-	-	-	-	-
7	Molecular Basis of Cancer and Cancer Therapy	INC7002-B	20	1	-	Core	-	-	-	-
7	Toxicology and Safety Pharmacology	INC7005-B	20	1	-	-	Core	-	-	-
7	Science of Solid Dosage Forms & Advanced Pharmaceutical Technologies	PHA7007-B	20	1	-	-	-	Core	-	-
7	Molecular and Cell Biology	BIS7020-B	20	1	-	-	-	-	Core	-
6	Bioorganic and Bioinorganic Chemistry	CFS6014-B	20	1	-	-	-	-	-	Core

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

In addition to the above requirements for Postgraduate Certificate:

FHEQ Level	Module Title	Module Code	Credits	Semester	MRes in Cancer Drug Discovery	MRes in Cancer Pharmacology	MRes in Drug Toxicology	MRes in Pharmaceutical Technology	MRes in Molecular & Cell Biology	MRes in Chemical Biology
7	MRes Project Part 1	LIS7020-E	60	2	Core	Core	Core	Core	Core	Core

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

In addition to the above requirements for Postgraduate Diploma:

FHEQ Level	Module Title	Module Code	Credits	Semester	MRes in Cancer Drug Discovery	MRes in Cancer Pharmacology	MRes in Drug Toxicology	MRes in Pharmaceutical Technology	MRes in Molecular & Cell Biology	MRes in Chemical Biology
7	MRes Project Part 2	LIS7021-E	60	3	Core	Core	Core	Core	Core	Core

Students will be eligible for the award of Degree of Masters by Research 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; namely, formal lectures from research/teaching staff and visiting clinicians/scientist and industrial researchers, small group workshops and discussions with peers, laboratory practicals, journal clubs, group and one-to-one tutorials, and a large component of individual research. These are supported by material provided on Canvas, the University's virtual learning environment. Students will also attend the Faculty Research Seminar programmes. Self-directed independent learning forms a significant component at MRes 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, report writing (technical and lay), preparing presentations (oral and poster) to deliver to peers, and other assignments.

Representatives from the Library and from Academic Skills Unit attend the induction programme to introduce the students to the range of support services available to the students. All students are allocated a Personal Academic Tutor (PAT) to support their learning needs. Students are encouraged to self-reflect and complete a skills audit and training need analysis as part of the Critical Appraisal module which is then used to identify the support they need. Within the Critical Appraisal module, a series of workshops designed in conjunction with Academic Skills Unit will enable students to gain knowledge on a range of topics including note taking, critical analysis, citing & referencing, good academic practice etc. Additional and bespoke lunch time workshops are also available from Academic Skills Unit. English Language Support for overseas student is provided by the Language Center. Students with specific support needs are encouraged to identify themselves at the beginning of the course, when they meet with their PAT. PAT's work closely with a dedicated Director of Student Support and Engagement and the Disability Service to provide a bespoke support package for any student who needs it.

Some learning outcomes (LO) are more apparent in particular modules. For example, LO1 and LO2 are mainly developed in Critical Appraisal, whilst LO3 is mainly developed in Practical Skills in Research; LO4 is a pathway-specific module. Acquisition of other learning outcomes (LO5, 6, 11 and 12) 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 these key skills. The MRes Project will allow students to demonstrate all skills and knowledge developed through the year, and its completion demonstrates mastery of LO7-15.

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 LO4, whilst a range of different types of coursework are used to assess other LOs, including essays of varying length, journal club, worksheets, preparation of portfolios of reports on experimental work and assessment of students' laboratory, transferable skills and professionalism during the project period, poster and oral presentations. The final MRes project is assessed by dissertation, *viva voce* examination and on professional performance to conducting research; these allow students to demonstrate achievement of all learning outcomes developed as part of the Postgraduate Certificate/Postgraduate Diploma taught programme, and more specifically, achievement of LO14-15, required for the MRes degree.

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 (Ordinance 5: for Postgraduate Taught Courses) and by Regulations 7 for assessment, and 9 for governing the awards. These are found at:

<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 the programme. Consideration of applications will be based on a combination of formal academic qualifications and other relevant experience.

The standard entry requirement for the programme is an Honours degree in a scientific discipline related to the course subject, or equivalent, 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 mature students with significant relevant experience.

Students who have already taken module CFS6014-B are ineligible for enrolment or transfer onto the Chemical Biology Pathway of the MRes but can enrol on the other pathways.

Students who have already taken module CFS7014-B are ineligible for enrolment or transfer onto the Cancer Drug Discovery Pathway of the MRes but can enrol on the other pathways.

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)