

Faculty of Life Sciences

Programme Specification

Programme title: MSc Drug Toxicology and Safety Pharmacology

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

In order for any new therapeutic agent to progress to the market, or before any chemical can be used in living organisms including humans, a thorough identification and understanding of its toxicity and safety is required. Accordingly, drug toxicology and safety pharmacology is a central and integral component of the chemical and pharmaceutical industries. The discipline of safety pharmacology and toxicological evaluation is dynamic, expanding and multidisciplinary, adapting in response to the demands for new medicines and the improvement in assessment methodology. In both the laboratory and the pharmaceutical industry, safety pharmacology has had to adapt to the changing face of drug development by establishing experimental models and target orientated assessment approaches. This is an exciting time to be involved in this area and, against a backdrop of increasing competitiveness in the chemical and pharmaceutical sector, the demand for “pre-trained” employees in this field is extremely high.

The MSc programme in Drug Toxicology and Safety Pharmacology is hosted by the Institute of Cancer Therapeutics which is situated in the heart of the University campus in purpose built facilities. The Institute has a strong research ethos and it is particularly well known as a centre of excellence in drug development and pharmacology. It is a multidisciplinary organisation incorporating a broad spectrum of skills ranging from chemistry through laboratory drug evaluation to preclinical *in vivo* studies. The MSc Drug Toxicology and Safety Pharmacology programme leader (Dr V Vinader) has long-established experience in the pharmaceutical research and development environment, both in industry and academia. Therefore, this programme is designed to meet the demand of employers and provide a comprehensive overview of the Drug Toxicology and Safety Pharmacology process.

The programme provides state of the art training, both theoretical and practical, in the area of preclinical toxicology with an emphasis on the molecular and *in vivo* aspects of toxicological assessment. This programme is designed to attract individuals with a first degree in the biology, chemistry, medical, pharmaceutical, pharmacological or toxicological sciences who want to specialise in medicines development or undertake employment in the pharmaceutical industry.

For career progression within this sector, a postgraduate qualification is often required. The programme promotes advanced scholarship within specialised areas concomitant with the development of key transferable skills (in IT and bioinformatics) and research techniques. The programme uses a range of teaching strategies to promote independent study and research to develop a systematic and critical understanding of drug toxicology and safety pharmacology, and enhance students' autonomous learning and personal transferable skills. This programme facilitates 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 the 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 toxicology and safety pharmacology.
- A2 Provide students with practical and hands-on skills applicable to the Drug Toxicology and Safety Pharmacology subject area
- A3 Develop within the context of Drug Toxicology and Safety Pharmacology, a comprehensive understanding of communication, research and scientific method
- A4 Provide students with a detailed knowledge of pre-clinical experimental approaches and legislative regulations
- 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 toxicology and safety pharmacology.
- LO2 Critically evaluate scientific literature, discuss and communicate scientific data.
- LO3 Apply standard laboratory methods to obtain accurate data
- LO4 Write and interpret scientific reports
- LO5 Critically evaluate and appraise experimental laboratory techniques with specific emphasis on obtaining a Home Office personal license for animal studies.
- LO6 Demonstrate critical thinking through ability to independently: recognise, define and prioritise problems
- LO7 Demonstrate critical thinking through ability to independently: analyse, interpret, objectively evaluate and prioritise information and data, recognising its limitations;
- LO8 Critically evaluate pre-clinical screening strategies in vitro and in vivo and develop a preclinical screening cascade.
- LO9 Apply scientific principles to the critical analysis of problems in order to determine the safety profile of agents under evaluation
- LO10 Develop autonomy in learning required for continuing professional development; apply skills in; time-management, presentation, written communication and problem-solving.
- LO 11 Use software packages in the analysis and reporting of screening and safety profiling of drugs

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

- LO12 Develop practical *in vitro* skills applicable to the drug toxicology and safety pharmacology discipline.
- LO13 Effectively communicate their understanding of research to different audiences eg poster presentation, oral presentation, grant proposal.

LO14 Demonstrate a conceptual understanding of research and scientific method through the ability to independently 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:

LO15 Demonstrate self-direction and originality in implementing a research project. Employ appropriate experimental approaches and report their findings in relation to current research knowledge and understanding.

LO16 Plan design and execute practical investigations, from the problem recognitions stage through to the evaluation and critical appraisal of results and findings.

LO17 Make decisions in complex and unpredictable situations and use problem solving strategies to develop innovative solutions

LO18 Exercise initiative and personal responsibility

LO19 Communicate and interact with a variety of audiences/professionals from other disciplines using a range of techniques

LO20 Reflect on the need for further personal and professional development to improve their own performance.

Curriculum

Postgraduate Certificate

FHEQ Level	Module Title	Type (Core/ Option/ Elective)	Credits	Semester (s)	Module Code
7	Toxicology and Safety Pharmacology	Core	20	1	INC7005-B
7	Preclinical Models for Drug Evaluation.	Core	20	1	INC7001-B
7	Critical Appraisal of a Current Topic in Cancer Therapeutics and Toxicology	Option	10+10	1&2	INC7017-B
7	Practical Skills in Research	Option	10+10	1&2	INC7018-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	Molecular Mechanisms of Toxicity	Core	20	2	INC7009-B
7	Case Studies in Drug Discovery	Option	20	2	INC7011-B
7	Experimental Design	Option	20	2	BIS7016-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	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 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 includes variety of activities, reading of selected textbooks and specified source literature, use of the virtual learning environment, report writing, preparing presentations etc. The teaching methods focus on student-centred approaches to learning.

Some learning outcomes (LO) are focussed on particular modules. For example, LO5 and LO8 are mainly developed in Preclinical Models for Drug Evaluation, LO1, 9,11 and 12 in Toxicology and Safety Pharmacology and Molecular Mechanisms of Toxicity. Acquisition of other 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 the skills and knowledge developed through the year, and its completion is essential to demonstrate mastery of LO15-20.

The overall study direction which students take will incorporate optionality through a choice of modules in the second semester and subjects in both the critical appraisal and project modules within the programme. The focus in these modules will be selected from a range of areas and topics provided to students, covering several areas within the safety pharmacology and toxicology disciplines. Within the research project, both laboratory based ('wet') and literature based ('dry') projects will be available, the choice being made by the student in consultation with the programme team.

The methods implemented in developing intellectual skills (learning outcomes LO2, 3-7 and LO10,12) include engaging with the students during tutorials, small-group seminars, Journal Clubs, laboratory investigations and individual project-based work. The methods of assessment of intellectual skills are implicit in the written examinations, experimental coursework and particularly the project work. Intellectual skills will also be monitored throughout the programme via oral and written communication.

The methods implemented in developing practical skills include laboratories linked with the taught modules (outcomes LO13 and 11 and 12). Students will also perform laboratory studies and use laboratory instruments under supervision during their research project. The project work will specifically develop outcomes LO6-7, and LO15 to 20. The methods of assessment of practical skills include feedback on laboratory work. Also a part of the mark of the Project report will be attributed to the Experimental Methodology and Presentation & Discussion of Results (outcomes LO3, 4, 11).

Modules throughout the programme will develop or consolidate and assess transferable skills, (learning outcomes LO6, 10, 13-20).

The University of Bradford is well known for attracting students from a wide variety of backgrounds, experiences and countries. This and the learning facilities available to all students provide the conditions for students to develop and manage their learning. The University of Bradford mission statement, Making Knowledge Work, is embedded in the philosophy of this programme, and is supported by well-equipped practical and computational facilities. The methods of assessment of transferable

skills are built into the structure of the examinations, case studies, and research or project work.

Assessment Strategy

A range of assessment methods are used, supported by formative (low stakes or unassessed) 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, LO5 (Home Office examination), and LO12. A range of types of coursework are also used to assess these, and other learning outcomes; essays of varying length, journal club presentations, training needs analysis, preparation of portfolios of reports on experimental work and reflective statements, assessment of students laboratory and transferable skills and professionalism during the project period, optionally poster presentation, grant application. The final MSc project is assessed by dissertation, viva voce examination and on students' professional performance to conducting research, and allows students to demonstrate their achievement of all learning outcomes developed as part of the PGC/PGD taught programme, and more specifically, achievement of LO15-20 required for the MSc degree.

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

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 in a related scientific discipline 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 with 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		