

<b>Module Details</b>	
<b>Module Title:</b>	Practical Skills in Research
<b>Module Code:</b>	LIS7018-B
<b>Academic Year:</b>	2019-20
<b>Credit Rating:</b>	20
<b>School:</b>	Life Sciences (Faculty-wide)
<b>Subject Area:</b>	Life Sciences (Faculty-wide)
<b>FHEQ Level:</b>	FHEQ Level 7 (Masters)
<b>Pre-requisites:</b>	
<b>Co-requisites:</b>	

<b>Contact Hours</b>	
<b>Type</b>	<b>Hours</b>
Independent Study	153
Lectures	16
Supervised time in studio/workshop	10
Laboratory	21

<b>Availability</b>	
<b>Occurrence</b>	<b>Location / Period</b>
BDA	University of Bradford / Semester 1 (Sep - Jan)

<b>Module Aims</b>
To provide a comprehensive understanding of selected important advanced pharmacology techniques; to develop student autonomy in learning and to develop research skills as well as enhance written communication skills and accurate data recording and analysis.

<b>Outline Syllabus</b>
Theory and practice of selected advanced laboratory techniques, such as: Introduction to good laboratory practices and health and safety. Sample preparation for bio-analysis. Analytical biochemical techniques: separation and analysis methods HPLC/ mass

spectrometry. Methods to study cells: microscopy, cell culture, cell proliferation, identification of cell markers and cell purification by FACS. Recombinant DNA techniques including Polymerase Chain Reaction (PCR), Northern & Southern blotting, molecular analysis of gene expression. Optical density measurements and enzyme-linked immunosorbent assay (ELISA). Physicochemical calculations e.g. ionization, ClogP. Graphical representation of data and statistical analysis. Writing of drug evaluation, molecular biology and pharmacology reports.

Optional training:

Home Office training, for in vivo efficacy and ethical issues associated with animal usage (3R's) OR Bioinformatics, training in development of methods and use of software tools for understanding biological data.

### Learning Outcomes

1	Demonstrate an understanding of the theory and principals of key experimental techniques and their application in pharmacological and biological sciences.
2	Demonstrate advanced good laboratory practices to a professional standard (behavior, rules and regulations).
3	Autonomously undertake experiments, critically evaluate and interpret results.
4	Develop advanced knowledge and practical experience of microscopy, cell culture, molecular biology, chromatography, mass spectrometry and biochemical analysis.
5	Evaluate health and safety considerations required legally for experimentation.
6	Demonstrate data handling, analytical thinking and statistical interpretation.
7	Demonstrate an understanding of the design of, and competently record, research experiments.
8	Acquire organisational and time management skills to produce a portfolio of work within a specified time frame.
9	Acquire the necessary skills for in vivo assessing efficacy and ethical issues associated with animal usage (Home office option) OR Acquire an advanced knowledge of software tools for understanding biological data (Bioinformatics option).
10	Prepare scientific reports.

### Learning, Teaching and Assessment Strategy

This course will be presented as a series of lectures, seminars, workshops and laboratory sessions. Where possible, practical classes and workshops will be held in the Institute of Cancer Therapeutics to provide students with the experience of working in a research environment. Some workshops and exercises will also be held in teaching laboratories.

Each practical or workshop will require the completion of a problem-solving and interpretation exercise (1000 word limit). The exercises are submitted as a portfolio at the end of the Semester.

Each practical report-exercise includes a health and safety acknowledgement (LO5), description of the experiment carried out, critical analysis of data and interpretation. LOs 1-7 are assessed therefore as part of each practical exercise report.

LO8 is an inherent LO that will be demonstrated by diligent completion of the portfolio.

LO9 The Home office training and assessment is offered as part of the module. The stand-alone examination will lead to attainment of Home Office certification to allow the students to apply for a Personal Licence to work with experimental animals in the UK or EU in the future. This is assessed as a multiple choice class test, the format and content of this test is set by the Home Office. Students choosing Bioinformatics training will undertake a similar test on this subject.

LO10 Each practical report is assessed by the corresponding academic that delivered the session according to the appropriate rubric. Each report is double considered. Reports are compiled by the module leader as a portfolio.

<b>Mode of Assessment</b>				
<b>Type</b>	<b>Method</b>	<b>Description</b>	<b>Length</b>	<b>Weighting</b>
Summative	Laboratory Report	Production of a portfolio of work (practical exercises report)	1000 word limit for each report	90%
Summative	Classroom test	Closed book MCQ test (EITHER Home Office Training option OR Bioinformatics Training option)	2 hours	10%

### **Reading List**

To access the reading list for this module, please visit <https://bradford.rl.talis.com/index.html>.

*Please note:*

*This module descriptor 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 minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*