

Module Details	
Module Title	Practical Skills in Research
Module Code	LIS7018-B
Academic Year	2023/4
Credits	20
School	Life Sciences (Faculty-wide)
FHEQ Level	FHEQ Level 7

Contact Hours	
Type	Hours
Independent Study	138
Lectures	2
Supervised time in studio/workshop	33
Laboratories	26

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 1

Module Aims
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.

Outline Syllabus
<p>Theory and practice of selected advanced laboratory and research techniques, such as: Introduction to good laboratory practices and health and safety, library skills, and data handling and manipulation. Appreciation of the ethical considerations for working with both animal and human tissue. Application of bioinformatics. 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), blotting, molecular analysis of gene expression. Optical density measurements and enzyme-linked immunosorbent assay (ELISA). Bradford Assay and dot blots for measuring protein amounts. Physicochemical calculations e.g. ionization, ClogP. Graphical representation of data and statistical analysis. Writing of drug evaluation, molecular biology and pharmacology reports. Opportunity to participate in the Home Office Personal Licence Course for working with animals.</p>

Learning Outcomes	
Outcome Number	Description
01	Demonstrate an understanding of the theory and principals of key experimental techniques and their application in pharmacological and biological sciences.
02	Demonstrate advanced good laboratory practices to a professional standard (behavior, rules and regulations).
03	Autonomously undertake experiments, critically evaluate and interpret results.
04	Develop advanced knowledge and practical experience of microscopy, cell culture, molecular biology, chromatography, mass spectrometry and biochemical analysis.
05	Evaluate health and safety considerations required legally for experimentation.
06	Demonstrate data handling, analytical thinking and statistical interpretation.
07	Demonstrate an understanding of the design of, and competently record, research experiments.
08	Acquire organisational and time management skills to produce a portfolio of work within a specified time frame.
09	Acquire the necessary skills for assessing the ethical issues associated with animal usage will be. There is also an opportunity for those students who wish to pursue working with animals in their career to participate in the Home Office Personal Licence training course, which 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 License 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.
10	Understand the ethical issues associated with working with human tissue.
11	Acquire a basic knowledge of bioinformatic software tools for understanding biological data.
12	Develop an understanding of resources available through Library Services to assist in one's research.
13	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 or equivalent). The exercises are submitted 7 days after each practical.

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, and LO13 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 of reports. Each practical report is assessed by the corresponding academic that delivered the session according to the appropriate rubric. A broad sample of reports is double considered to check for marking consistency. Reports are compiled by the module leader as a portfolio.

LO9, 10 and 11 will be assessed in a multiple choice class test:

LO9 Acquire the necessary skills for assessing the ethical issues associated with animal usage will be. There is also an opportunity for those students who wish to pursue working with animals in their career to participate in the Home Office Personal Licence training course, which 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.

LO10 Understanding the ethical issues associated with the use of human tissue.

LO11 Acquire a basic knowledge of bioinformatic software tools for understanding biological data.

LO12 The workshops provided by the Library staff will provide the students with an understanding of the resources which are available to support their research and learning during the course and beyond.

### Mode of Assessment

Type	Method	Description	Weighting
Summative	Laboratory Report	Production of a portfolio of work	90%
Summative	Examination - MCQ	Closed book MCQ test covering the animal ethics, human ethics and bioinformatics workshops (1 Hr)	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.*

