

Advanced Laboratory and Research Skills

Module Code:	CFS6030-D
Academic Year:	2018-19
Credit Rating:	40
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry
FHEQ Level:	FHEQ Level 6
Module Leader:	Dr William Martin

Additional Tutors:

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	4
Project supervision	4
Practical classes and	6
Tutorials	6
Laboratory	102
Directed Study	278

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

In this module you will learn how to take your practical skills and apply them to research based problems. We will take you through the tools required to approach a research question and you will develop your problem- solving skills. You will develop the skills

required to disseminate your work in dissertation form. Additionally, you will also develop your interview and assessment centre techniques in sessions run by the careers service

Outline Syllabus

Selected experiments to develop knowledge on advanced practical techniques: working under inert conditions, column chromatography, syringe technique etc.

Advanced use of chemical search engines such as Reaxys & SciFinder in constructing complex searches; critical appraisal of the primary scientific literature; preparation of a research plan based on engagement with the primary literature. Execution of this scientific plan and analysis of subsequent results. Developing good interview and assessment centre technique.

Advanced scientific writing - the nature of academic writing, management of bibliographies, plagiarism in advanced scientific writing.

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 Use your developed skills to interrogate specialist search software.
- 2 Carry out selected transformations and preparations in the laboratory
- 3 Apply methods for investigating complex systems.
- 4 Develop advanced laboratory techniques.
- 5 Interpret spectroscopic data to identify reaction products and define separation science strategies for further purification.
- 6 Make scientifically informed decisions with regards to the management of experiments
- 7 Conduct a search of the primary literature using specialist chemical search engines.
- 8 Analyse the primary literature and extract pertinent information.
- 9 Access the primary literature through specialist search software.
- 10 Communicate scientific ideas effectively.
- 11 Develop interview technique
- 12 Devise and sustain arguments using ideas, some of which are derived from the recent primary literature.
- 13 Describe and comment upon particular aspects of current research, or equivalent advanced scholarship.
- 14 Develop specialist knowledge in the chosen area of investigation.
- 15 Critically assess previously reported research; be able to discuss scientific principles with a supervisor; analyse/present data in an appropriate way.
- 16 Source and select appropriate information; write a critical report on a specialist area; develop presentational skills.

Learning, Teaching and Assessment Strategy

Laboratory-based work will include staff-led demonstration of practical and manipulative skills at the bench and supervision of students experimental work. Pre-laboratory workshops will be provided for each experiment to familiarise students with the concepts and procedures; the post lab workshops will allow students to reflect on the results and their significance.

Computer based workshops will introduce you to the web-based tools that are used by research chemists. Teaching of health and safety and laboratory skills will be delivered in workshops. Laboratory skills will be taught and practised in laboratory sessions. Students will receive feedback in the form of marked laboratory reports, review of laboratory records and orally in seminars. Instruction for interview and assessment centre technique will be given in workshops.

Introductory lectures will be given to introduce students to the dissertation writing process. Students will be given directed reading in the general area of their dissertation by their supervisor. Students will meet in a group with their dissertation supervisor and will discuss their assigned research area. Students will be guided to produce a plan of laboratory work and will then perform the experiments. Students will then individually produce a dissertation based on this work, that should also extend into closely related areas of the chemical literature.

Students will select an area of interest and will be given an academic supervisor. Working with their supervisor the group will produce a plan of work on how to tackle a research problem. This exercise will test LOs 1, 6, 7, 10, 14, 15, 16. This is a formative assessment, and feedback will be given on the search strategy employed.

The laboratory work undertaken by the student will be assessed. This will cover LOs 2, 4, 5, 6.

An individual viva will be conducted to cover LO 10, 11, 12.

A final individual dissertation will cover LO 1, 3, 7, 8, 9, 10, 12, 13, 14, 15,16

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Dissertation or Project Report	final individual dissertation	0-6000 words	75%	Yes
Formative	Coursework	Group preparation of research plan		%	No
Summative	Coursework	Continuous assessment of		15%	No

		laboratory record and associated reports			
Summative	Computer- based assessment	Technical and HR interview on laboratory work	1 hour	10%	No

Legacy Code (if applicable)

Reading List

To view Reading List, please go to [rebus:list](#).