

Module Details	
Module Title:	Practical Chemistry 1
Module Code:	CFS4026-D
Academic Year:	2019-20
Credit Rating:	40
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry
FHEQ Level:	FHEQ Level 4
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	Hours
Lectures	12
Tutorials	4
Laboratory	168
Directed Study	216

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

Module Aims
This module will introduce the fundamental techniques required to work safely and efficiently in the laboratory. You will develop your skills in the safe handling of chemicals, in making accurate qualitative observations, quantitatively analysing compounds prepared in the laboratory, and in reporting and interpreting experimental results. You will learn about spectroscopic techniques and use these methods in the analysis of what you synthesise in the lab. You will use measurements of physical parameters to investigate aspects of physical chemistry. Through preparing laboratory reports you will be introduced to the standard formats and drawing packages used by professional chemists to share their results. You will be tutored in the basic numeracy skills necessary to study a degree in the chemical sciences, and will apply these skills to your experimental work. The principles of Green Chemistry will be introduced, and you

will learn how to assess the environmental impact of your laboratory work.

Outline Syllabus

Chemical hazards and risk assessments, sources of safety data, on-line databases, definitions and safety terms, exposure limits, legislation, CHIP, COSHH, REACH.

Data manipulation & presentation of results. Precision, accuracy & sensitivity, linear regression, units. Experimental errors & calibration. Validation of data. Statistical methods. Reporting & interpreting experimental results. Quantitative & qualitative measurements, Algebra, Differential calculus, Integral calculus, Trigonometry.

Green chemistry - Definitions & metrics used, the tools used to assess the environmental impact of chemical processes.

Purification of single & mixed substances. Separation & identification of mixtures by thin layer chromatography. Solvent extraction from solids & liquids. Experiments to illustrate thermodynamic equilibria & the variation of equilibrium position with temperature. Measurements of physical properties of states of matter; refractive index, boiling point & vapour pressure. Measurement of heats of reaction by calorimetry. Measurement of enthalpies of solution & partition coefficients. Experiments illustrating classical methods of inorganic analysis. Laboratory techniques in separating organic mixtures: Elementary organic synthesis. Spectroscopic characterisation of organic & inorganic compounds.

Professional Development: Presenting information effectively, monitoring & evaluating results, drawing conclusions, chemical reports, chemical structure drawing.

Learning Outcomes

1	Classify types of chemical hazard and implement safe working practices based on this analysis.
2	Apply appropriate standards of reporting for recording and then disseminating experimental data and results.
3	Record and interpret analytical data, combining the data to help answer experimental questions.
4	Conduct basic laboratory procedures in a safe and efficient manner.
5	Explain the role of Green Chemistry in measuring, and then minimising the environmental impact of practical chemistry.
6	Manipulate numerical data and equations and will be able to identify and quantify errors.

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. 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. Data analysis and mathematics will be taught and practised through problem-based learning and workshops. Workshops and seminars will be used to teach the fundamental spectroscopic techniques used in the lab, and to give instruction in the use of specialist software for the preparation of laboratory reports.

Mode of Assessment				
Type	Method	Description	Length	Weighting
Summative	Examination - closed book	Closed book maths exam and data handling exercise	1.5 hours	30%
Summative	Coursework	Continuous summative assessment of practical work and reports (6000 words)	-6000 words	70%

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.