UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Practical Chemistry 1
Module Code	CFS4026-D
Academic Year	2020/1
Credits	40
School	School of Chemistry and Biosciences
Subject Area	Chemistry
FHEQ Level	FHEQ Level 4
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Online Lecture (Synchronous)	12
Tutorials	4
Laboratories	168
Directed Study	216

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

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

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

Learning, Teaching and Assessment Strategy

The module uses a blended approach to support learning and achievement. Students will complete a mixture of wet and dry laboratory experiments supported by weekly online pre-lab and post-lab learning packages. These will include short videos that demonstrate key skills, a set of structured acitvities (reading, online VLE quizzs etc.) that 'scaffold' the the learning. Students will submit laboratory handbooks and reports towards a continual assessment of their progress. Opportunities for formative feedback will be given to guide progress. Wet labs will be held on-campus to ensure essential practical skills are developed. Laboratory-based work will include staff-led demonstration of practical and manipulative skills at the bench and supervision of students` experimental work. Teaching of health and safety and laboratory skills will be delivered in workshops. Laboratory skills will be taught and practised in laboratory sessions. 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	Coursework	Continuous summative assessment of practical work and reports (6000 words)	N/A	70%
Summative	Examination - Open Book	Open book maths exam and data handling exercise	1 hour 30 mins	30%

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.
