UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Practical Chemistry For Forensic Scientists
Module Code	ARC4023-D
Academic Year	2020/1
Credits	40
School	School of Archaeological and Forensic Sciences
Subject Area	Forensic Science
FHEQ Level	FHEQ Level 4
Pre-requisites	N/A
Co-requisites	N/A

Contact Hours	
Type	Hours
Lectures	12
Seminars	22
Practical Classes or Workshops	6
Laboratories	150
Directed Study	210

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. Development of 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. It will consider how practical chemistry outcomes can be used in the forensic environment.

Outline Syllabus

Chemical hazards and risk assessments, sources of safety data, on-line databases, definitions and safety terms, exposure limits, legislation, CHIP, COSHH and REACH.
Data manipulation and presentation of results. Precision, accuracy and sensitivity, linear regression, units. Experimental errors and calibration. Validation of data. Statistical methods. Reporting and interpreting experimental results. Quantitative and qualitative measurements, Algebra, Differential calculus, Integral calculus, Trigonometry.
Purification of single and mixed substances. Separation and identification of mixtures by thin layer chromatography. Solvent extraction from solids and liquids. Experiments to illustrate thermodynamic equilibria and the variation of equilibrium position with temperature. Measurements of physical properties of states of matter; refractive index, boiling point and vapour pressure. Measurement of heats of reaction by calorimetry. Measurement of enthalpies of solution and partition coefficients. Experiments illustrating classical methods of inorganic analysis.
Laboratory techniques in separating organic mixtures: Elementary organic synthesis. Spectroscopic characterisation of organic and inorganic compounds.
Professional development: Presenting information effectively, monitoring and evaluating results, drawing conclusions, chemical reports, chemical structure drawing.
Introduction to forensic applications of practical chemistry.

Learning Outcomes

Outcome Number	Description
01	Describe types of chemical hazards.
02	State how to minimise risks in using hazardous substances; explain, with examples, how practical work reinforces theoretical studies.
03	Present laboratory reports in the appropriate format. Identify and quantify experimental errors. Interpret and analyse data.
04	Perform basic chemical operations and carry out some measurements in practical organic and inorganic chemistry.
05	Carry out simple COSHH assessments.
06	Apply practical chemistry to forensic problems

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. Problem-based learning will allow students to explore how chemistry is used in a forensic investigation.
Students will be assessed on continuous summative assessment of practical work and reports. Additionally there will be an open book maths and data handling exam.

Mode of Assessment				
Type	Method	Description	Length	Weighting
Summative	Coursework	Practical Reports (6000 words)	N/A	70%
Summative	Examination - Open Book	Exam Open Book maths / data handling (2 hours)	2 hour	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.

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