



University of the
West of England

MODULE SPECIFICATION

Code: USSJRG-20-1 **Title:** Chemistry for Forensic Science **Version:** 2

Level: 1 **UWE credit rating:** 20 **ECTS credit rating:** 10

Module type: Standard

Owning Faculty: Health and Life Sciences **Field:** Applied Sciences

Faculty Committee approval: Quality and Standards Committee **Date:** September 2011

Approved for Delivery by: University Centre Yeovil

Valid from: September 2011 **Discontinued from:**

Pre-requisites:
NONE

Co-requisites:
NONE

Entry Requirements:
NONE

Excluded Combinations:
NONE

Learning Outcomes:

The student will be able to:

- demonstrate knowledge of chemical principles underlying atomic structure and bonding;
- name elements, simple molecules and organic functional groups;
- use basic chemical terminology to describe commonly encountered chemical reactions;
- explain how electromagnetic radiation interacts with matter;
- relate three-dimensional molecular geometry to macroscopic properties;
- carry out simple laboratory techniques in chemistry;
- recognise and describe a range of routine analytical techniques available for the chemical analysis of molecules;
- describe the functions of the components of basic analytical instruments and operate analytical instruments at a basic level;
- record experimental data in an appropriate manner, use it for the calculation of concentrations and other parameters of simple test samples and in the calibration of instruments.

Syllabus Outline:

Structure and Bonding:

The periodic table, atoms, stable electron configurations, covalent and ionic bonding. Electronegativity, polar bonds and intermolecular forces. Formation of hybrid orbitals, sigma and pi bonds and non-bonding electron pairs. Lewis structures. Chemical terms and calculations of mass and concentration – moles, relative atomic and molecular mass, molarity, reaction yields. Names and formulae of important inorganic compounds and their ions. Classification of hydrocarbons and organic functional groups.

Principles of Chemical and Physical Reactivity.

Bond and lattice energies. Basic kinetic theory, activation energy, order of reaction and simple rate equations. Introduction to radiochemistry and sources of radioactivity.

Fundamental Stereochemistry:

Stereoisomers and structural isomers. Optical isomers. Molecules containing a chiral centre, enantiomers

and their physical properties. Perspective formulae, sawhorse representations.

Basics of Chemical Analysis:

spectroscopy (UV, Vis, IR), chromatography (TLC, GC, HPLC), electrophoresis (e.g. SDS-page), electrochemistry (e.g. pH measurement)

Teaching and Learning Methods:

The module will be delivered using lectures, online video tutorials (<http://science.uwe.ac.uk/ls/orgchem/>) and practical work. Students will be expected to widen their own knowledge base in particular areas of the syllabus having been given specific direction; problems relating to this material and that in other areas will form the basis of some of the tutorial sessions. Tutorial sessions offer students support focused on their individual needs.

Reading Strategy:

All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively.

Any **essential reading** will be indicated clearly, along with the method for accessing it, e.g. students may be expected to purchase a set text, be given or sold a print study pack or be referred to texts that are available electronically, etc. This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders.

If **further reading** is expected, this will be indicated clearly. If specific texts are listed, a clear indication will be given regarding how to access them and, if appropriate, students will be given guidance on how to identify relevant sources for themselves, e.g. through use of bibliographical databases.

Indicative Reading List:

Current versions of the following:

Principles of Chemistry are covered in General Chemistry books such as:

- Lewis R. & Evans W., Chemistry, Palgrave Foundations.
- Atkins P and Jones L, Chemical Principles, W H Freeman and Co.

Fundamental chemistry explained in a forensic science context can be found in

- Johll, M., Investigating Chemistry, A Forensic Perspective, W.H Freeman & Company.

Additional support can be found in texts such as

- Norman N C, Periodicity and the s- and p-Block Elements, (Oxford Chemistry Primer), Oxford Sciences Publications.
- Winter M J, Chemical Bonding, (Oxford Chemistry Primer), Oxford Sciences Publications.
- Hornby M & Peach J, Foundations of Organic Chemistry (Oxford Chemistry Primer), Oxford Science Publications.
- Harwood L M and Claridge D W, Introduction to Organic Spectroscopy, (Oxford Chemistry Primer), Oxford Science Publications.
- Crow J., Bradshaw T. & Monk P., Chemistry for the Biosciences, OUP.
- Higson S.P.J., Analytical Chemistry, OUP.

Suitable textbooks can be found in Section 540 of the Frenchay library.

Assessment:

Weighting between components A and B (standard modules only) A: 40% B: 60%

FIRST ATTEMPT

First Assessment Opportunity

Component A (*controlled*)

Description of each element

EX1 Exam (2 hours) Assessment Period 1

Element Wt (Ratio)

(*within Component*)

Final Assessment 1

Component B

Description of each element

CW1 Portfolio of worksheets/ practical reports.

CW2 Laboratory based exercises in which students will be assessed on their practical skills, theoretical appreciation and interpretation of data provided/generated during the session.

Element Wt (Ratio)

(*within Component*)

1

1

Second Assessment Opportunity (Resit) further attendance at taught classes is not required

Component A (*controlled*)

Description of each element

EX2 Exam (2 hours) Assessment Period 3

Element Wt (Ratio)

(*within Component*)

Final Assessment 1

Component B

Description of each element

CW3 Extended Portfolio of rewritten practical reports and virtual laboratory/ data interpretation exercises

Element Wt (Ratio)

(*within Component*)

1

EXCEPTIONAL SECOND ATTEMPT Attendance at taught classes is required.

Specification confirmed by**Date**
(Associate Dean/Programme Director)