MODULE SPECIFICATION

Part 1: Information			
Module Title	Chemistry in Context		
Module Code	USSJRT-30-1	Level	Level 4
For implementation from	2020-21		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes.

Outline Syllabus: The syllabus includes:

Winning Combinations:
Why do atoms combine into complex molecules and materials, and how does this influence their chemical and physical properties? Chemical combinations - origins of ionic and covalent bonding related to atomic structure and the Periodic Table; electronegativity, polar bonds and intermolecular forces. Nuclear decay processes and an introduction to nuclear forensics. Molecular orbital and valence bond theories of sigma and pi bonding in organic and inorganic compounds. Naming and structures of important inorganic compounds and metal coordination compounds, origins of isomerism and biological relevance. Theories of bonding related to electronic and magnetic properties of metals and their complexes.

Explosive or Inert?:
Why do reactions happen? Introduction to stability of atoms, molecules and mixtures, with examples of specific explosives. Entropy, order and disorder. Energy and combustion, enthalpy. Isotopes, radiation and radioactive decay. Elementary kinetics. Definition and factors influencing the rate of a chemical reaction. Classification of reactions according to speed and complexity.

Rate equations for first and second order reactions: mention of zero, third and fractional order reactions. Experimental and mathematical methods for determination of order and rate constants. Temperature
dependence of reaction rates. Introduction to catalysis and organic synthesis. Dissociation constants and theories of acids and bases.

Drugs, Flavours and Fragrances:
What are the structures and origins of important drugs? Identifying organic functional groups and ring systems: classes of functional group, unsaturated and aromatic systems. Synthesis and reactivity of aromatic and non-aromatic ring systems. Fundamental stereochemistry in the context of drugs - structural isomers and stereoisomers. Chiral centres, enantiomers and physical properties. Different representations of structure in chiral molecules. Systems containing two chiral centres, diastereoisomers, meso compounds. Specification of relative configurations, absolute configurations, sequence rules for molecules containing one chiral centre. Geometrical isomerism and cis/trans, Z/E specification of configuration. Relevance of stereochemistry to biochemistry. Types of chemical reagent and common synthetic reactions in organic synthesis.

Teaching and Learning Methods: The material will be delivered using a combination of lectorials (lectures/tutorials) and workshops. Practical work may be included if consistent with the requirements of social distancing. Material will be augmented by directed reading in the recommended texts and in selected publications from the scientific literature. The topics selected for delivery by workshops will be designed to enhance problem solving skills.

Technology enhanced learning will be embedded within teaching materials via links to supplementary electronic online resources of the textbook and other relevant information portals, e.g. http://www.chemspider.com. Use will also be made of various in-house electronic resources and flash videos in chemistry for biologists available at http://calcscience.uwe.ac.uk. Student learning will be further supported through a variety of materials posted on the University's E-Learning Environment, Blackboard.

Contact hours with an approximate indication of time required for each:

Face-to-face lectorials and workshops - 66 hours.

Independent learning - 78 hours for each of the following;

Essential reading to support acquisition of knowledge and completion of problem solving skills exercises relating to lectorials or workshops

Preparation and submission of coursework

Revision and preparation for exams.

Part 3: Assessment

Students will undertake lectorials and workshops based on the theoretical and applied aspects of chemistry by consideration of chemical structure and reactivity within a forensic context.

The assessed worksheets will contain a variety of questions and responses for students to complete and will be directed to increase the students' problem solving skill.

The examinations will assess the students' knowledge acquired during lectorials and workshops, and from their own directed, independent learning.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		30 %	Portfolio of worksheets 1
Portfolio - Component B		30 %	Portfolio of worksheets 2
Examination (Online) - Component A		13 %	Online examination 1 (24 hours)
Examination (Online) - Component A	✓	27 %	Online examination 2 (24 hours)
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Portfolio - Component B		60 %	Portfolio of worksheets
Examination (Online) - Component A	✓	40 %	Online examination (24 hours)

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	**Reference**
Give examples to illustrate how chemical structure and bonding relates to macroscopic properties in simple inorganic and organic molecules	MO1
Use ideas of entropy and enthalpy as a predictive tool to determine stabilities of compounds and yields of reactions	MO2
Analyse simple kinetic data and relate this analysis to reaction mechanisms	MO3
Describe common synthetic strategies and types of reaction relevant to drugs	MO4
Identify important classes of organic functional groups and ring systems, and relate their structure to action as acids or bases in chemical reactions	MO5
Illustrate their knowledge of chirality and configuration in organic molecules using simple examples of drugs, flavours or fragrances	MO6
Explain how underlying bonding in metals and their complexes gives rise to their magnetic, electronic and biological properties	MO7

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	234
Total Independent Study Hours:	234
Scheduled Learning and Teaching Hours:	
Face-to-face learning	66
Total Scheduled Learning and Teaching Hours:	66

	Hours to be allocated	300
	Allocated Hours	300
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ussjrt-30-1.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: