Module Specification

Chemistry in Practice

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Contents

Module Specification **1**

Part 1: Information **2**

Part 2: Description **2**

Part 3: Teaching and learning methods **3**

Part 4: Assessment **5**

Part 5: Contributes towards **7**

Part 1: Information

Module title: Chemistry in Practice

Module code: USSKCK-30-0

Level: Level 3

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Health & Applied Sciences

Department: HAS Dept of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: See Learning Outcomes.

Outline syllabus: Structural Chemistry: Periodicity of physical properties; bonding: covalent bonds; ions and the ionic bond. Carbon compounds and systematic nomenclature. Basic description of bonding in saturated and unsaturated

hydrocarbons.

Organic Functional Groups and The Benzene Ring: The naming, structure and general methods of synthesis of common functional groups. Typical reactions of common organic functional groups. The structure, synthesis and reactivity of benzene.

Drug Development: Strategies for the development of drugs; the synthesis of aspirin and its development into ibuprofen and naproxen.

Isomerism and Biology: Constitutional and stereo-isomerism. Enantiomers and diastereoisomers. Methods of separation and identification. The amino acids and formation of primary, secondary and tertiary structure of proteins. The structures of simple sugars and formation of polysaccharides.

Synthetic Polymers: Formation and examples of addition and condensation polymers. Methods of cross-linking polymers. The relationships between chemical structure and physical properties of polymers. Glassy and rubbery polymers, measuring Tm and Tg.

Laboratory Skills: Separating and purifying mixtures by recrystallization, distillation, filtration, solvent extraction, chromatography, and the characterization of pure compounds by melting and boiling points. The synthesis of simple organic molecules, such as aspirin or detergents. Calculations of theoretical and percentage yield, molecular formula from percentage of elements. Measurement of pH and calculation of hydrogen ion concentration. Measurement and inter-conversion of mass, volume and density of compounds.

Part 3: Teaching and learning methods

Teaching and learning methods: The module will run in semester 2. The material will be delivered using a combination of lectures, tutorials and laboratory work. Lectures will be augmented by directed reading in the recommended text and in

selected publications e.g. Chemistry World, New Scientist. The topics selected for delivery by practical work will be designed to enhance problem solving skills and to provide experience of relevant laboratory techniques and data manipulation. Tutorial sessions will be used to allow students to progress at different rates depending on their academic backgrounds and individual needs.

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 in-house electronic resources and flash videos in chemistry 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.

Independent learning will take the following forms with an approximate indication of time required for each:

Essential reading to support acquisition of knowledge and completion of problem solving skills exercises relating to lectures, tutorials or practical classes – 78 hours

Preparation and submission of coursework – 78 hours

Revision and preparation for exams – 78 hours.

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

MO1 Describe the structure of the atom and how this structure is related to chemical reactivity

MO2 Describe the periodic classification of elements and to use the periodic table as a predictive tool

MO3 Describe and name simple molecules

MO4 Recognise the different types of isomerism and inter- and intra-molecular bonding within simple organic molecules

MO5 Describe the general chemical structure and biological function of simple amino acids, proteins, sugars and carbohydrates

MO6 Recognise how chemical reactions may be classified

MO7 Identify methods of formation of simple synthetic polymers, and describe their fundamental properties and functionality as materials in terms of underlying structure

MO8 Demonstrate fundamental knowledge about several laboratory techniques, and in simple calculations and data handling, commonly used in chemistry

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 234 hours

Face-to-face learning = 66 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/usskck-30-0.html

Part 4: Assessment

Assessment strategy: Assessment 1 is a problem solving exercise.

Assessment 2 is a portfolio of worksheets.

Students will undertake exercises that assess their ability to record observations and to manipulate data obtained. The tutorial sessions will be based on the theoretical and practical aspects of the syllabus and will include problem based learning in the areas of chemical reactivity and chemical synthesis. The assessed worksheets will contain questions and responses for students to complete.

Assessment 3 is an examination.

The examination will assess the students' knowledge acquired during lectures, tutorials and practical classes and from their own directed, independent learning.

Assessment tasks:

Set Exercise (First Sit)
Description: Problem solving exercise
Weighting: 30 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO6

Portfolio (First Sit)
Description: Portfolio of worksheets
Weighting: 30 %
Final assessment: No
Group work: No
Learning outcomes tested: MO6, MO8

Examination (Online) (First Sit)
Description: Online examination (24 hours)
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7, MO8

Set Exercise (Resit)
Description: Problem Solving Exercise
Weighting: 30 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO6

Portfolio (Resit)

Description: Portfolio of worksheets
Weighting: 30 %
Final assessment: No
Group work: No
Learning outcomes tested: MO6, MO8

Examination (Online) (Resit)
Description: Online examination (24 hours)
Weighting: 40 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5, MO6, MO7, MO8

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Biological Sciences {Foundation} [Frenchay] MSci 2023-24

Environmental Science {Foundation} [Frenchay] MSci 2023-24

Wildlife Ecology and Conservation Science {Foundation} [Frenchay] MSci 2023-24

Biological Sciences {Foundation} [Frenchay] BSc (Hons) 2023-24

Biomedical Science {Foundation} [Frenchay] BSc (Hons) 2023-24

Biomedical Science {Foundation} [Frenchay] MSci 2023-24

Forensic Science {Foundation} [Frenchay] BSc (Hons) 2023-24

Forensic Science {Foundation} [Frenchay] MSci 2023-24

Environmental Science {Foundation} [Frenchay] BSc (Hons) 2023-24

Wildlife Ecology and Conservation Science {Foundation} [Zoo] BSc (Hons) 2023-24