UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Inorganic Chemistry 1
Module Code	CFS4022-B
Academic Year	2020/1
Credits	20
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
Learning Objects Interaction	21
Tutorials	6
Directed Study	146
Practical Classes or Workshops	25
Online Tutorials (Synchronous)	2

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

Module Aims

To introduce the students to the language and terminology of inorganic chemistry, while building an understanding of the underlying principles that govern chemical & physical properties of atoms and simple molecules. The concepts of bond formation and chemical properties will be discussed, with an introduction to vibrational spectroscopy.

The course will address the periodicity of the main group elements, transitional metals, lanthanides and actinides, with additional theory on radioactive elements and their uses in radiopharmaceuticals. This course will also introduce solid state chemistry, group theory and the principles of X-ray diffraction. Additional transferable skills will be developed by groupwork and the students will improve their presentation skills with additional support provided by the careers centre.

Outline Syllabus
i) Atomic structure and properties, including the Bohr model and Particle-Wave Duality. ii) Lewis model and VSEPR theory to describe bonding in homonuclear and heteronuclear diatomic molecules. Lewis acid-base theory. iii) Predicting the shapes and symmetry of polyatomic molecules, including symmetry elements, operations and vibrational spectroscopy. iv) Molecular Orbital Theory of diatomic and polyatomic molecules. v) Determining the periodic trends of the s, p, d and f-block elements to enable prediction of chemical reactivity and physicochemical properties. vi) Synthesis and application of radioactive materials, including their uses in radiopharmaceuticals. vi) Using experimental and theoretical data to determine the solid state properties of compounds and address their synthesis and application, including details of their conductivity and principles of X-ray diffraction. vii) Methods of elemental analysis including combustion [CHN(S)] analysis, Atomic Absorption Spectroscopy, X-ray Photoelectron/Fluorescence Spectroscopy. viii) Teamwork to write and present a seminar style presentation.

Learning Outcomes	
Outcome Number	Description
01	Describe the basic principles of atomic structure and identify quantum numbers
02	Appraise and compare different models of bonding for homonuclear and heteronuclear diatomic molecules
03	Explain the different models used to predict the shapes and stability of polyatomic molecules.
04	Describe the general chemistry of the s, p, d & f-block elements, and identify trends in their chemical and physical properties.
05	Give the preparation details of radioactive materials and discuss their uses in radiopharmaceuticals.
06	Explain the principles of solid state chemistry, discuss their applications, conductivity and the basic details of X-ray diffraction.
07	Define the symmetry elements and operations of molecules and discuss their importance in vibrational spectroscopy.
08	Work as a team to discuss and prepare a scientific presentation.
06	Develop team-based problem solving skills in the application of analytical techniques.

Learning, Teaching and Assessment Strategy

The module uses a blended approach to support learning and achievement. Students will engage with a series of weekly online learning packages. These will include short videos that adrress key concepts, a set of structured activities (reading, online discissions etc.) that 'scaffold' the learning, and a range of formative tasks that generate feedback on progress.

Students will also engage in a series of on-campus tutorials. Online sessions (tutorials/discussions) will also be used to support learning and monitor progress as student move through the curriculum. In semester 1 students will be assigned to different groups to prepare and present a seminar to the cohort. Support for group working will be provided by the careers service.

Students will be guided throughout the module with directed study to acquire knowledge and understanding of the underlying concepts laid out in the syllabus. The virtual learning environment (VLE) will be used to disseminate lecture notes, module handbooks, links to online resources, and any announcements regarding the module to the students.

Assessment 1: A group presentation (LO 8).
Assessment 2: An online classroom test in January of up to 1 hour will cover material from semester 1 (LOs 1-3).
Assessment 3: An online open book examination of up to 2 hours at the end of the module (LOs 1-7).
Assessment 4: Tutorial Sheets (LOs 1-7).

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Presentation	Group work	12 mins	20%
Summative	Examination - MCQ	Online Test MCQ	1 hour	20%
Summative	Examination - Open Book	Summative assessment: open book examination	2 hour	50%
Summative	Classroom test	Work Sheets	N/A	10%

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.
