UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title:	Inorganic Chemistry 1
Module Code:	CFS4022-B
Academic Year:	2019-20
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry
FHEQ Level:	FHEQ Level 4
Pre-requisites:	
Co-requisites:	

Contact Hours	
Type	**Hours**
Lectures	30
Tutorials	14
Directed Study	156

Availability	
Occurrence	**Location / Period**
BDA	University of Bradford / Academic Year (Sept - May)

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.

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

1	Describe the basic principles of atomic structure and identify quantum numbers.
2	Appraise and compare different models of bonding for homonuclear and heteronuclear diatomic molecules
3	Explain the different models used to predict the shapes and stability of polyatomic molecules.
4	Describe the general chemistry of the s, p, d & f-block elements, and identify trends in their chemical and physical properties.
5	Give the preparation details of radioactive materials and discuss their uses in radiopharmaceuticals.
6	Explain the principles of solid state chemistry, discuss their applications, conductivity and the basic details of X-ray diffraction.
7	Define the symmetry elements and operations of molecules and discuss their importance in vibrational spectroscopy
8	Work as a team to discuss and prepare a scientific presentation.

Learning, Teaching and Assessment Strategy

The core content will be delivered through lectures to provide students with fundamental knowledge in inorganic chemistry. These lectures will be supported by tutorial sessions where

students will be asked to work in small groups to solve problems based on critical thinking. This will help in peer-learning activities. Formative feedback will be given at the end of these activities.

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: A class-room test in January will cover material from semester 1 (LOs 1-3)

Assessment 3: A summative examination 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		20%
Summative	Examination - closed book	Summative assessment: closed book examination	2 hours	50%
Summative	Classroom test	Closed book classroom test	1 hour	20%
Summative	Classroom test	Work SHeets		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.