UNIVERSITY of BRADFORD

Module Descriptor

Module Details	
Module Title	Inorganic Chemistry 1 (at distance)
Module Code	CFS4029-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
Seminars	4
Online Tutorials (Synchronous)	24
Directed Study	176

Availability	
Occurrence	Location / Period
DLA	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.

Learning, Teaching and Assessment Strategy

This module will be delivered using a 'flipped' learning and teaching strategy: this means you will be provided with taught material which you will need to study before the class takes place. This material will be presented in a range of media including podcasts, vodcasts, and directed reading and will be delivered through the University's VLE. On-line activities such as quizzes, discussions and worksheets will support the taught material.

The majority of classes will be hosted and facilitated online using collaborative software. These sessions will require you to use the knowledge you have gained through completion of the pre-work and apply it to real world problems in the discipline of inorganic chemistry. Furthermore, the problems will require you to take a collaborative approach to solving them, helping you develop key employability skills in a peer-learning environment.

You will interact with your course tutor and other group members on a regular, timetabled basis which will be supported via teleconferencing facilities. In these sessions, your group will be encouraged to explore both the core content and reflect on your approach to solving problems.

Your active engagement with the online discussions and activities will be crucial to success in this module and evaluation of engagement will inform the support you receive from your Supervisory Team.
In semester-1 students will work with their study group to prepare and present a given topic related to the knowledge developed in this module to the cohort in a seminar style. Support for group working will be provided by the careers service and additional resources will be made available through the VLE.
Assessment 1: An on-line group presentation, which will cover LO 8. The study groups will develop a joint presentation on a given relevant topic. Formative feedback on presentation will be given as part of the regular timetabled tutorial sessions.

Assessment 2: A remote on-line assessment in January will cover material from semester 1, supervised by the course tutor. This will cover LOs 1-3.

Assessment 3: A summative examination in Bradford at the end of the module. Covers LOs 1-7.
Formative feedback on regular tutorial questions in the style of the assessment 2 and 3 will be provided throughout the year during the regular timetabled sessions.

Mode of Assessment

Type	Method	Description	Length	Weighting
Summative	Presentation	On-line presentation	20 mins	20%
Summative	Examination - Open Book	Open book examination	2 hour	50%
Summative	Computer-based assessment	Remote on-line assessment (MCQ)	1 hour	30%
Formative	Coursework	Tutorial Sheets	N/A	N/A

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.

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