UNIVERSITY of BRADFORD

Module Descriptor

Inorganic Chemistry 1

Module Code:	CFS4022-B
Academic Year:	2018-19
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry and Forensic Science (ceases 2016)
FHEQ Level:	FHEQ Level 4

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	30
Tutorials	14
Directed Study	156

Availability Periods

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

Module Aims

Introduce students to the language and terminology of inorganic chemistry & build an understanding of the underlying principles that govern chemical & physical properties of atoms and simple molecules.

Introduce different models describing bond formation between atoms and relate these to the physical & chemical properties of simple molecules.

Give a perspective on physical & chemical properties of the main group elements.

Introduce the concepts of crystalline materials, lattice systems & the basic principles of X-ray diffraction.

Introduce the skills required for working in a group situation.

Outline Syllabus

Language of inorganic chemistry, measurements, units and nomenclature, balancing equations, oxidations states.

Atomic structure and properties - Classing atomic structure, the Bohr model of the atom, the nature of the electron, wavefunctions, many electron atoms, nuclear chemistry.

Diatomic molecules - Lewis model, Valence bond theory, molecular orbital theory, energy level diagrams, heteronuclear diatomic molecules.

Polyatomic molecules - Lewis model, VSEPR, Polarity, resonance, molecular orbitals.

Acids and bases -Brønsted Lowry theory, strengths of acids and bases, buffer solutions, pH changes in acid / base titrations, indicators, oxoacids, acidic and basic oxides and Lewis acids and bases.

Periodic table and periodicity:
- atomic properties and periodicity, Hydrogen,
- s -block chemistry - Group 1 elements, compounds and ions in solutions, Group 1 metals in liquid ammonia
- Group 2 elements, compounds, biominerals, diagonal relationships
- p - block chemistry - general aspects and trends, descriptive chemistry of Group 13, 14, 15, 16, 17 and 18.
- A general introduction to the d and f-group elements

Synthesis and application of radioactive materials – nuclear fission, nuclear fuel cycle, radiopharmaceuticals and isotopes

Solids - structures based on the packing of spheres, metallic and ionic bonding, lattice energies. Metals and band theory, semi conductors and insulators.

Basics of symmetry and group theory: Symmetry elements, symmetry operations, point group symmetry.
Vibrational spectroscopy (Infrared and Raman) and its relation to symmetry.

Group work - Different roles in a group, presentation skills.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Express chemical formulae, equation, & oxidation states with proper use of units & terminology.

10 Explain basic structural aspects of solids, crystal packing, metallic & ionic bonding, & lattice energies.

11 Recognize different symmetry elements and symmetry operations.

12 Use the symmetry of molecules to predict and distinguish Infrared and Raman active bonds for simple molecules.

13 Recognise, interpret and converse using the language of inorganic chemistry.

14 Identify and relate the knowledge of fundamental inorganic chemistry with applications in different areas of everyday applications and technologies.

15 Express, present, and discuss basic concepts of inorganic chemistry.

16 Use specialist software packages to prepare a scientific presentation.

17 Work as a team to discuss, decide, and prepare a presentation on a given subject.

2 Describe the basic principles of atomic structure & quantum numbers.

3 Appraise & compare different models of bonding for diatomic molecules.

4 Describe different models to predict shapes & stability of polyatomic molecules.

5 Name & describe different theories of acids & bases & the underlying principles.

6 Interpret the periodic table & justify periodic trends.

7 Recognise & describe the general chemistry of the s, & p-group elements.

8 Recognise and identify the d & f-group elements.

9 Describe the preparation and application of radioactive materials.

Learning, Teaching and Assessment Strategy

The core content will be delivered by lecture to build up the fundamental knowledge in inorganic chemistry. This 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 who will 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.
Students will be guided throughout the module with directed study to acquire knowledge and understanding of the underlying concepts underlined in the syllabus.

The virtual learning environment (VLE) will be used to disseminate lecture notes, module handbook, links to online resources, and any announcement regarding the module to the students.

A regular drop-in session will allow the students to meet the instructor in person to discuss any issues related to the module. Please see your timetable.

Assessment 1: A group presentation.

Assessment 2: A class-room test in January will cover material from semester 1.

Assessment 3: A summative examination at the end of the module.

Assessment 4: Tutorial Sheets

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Presentation	Group work		20%	No
Summative	Examination - closed book	Summative assessment: closed book examination	2 hours	50%	Yes
Summative	Classroom test	Work SHeets		10%	No
Summative	Classroom test	Closed book classroom test	1 hour	20%	No

Legacy Code (if applicable)

CT-1018L

Reading List

To view Reading List, please go to **rebus:list**.