UNIVERSITI TEKNOLOGI MARA

CHM153: INORGANIC CHEMISTRY

Course Name (English)	INORGANIC CHEMISTRY APPROVED
Course Code	CHM153
MQF Credit	3
Course Description	This course includes the following main topics: Molecular Orbital Theory, transition metal elements and their compounds, coordination compounds nomenclature, structure, isomerism, bonding, magnetism, colour and stability constants of complexes, application of complexes and coordination compounds
Transferable Skills	Demonstrate ability to identify and articulate self skills, knowledge and understanding confidently and in variety of contexts.
Teaching Methodologies	Lectures, Blended Learning, Lab Work, Discussion
CLO	CLO1 Explain and apply the concept of the Molecular Orbital Theory, transition metal complexes and coordination compounds (Crystal Field Theory and Valence Bond Theory) in explaining the bonding, molecular geometries, colour and magnetism of complex ions. CLO2 Identify and sketch the various types of isomerism CLO3 Conduct experiments and report results in selected areas of inorganic and coordination compounds.
Pre-Requisite Courses	No course recommendations

Topics
1. Molecular Orbital Theory 1.1) Molecular Geometry 1.2) Lewis structure and Valence Shell Electron Pair Repulsion (VSEPR) Theory 1.3) Hybridization of atomic orbitals (sp, sp2, sp3, dsp2, sp3d2 and d2sp3) 1.4) Type of bonding in molecular orbitals 1.5) Bonding (? and ?) and anti-bonding (?* and ?*) 1.6) Homonuclear diatomic molecules (H2, Li2, B2, C2, N2, O2, F2, Ne2) 1.7) Molecular orbital energy level diagram 1.8) Electronic configuration for the diatomic molecule 1.9) Bond order 1.10) Magnetism
2. Transition metal elements and their compounds 2.1) Definition 2.2) Electron configuration 2.3) Distinctive characteristics of transition metal elements: Physical properties and oxidation states
3. Complex ion and coordination compounds 3.1) Werner's Theory 3.2) Definition: Complex ion, coordination compound, ligand, coordination number, donor atom, net charge and counter ion. 3.3) Nomenclature 3.4) Structure and isomerism (structural and stereoisomer) 3.5) Bonding 3.6) Valence Bond Theory; bonding, hybridization and magnetic properties 3.7) Crystal Field Theory; splitting of d orbitals in octahedral complexes, colour and magnetism. 3.8) Stability constants, Kn 3.9) Definition 3.10) Factors affecting stability constants 3.11) Calculate the value of Kn 3.12) Labile and inert complex ions

4. Applications of transition metals, complex ions, coordination compounds
4.1) Biological systems.
4.2) Industries

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	1 Assignment	20%	CLO2
Test	Online Test 1	25%	CLO3
Written Report	1 Lab report	15%	CLO3

Reading List

Reference Book Resources

- **G.I. Brown 2007, *Introduction to Inorganic Chemistry*, 6 Ed., Longman**
- **Michael Freemantle 1995, *Chemistry in action*, 2 Ed., Great Britain Bath Press**
- **F.A. Cotton and G. Wilkinson 1995, *Basic Inorganic Chemistry*, 3 Ed., John Wiley & Sons**
- **Gary L. Miessler and Donald A. Tarr 2004, *Inorganic Chemistry*, 3 Ed., Prentice Hall**
- **Silberberg 2006, *Chemistry The Molecular Narute of Matter and* , 4 Ed., McGraw Hill**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources