



UNIVERSITI TEKNOLOGI MARA

CHM475: INORGANIC CHEMISTRY

Course Name (English)	INORGANIC CHEMISTRY APPROVED
Course Code	CHM475
MQF Credit	3
Course Description	This course will interactively engage students cognitively and scientifically in areas of bonding in chemical substances particularly those involving elements in the second period of the periodic table, transition metals and ligands (coordination compounds) and the role these compounds play in some biological systems. The designated lecture sessions are used to describe, discuss and employ important theories in inorganic chemistry.
Transferable Skills	Skills in synthesis inorganic compounds
Teaching Methodologies	Lectures, Lab Work
CLO	CLO1 Explain the Valence Bond Theory, Molecular Orbital Theory and Crystal Field Theory CLO2 Describe the stability formation of complex ions related to chelate and macrocyclic effects CLO3 Discuss the importance of metal complexes in biological systems CLO4 Conduct experiments and write reports on experimental findings in a scientific manner
Pre-Requisite Courses	No course recommendations
Topics	
1. Valence Bond Theory 1.1) Hybridization of Atomic Orbitals (sp, sp ² , sp ³ , sp ³ d and sp ³ d ²) 1.2) Orbital Shapes and Energies (s, p and d)	
2. Molecular Orbital Theory 2.1) Types of Molecular Orbitals 2.2) Homonuclear Diatomic Molecules (Second Period Elements) 2.3) Heteronuclear Diatomic Molecules (NO, HF, CN) 2.4) Bond Order	
3. Metallic Bonding 3.1) Electron Sea Model 3.2) Band Theory of Metals	
4. First Row Transition Metals and Coordination Compounds 4.1) Electron configuration 4.2) General characteristics of transition metals, physical properties and variable 4.3) oxidation states	
5. Coordination Compounds 5.1) Ligands 5.2) Coordination number 5.3) Nomenclature	
6. Isomerism 6.1) Structural Isomerism: ionization, hydrate, linkage and coordination isomers. 6.2) Stereoisomerism: geometric and optical isomers	
7. Bonding Theory 7.1) Valence Bond Theory: sp ³ , dsp ² , sp ³ d ² and d ² sp ³	

8. Crystal Field Theory 8.1) Octahedral Complexes 8.2) Tetrahedral Complexes 8.3) Square Planar Complexes
9. Properties of Complexes 9.1) Spectrochemical series of ligands 9.2) Magnetism 9.3) Coloured compounds
10. Stabilization of Complex Ions 10.1) Complex ion equilibrium (ligands replacement) 10.2) Chelate Effect 10.3) Macrocyclic Effect
11. Metal Complexes in Biological Systems 11.1) Hemoglobin 11.2) Oxyhemoglobin and deoxyhemoglobin 11.3) Toxicity of CO and CN in hemoglobin

Assessment Breakdown		%	
Continuous Assessment		100.00%	

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Quiz	Quiz	10%	CLO1
	Test	Mid-Term Test	30%	CLO2
	Test	Final Test	40%	CLO3
	Written Report	Lab Reports	20%	CLO4

Reading List	Recommended Text <ul style="list-style-type: none"> • Raymond Chang, Kenneth A. Goldsby, <i>Chemistry</i> [ISBN: 9789814599788] • Silberberg, <i>General Chemistry, 7th Ed.</i> [ISBN: 978981464645]
Article/Paper List	This Course does not have any article/paper resources
Other References	This Course does not have any other resources