UNIVERSITI TEKNOLOGI MARA

CHM361: INORGANIC CHEMISTRY

Course Name (English)	INORGANIC CHEMISTRY APPROVED
Course Code	CHM361
MQF Credit	3
Course Description	This course will provide knowledge in valence bond theory and orbital hybridization, molecular orbital theory, crystalline and solid state, transition metals, coordination compounds and metallurgy of iron. Students will define and explain various terms and theories (crystal field theory and valence bond theory). They will perform investigations via laboratory experiments, make predictions as to the possible outcomes of an experiment and subsequently discuss the results and the findings in the form of a written report.
Transferable Skills	Practical Skills and Seeking Information Related to Inorganic Chemistry
Teaching Methodologies	Lectures, Blended Learning, Lab Work, Case Study, Collaborative Learning
CLO	CLO1 Apply the concepts, laws and theories of bonding in covalent and coordination compounds. CLO2 Perform (plan, conduct and analyze) scientific investigations in areas of inorganic chemistry. CLO3 Report self-explored ideas and information to solve problem in areas of coordination compounds.
Pre-Requisite Courses	No course recommendations

Topics
1. Valence Bond Theory 1.1) Lewis Structures 1.2) Valence Shell Electron Pair Repulsion Theory (VSEPR) 1.3) Valence Bond Theory 1.4) Orbital Hybridization: sp, sp2, sp3, sp3d and sp3d2
2. Introduction to Molecular Orbital Theory 2.1) Types of Molecular Orbitals 2.2) Homonuclear Diatomic Molecules (Second Period Elements) 2.3) Energy Level Diagram and Electron Configuration for the Diatomic Molecule 2.4) Bond Order
3. Crystalline and Solid State 3.1) Crystal Structures 3.2) Metallic Crystal Structure (Simple Cubic, Body-centered Cubic, Face-centered Cubic and Hexagonal Close-packed) 3.3) Ionic Lattice (NaCl and CsCl) 3.4) Giant Molecule Crystal Structures (Graphite and Diamond) 3.5) Crystal Defects: Point Defect 3.6) Stoichiometric Defect: Schottky, Frenkel, Vacancy and Interstitial Defect 3.7) Non-stoichiometric Defect: Metal Excess and Metal Deficiency 3.8) Semiconductor 3.9) Doping 3.10) P-type and N-type Semiconductor 3.11) Metallic Bonding 3.12) Electron Sea Model 3.13) Band Theory of Metals (Semiconductor, Conductor and Insulator)

4. Transition Metals 4.1) Introduction to Transition Metals 4.2) First Row Transition Metals 4.3) Electron Configuration of Atoms and Ions 4.4) General Properties: Atomic Size, Ionization Energy and Electronegativity 4.5) Special Characteristics 4.6) Metallurgy of Iron
5. Coordination Compounds 5.1) Ligands 5.2) Complex Ions 5.3) Coordination Number 5.4) Nomenclature 5.5) Isomerism 5.6) Structural isomerism (Hydrate, Ionization, Linkage and Coordination Sphere) 5.7) Stereoisomerism (Geometric and Optical).
6. Bonding in Complex Ions 6.1) Valence Bond Theory: sp3, dsp2, sp3d2 and d2sp3 6.2) Crystal Field Theory: Square Planar, Tetrahedral and Octahedral Complexes 6.3) Magnetism 6.4) Colour

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Case Study	Written report based on selected issues/topics.	20%	CLO3
Practical	Written report based on laboratory work	20%	CLO2
Test	Test	20%	CLO1

Reading List

Reference Book Resources

- **Chang, R., Goldsby, K. 2016, *Chemistry*, 12th Ed., McGraw-Hill [ISBN: 978-007802151]**
- **Silberberg, M.S., Amateis, P.G. 2015, *Chemistry, the Molecular Nature of Matter and Change*, 7th Ed., McGraw-Hill [ISBN: 978-002144254]**
- **Zumdahl, S.S., Zumdahl, S.A. 2014, *Chemistry*, 9th Ed., Brooks/Cole, Cengage Learning [ISBN: 978-113361109]**
- **Ebbing, D., Gammon, S.D 2012, *General Chemistry*, 10th Ed., Brooks/Cole. [ISBN: 978-128505137]**
- **Housecroft, C.E. and Sharpe, A.G. 2012, *Inorganic Chemistry*, 4th Ed., Pearson [ISBN: 978-027374275]**

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

Other References: This Course does not have any other resources