

Course (Unit) Title	<b>Coordination and Organometallic Chemistry</b>
Course (Unit) Code	CHE201G2
Credit Value	02 (30 hours)
Objective/s	<ul style="list-style-type: none"> <li>• Describe basic knowledge in structure of coordination compounds</li> <li>• Illustrate the chemical bonding in coordination compounds</li> <li>• Outline the concepts of coordination chemistry</li> <li>• List the fundamentals of organometallic chemistry</li> </ul>
Intended Learning Outcomes	<ul style="list-style-type: none"> <li>• Distinguish the coordination compounds</li> <li>• Explain the bonding of coordination compounds using crystal field theory</li> <li>• Evaluate the magnetic moments of simple coordination compounds</li> <li>• Determine the stability constant of the coordination compounds.</li> <li>• Apply EAN rule in organometallic compounds</li> <li>• Explain the <math>\sigma</math> and <math>\pi</math> bonding in organometallic compounds</li> <li>• Identify the suitable organometallic catalysis in various synthesis</li> </ul>
	<p><b>Introductory Coordination Chemistry</b></p> <ul style="list-style-type: none"> <li>• Introduction to coordination complexes, Werner's theory, nomenclature, geometry and isomerism of coordination compounds</li> </ul> <p><b>Bonding of coordination compounds</b></p> <ul style="list-style-type: none"> <li>• Valence bond theory, crystal field theory, ligand field theory, high and low field complexes, crystal field splitting energy, Jahn-Teller distortion, crystal field splitting energy</li> <li>• Magnetic properties of coordination complexes of first transition elements, calculation of spin contribution to paramagnetic moment</li> <li>• Stability of coordination complexes, factors affecting the stability constant and formation of coordination complexes, Chemistry of complexones</li> </ul> <p><b>Preparation and application</b></p> <ul style="list-style-type: none"> <li>• Preparations and applications of coordination complexes, Introduction to <i>Trans</i> effect</li> </ul> <p><b>Organometallic chemistry</b></p> <ul style="list-style-type: none"> <li>• Introduction to organometallic compounds: classifications, valence electron count, oxidation state, The 18-valence electron rule and its' applications</li> </ul>

	<p><b>Bonding and reactions of organometallic compounds</b></p> <ul style="list-style-type: none"> <li>• Transition metal alkyl, carbene, carbonyl, cyanide, isocyanide, thiocyanate, and isothiocyanate compounds</li> <li>• Bonding in <math>\pi</math> complexes: olefin and arene complexes, alkene, ferrocene</li> </ul> <p><b>Preparation and application of organometallic compounds</b></p> <ul style="list-style-type: none"> <li>• Organometallic compounds of alkali metals, alkaline earth metals, Zn, Cd, Hg and Al</li> <li>• Organometallic catalysis and their applications</li> </ul>
Teaching and Learning Methods / Activities	Lectures, Tutorials and Assignments
Evaluation	In course examination 30% End of course examination 70% (Answer 04 questions out of 06)
Recommended References	<ul style="list-style-type: none"> <li>• Atkins, P., Overton, T., Rourke, J. and Weller, M., <i>Inorganic Chemistry</i>, 5<sup>th</sup> Edition, Fraser Armstrong, Oxford University Press, 2010</li> <li>• Shriver, D. and Atkins, P., <i>Inorganic Chemistry</i>, 5<sup>th</sup> Edition, Oxford University Press, 2010.</li> <li>• Lee, J. D., <i>Concise of Inorganic chemistry</i>, 5<sup>th</sup> Edition, Blackwell Science press, 1999.</li> </ul>