Subject Description Form

Subject Code	ABCT3779
Subject Title	Inorganic Chemistry II
Credit Value	3
Level	3
Pre-requisite	Inorganic Chemistry I
Objectives	This subject provides student with an overview of transition metal chemistry which forms a foundation for students pursuing further studies in chemistry.
Intended Learning Outcomes	Upon completion of this subject, students will be able to: a. explain the fundamental concepts in coordination chemistry of transition metals / inner transition metals (d and f) b. explain the bonding characteristics in coordination compounds in term of Crystal Field Theory and Molecular Orbital Theory; c. relate the physical properties and reactivities of selected transition metal complexes with their structure and bonding; d. formulate mechanisms for reactions of transition metal complexes; e. realize the importance of inorganic compounds in bioinorganic chemistry such as Nitrogen fixation and Heme protein copper protein in redox reactions; f. develop their logical and critical thinking through the discussions of possible reaction mechanisms.
Subject Synopsis/ Indicative Syllabus	**Indicative Content** Molecular symmetry Symmetry and Group theory, symmetry operation and point groups, character table, representations, application of symmetry, symmetry and molecular orbitals, molecular vibrations Coordination chemistry of transition metal complexes Structures and isomerism, Bonding in coordination compounds; electronic configurations and reactivities of coordination complexes; electronic spectra and magnetism of coordination complexes. Inorganic reactions and mechanisms Kinetics and mechanisms of substitution reactions of octahedral and square planar complexes; Trans effect; electron transfer reactions. Basic organometallic chemistry Structure and bonding of metal carbonyl complexes; electronic and steric properties of phosphorus ligands, π-complexes of alkenes, alkynes and

<table>
<tr><td></td><td>arenes, complexes containing M-C, M=C and M≡C bonds, spectral analysis and characterization

<u>Selected topics of bioinorganic chemistry</u>
Oxygen carriers and oxygen transport proteins; electron transfer proteins in biological redox reactions; Vitamin B_{12}; Nitrogen fixation.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The lectures will be focused on the description and discussion of the fundamental ideas and the more important principles of inorganic chemistry. Students are expected to read their textbooks to gain better understanding of the key concepts of the subjects. A few problem sets will be provided throughout the course; students should try to solve them although it is not mandatory for them to submit the solutions. The students will be graded based upon their performance in the form of continuous assessment such as a midterm tests as well as a final examination</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr>
<tr><td>1.examination</td><td>50</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. continuous assessment</td><td>50</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assignments, quizzes and examinations are used to assess student’s learning in key theoretical concepts in structure and bonding theory of coordination compounds and understanding of the structure reactivity relationship. In-class discussion and homework assignments (e.g. end-of-chapter exercises and tutorial assignments) would enhance student’s understanding of the concepts and establish relationship to rationalize reactivities of inorganic compounds. The continuous assessment and examination will gauge the student’s competence in examining chemical systems through a molecular perspective, and students should demonstrate their ability to formulate reasonable molecular explanations for specific chemical events with critical deliberation of various theoretical models in relation to solving specific problems.</td></tr>
<tr><td>Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td></td><td>▪ Lectures</td><td>39 Hrs.</td></tr>
<tr><td></td><td>▪ Tutorials</td><td>/</td></tr>
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	Other student study effort:	
	▪ Self-study	56Hrs.
	▪ Homework / assignments	16Hrs.
	Total student study effort	111Hrs.
Reading List and References	Housecroft, C. E. and Sharpe A. G. Inorganic Chemistry, 4th ed, Pearson All students are encouraged to have the textbook, which will be used as texts for the duration of level 3 studies in inorganic chemistry courses.	