UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY
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Module name:	Coordination Chemistry
Module level, if applicable:	Undergraduate
Code:	KMA 6408
Sub-heading, if applicable:	-
Classes, if applicable:	2
Semester:	4th
Module coordinator:	Prof. AK. Prodjosantoso, Ph.D
Lecturer(s):	1. Prof. KH. Sugiyarto, Ph.D 2. Prof. AK. Prodjosantoso, Ph.D 3. Isti Yunita, Ph. D
Language:	Bahasa Indonesia and English
Classification within the curriculum:	Compulsory Subject
Teaching format / class hours per week during the semester:	• Lectures: 150 minutes lectures, 180 structured activities and 180 individual study per week • Laboratory work: 170 minutes includes the laboratory work and it's reporting per week
Workload:	Total workload of the activity is 181,33 hours per semester which consists of 150 minutes lectures, 180 structured activities and 180 individual study and also 170 minutes laboratory work with it's reporting per week for 16 weeks
Credit points:	4 SKS (7 ECTS) with the details of 3 SKS (5 ECTS) lectures and 1 SKS (2 ECTS)
Prerequisites course(s):	Metal Innorganic Chemistry
Course Outcomes	After taking this course, the students are expected to be able to: CO1: Explain the application of Coordination Chemistry concept, including the history of the growth of Coordination Chemistry. CO2: Explain the concept of Coordination Chemistry: boundary of transition elements, electron configurations, coordination numbers, molecular orbital diagrams. CO3: Analyzing the application and innovation related with Coordination Chemistry.
Content:	1. Coordination chemistry theory explains the chemical transition elements, including the understanding of transition elements, the nature of transition elements, electronic configuration of transition elements, trends in periods and classes, catalytic properties of transition elements, magnetic properties of complex compounds, and term spectroscopy 2. Complex compounds: boundaries of complex compounds, formulations of complex compounds, bonds in complex

<table>
<tr><td></td><td>compounds, coordination numbers and spatial forms of complex compounds, complex compound formula writing, nomenclature of complex compounds, the development of the theory of complex compound formulations, isomers in complex compounds, metallocene and metal cluster, application of complex compounds.
3. The development of the theory of bond formulations in complex compounds according to the Blomstrand-Jorgensen chain model, and Werner's model, geometric shapes, and isomers of complex compounds, the concept of effective atomic numbers, and valence bond theory (VBT), field theory crystals (CFT), dia- / para-magnetic, high- / low-spin magnetic properties, magnitude of orbital divisions d by the strength of the CFT model crystal field, molecular orbital theory (MOT); the magnetic properties of dia- / para- magnetic, high- / low-spin, and the level of covalance of the MOT model
4. Thermodynamics and kinetics of complex compounds, stability and instability of complex compounds, thermodynamics of complex compounds, complex equilibrium constants in solutions, complex compound kinetics, complex reaction reaction mechanisms, reaction rates and electronic configurations, ligand substitution reactions, trans effects, redox reactions, and complex acid-base ion reactions
5. Chemical group 3 elements, lantanoides, and actinoids</td></tr>
<tr><td>Study / exam achievements:</td><td>Attitude assessment is carried out at each meeting by observation and/or self-assessment techniques using the assumption that basically every student has a good attitude. The student is marked very good or not good attitude if they show it significantly compared to other students in general. The result of attitude assessment is not taken into account in the final grades, but as one of the requirements to pass the course. Students will pass from this course if at least have a good attitude. The final mark will be weight as follow:
<table>
<tr><th>No</th><th>CO</th><th>Assessment Object</th><th>Assessment Technique</th><th>Weight</th></tr>
<tr><td>1</td><td>CO1,
CO2,
CO3</td><td>a. Assignments
b. Activity
c. Final Exam
d. Midterm Exam</td><td>Presentation / written test</td><td>20%
20%
30%
30%</td></tr>
<tr><td colspan="4">Total</td><td>100%</td></tr>
</table></td></tr>
<tr><td>Forms of media:</td><td>Handout, Board, LCD Projector, Laptop/Computer, Module</td></tr>
<tr><td>References:</td><td>• Sugiyarto, K. H. (2001). Common Textbook: Buku/Diktat Dasar-dasar Kimia Anorganik Transisi. Yogyakarta: Jurusan Pendidikan Kimia, FMIPA, UNY
• Shriver, D. F., Langford, C. H., Atkins, P. W. (1990) Inorganic Chemistry. New York, NY: Oxford Press
• Oxtoby, D. W. (2002). Principles of Modern Chemistry. Toronto, Canada: Nelson Thomson Learning Inc.
• Geoffrey, A. L. (2010) Introduction to Coordination Chemistry. United Kingdom, UK: Wiley.
Suggested Reading:</td></tr>
</table>

	• Raghad H., Emad, Y., & Ahmed, A. Synthesis and characterization of transition metal complexes of 4-Amino-5-pyridyl-4H-1,2, 4-triazole-3-thiol. *Springer Plus, 2*, 510. • Taichi, N., Katsunori, S., & Makoto, Y. Aluminabenzene-Rh and -Ir Complexes: Synthesis, Structure, and Application Toward Catalytic C-H Borylation. *J. Am. Chem. Soc., 139*(49), 17763–17766.

PLO and CO mapping

	PLO									
	Attitude	General Skill		Knowledge				Specific Skill		
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CO1					√					
CO2							√			
CO3								√		