

Anan College		Year	2024	Course Title	Inorganic Chemistry 2
Course Information					
Course Code	1414B10		Course Category	Specialized / Compulsory	
Class Format	Lecture		Credits	Academic Credit: 2	
Department	Course of Chemical Engineering		Student Grade	4th	
Term	First Semester		Classes per Week	前期:2	
Textbook and/or Teaching Materials	Inorganic Chemistry: A Modern Approach (Tokyo Kagaku Doujin)				
Instructor	Zheng Tao				
Course Objectives					
1. to understand the periodicity of the elements and the relationship between the structure of the nucleus and the state of the outer electrons and the properties of the elements. 2. to be able to understand the structure and nomenclature of complexes, properties such as magnetism and color, and theories such as valence bond theory and crystal field theory.					
Rubric					
	Ideal Level		Standard Level		Unacceptable Level
Achievement 1	Explain the properties and classification of elements. Explain all properties of elements and compounds in each block.		Explain the properties and classification of elements. To be able to explain the properties of elements and compounds of each block.		Explain the properties and classification of elements. Briefly explain the properties of elements and compounds in each block.
Achievement 2	Explain coordination bonds, the definition of coordination compounds, and their structures. To be able to explain isomers of complexes and draw all structures.		To be able to explain the definition and structure of coordination bonds and coordination compounds. To be able to explain isomers of complexes and to draw their structures.		To be able to explain the definition and structure of coordination bonds and coordination compounds. To be able to explain isomers of complexes.
Achievement 3	To be able to explain all about valence bond theory and crystal field theory. To be able to explain the relationship between crystal field splitting, magnetism and color of complexes.		To be able to explain valence bond theory and crystal field theory. To be able to explain the relationship between crystal field splitting, magnetism and color of complexes.		To be able to explain about valence bond theory and crystal field theory. To be able to explain about the relationship between crystal field splitting, magnetism and color of complexes.
Achievement 4	To be able to explain stability and reaction of complexes. To be able to calculate all stability constants and concentrations.		To be able to explain stability and reaction of complexes. To be able to calculate stability constants and concentrations		To be able to explain the stability and reactions of complexes in simple terms To be able to perform basic calculations related to stability constants and concentrations
Assigned Department Objectives					
学習・教育到達度目標 D-1					
Teaching Method					
Outline	The properties of elements depend on the properties of electrons moving around the nucleus. In the first half of this lecture, the structure, synthesis, and physical properties of major elements and inorganic compounds composed of them will be explained, while being aware of similarities and differences among homologous elements. In the second half of the lecture, the definition and structure of complexes, valence bond theory, crystal field theory, and other theories, as well as properties such as magnetism and color of complexes, will be explained. *Relationship with Practice This course is taught by faculty members who have been in charge of research and development related to inorganic materials such as electrode materials in companies, and they use this experience to teach inorganic chemistry in a lecture format.				
Style	In the first half of the lecture, the group will investigate and present the properties of elements and compounds of each family. All class members will answer questions prepared by the group. Group members will answer questions.				
Notice	Reference books Schreiber Inorganic Chemistry (Upper and Lower), Tokyo Kagaku Doujin				
Characteristics of Class / Division in Learning					
<input type="checkbox"/> Active Learning		<input checked="" type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class	
				<input checked="" type="checkbox"/> Instructor Professionally Experienced	
Course Plan					
			Theme	Goals	
1st Semester r	1st Quarter	1st	Coordination compounds (metal complexes) and coordination bonds. Structure of complexes.	1. Explain th coordination compounds and coordination bonds 2. Explain the structure of complexes.	
		2nd	Nomenclature of coordination compounds. Isomers of complexes.	1. Explain the nomenclature of coordination compounds. 2. Explain isomers of complexes and draw isomeric structures.	
		3rd	Valence bond theory and magnetism of complexes.	Explain valence bond theory and use this theory to explain the magnetism of complexes.	
		4th	Overview of crystal field theory.	Explain crystal field theory and crystal field splitting.	

		5th	Crystal fields and electronic states of metal ions.	Explain crystal field stabilization energies and the electronic states of metal ions.
		6th	Electronic structure and spectroscopy of complexes	1. Explain d-d transitions, spectrochemical series, etc. 2. Explain the relationship between energy ranking and the color of complexes.
		7th	Stability and reaction of complexes	Explain equilibrium and stability constants of complexes in aqueous solution.
		8th	Intermediate test	
	2nd Quarter	9th	Oxidation and reduction reactions	Explain oxidation/reduction reactions, oxidizing and reducing agents, and write redox reaction equations.
		10th	Properties and classification of elements. Hydrogen, noble gases.	1. Explain the properties and classification of elements. 2. Explain the properties of hydrogen and noble gases and solve problems.
		11th	Alkali metals and alkaline earth metals. Boron and elements of group 13.	Explain the properties of alkali metals and alkaline earth metals, boron and elements of group 13 and solve problems.
		12th	Carbon and elements of group 14. Nitrogen and elements of group 15.	Explain and solve problems on the properties of carbon and elements of group 14, nitrogen and elements of group 15.
		13th	Oxygen and halogens.	Explain the properties of oxygen and halogens and solve problems.
		14th	Zinc and group 12 elements. Rare earth and actinide elements	Explain the properties of zinc and group 12 elements and solve problems. Can explain the properties of rare earth and actinide elements and solve problems.
		15th	final exam	
		16th	Return of Final Exam Answer Sheet	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	70	0	0	0	0	30	100
Basic Proficiency	50	0	0	0	0	20	70
Specialized Proficiency	20	0	0	0	0	10	30
Cross Area Proficiency	0	0	0	0	0	0	0