YOZGAT BOZOK UNIVERSITY FACULTY OF ARTS AND SCIENCES
CHEMISTRY DEPARTMENT COURSE PLAN

Course Code	Course Title	Semester	Course Type (C/E)	T+A+L (Time/Week)	Credit	ECTS	Course Language
KİM712	Coordination Chemistry	1-2	E	2+0+0		5	Turkish

COURSE INFORMATION

Course Catalog Description (Content)	Nomenclature, classification, elucidation of structures and properties of coordination compounds
The Aim of the Course	To gain the skills of naming and classifying coordination compounds, elucidating their structures and explaining their properties theoretically.
Course Level	Bachelor degree
Course Language	Turkish
Teaching method	(X) Formal ( ) Online ( ) Mixed/Hybrid
Teaching Staff of the Course	Prof. Dr. Mustafa SAÇMACI
Prerequisite Course(s) of the Course	
Learning Outcomes from the Course	1) Distinguish the terms coordination compound, ligand, valence and auxiliary valence using Werner Theory. 2) Gives examples of usage areas of common natural and synthetic complexes in daily life. 3) Explain the phenomenon of isomerism in coordination compounds. 4) Explains hybridization and geometry in coordination compounds with valence bond theory. 5) Examines the crystal field splitting diagrams and ray absorption properties of complexes in different geometries. 6) Draws molecular orbital diagrams of coordination compounds and ligands and relates HOMO and LUMO orbitals to the electronic spectra of these compounds.

COURSE CONTENT

Week	Theory	Practice/Laboratory
1	Introduction: Coordination compound, Ligand, Werner Theory, Application areas of Coordination Compounds.	
2	Introduction: Coordination compound, Ligand, Werner Theory, Application areas of Coordination Compounds.	
3	Ligands: Classification of ligands, according to the number of teeth, donor-acceptor types, electronic structures, neutral and anionic ligands and their nomenclature.	
4	Coordination Numbers: The most common geometries in transition metal complexes, geometric structures of complexes with coordination numbers of 2, 3, 4, 5, 6, 7, 8 and 9 and examples of these complexes.	
5	Nomenclature of Coordination Compounds: Naming according to Stock and Ewens-Basset system, reading of those whose anion is coordination compound, reading of those whose cation is coordination compound, reading of those whose whole is coordination compound.	
6	Isomerism in Coordination Compounds: Structural isomerism (ionization isomerism, hydration isomerism, coordination isomerism, donor atom isomerism, polymerization isomerism), stereoisomerism	

	(geometric isomerism, optical isomerism, conformational isomerism).	
7	Isomerism in Coordination Compounds: Structural isomerism (ionization isomerism, hydration isomerism, coordination isomerism, donor atom isomerism, polymerization isomerism), stereoisomerism (geometric isomerism, optical isomerism, conformational isomerism).	
8	Effective Atomic Number Theory: EAN and the 18 electron rule, Werner complexes, carbonyl compounds, nitrosyl compounds, olefin complexes, metallocene complexes.	
9	Valence Bond Theory: Valence bond theory, hybrid orbitals, sp, sp2, sp3, sp3d, dsp2, sp3d2 hybridizations, valence bond theory and carbonyl compounds, valence bond theory and privileged states.	
10	Valence Bond Theory: Valence bond theory, hybrid orbitals, sp, sp2, sp3, sp3d, dsp2, sp3d2 hybridizations, valence bond theory and carbonyl compounds, valence bond theory and privileged states.	
11	Crystal Field Theory: Crystal field splitting in octahedral, tetrahedral and square plane complexes, coupling energy, chromaticity in coordination compounds, color and spectrochemical series, Jahn Teller's theorem.	
12	Crystal Field Theory: Crystal field splitting in octahedral, tetrahedral and square plane complexes, coupling energy, chromaticity in coordination compounds, color and spectrochemical series, Jahn Teller's theorem.	
13	Molecule and Ligand Field Theory: Molecular orbitals (bonding, antibonding and non-bonding orbitals), application of molecular orbital theory to diatomic molecules, application of molecular orbital theory to coordination compounds, ligand field theory, orbital overlaps forming π bonds, π-donating ligands, π-acceptor ligands.	
14	Molecule and Ligand Field Theory: Molecular orbitals (bonding, antibonding and non-bonding orbitals), application of molecular orbital theory to diatomic molecules, application of molecular orbital theory to coordination compounds, ligand field theory, orbital overlaps forming π bonds, π-donating ligands, π-acceptor ligands.	
15	Final Exam	

Course Learning Resources

1. Inorganic Chemistry; D.F. Shriver, P. W. Atkins, Translation Editors: Saim Özkar, Bekir Çetinkaya, Ahmet Gül, Yaşar Gök, Bilim Publishing, 1999.
2. Inorganic Chemistry; G. L. Miessler, D. A. Tarr, Translation Editors: Nurcan Karacan, Perihan Gürkan, Palme Publishing, 2002.
3. Coordination Chemistry; T. Gündüz, Bilge Publishing, 1994.

ASSESSMENT CRITERIA

Work Activities During the Semester	**Number**	**Contribution**
Homework	1	%30
Practice		
Forum/ Discussion Application		
Short Exam (Quiz)	2	%35

Ratio Of Semester Studies To Semester Success (%)		%40
Ratio of Final to Success (%)	1	%60
Total		%100

COURSE WORKLOAD TABLE

Activity	Total Weeks	Duration (Weekly Hours)	Total Workload
Theory	14	2	28
Practice			
Forum/ Discussion Application			
Reading	14	3	42
Internet Scanning, Library Study	14	2	28
Material Design, Application			
Report Preparation			
Presentation Preparation			
Presentation			
Final Exam	1	2	2
Preparation for the Final Exam	4	6	24
Other(s) (Specify: … …. ………..)			
Total Workload			
Total Workload / 25 (s)			124/25
ECTS Credits of the Course			124/25≅5
Note: The workload of the course will be determined by the instructor on a per-course basis.			

PROGRAM LEARNING OUTPUTS CONTRIBUTION LEVELS

No	Program Learning Outputs	1	2	3	4	5
1	Gains extensive knowledge about the basic chemical properties of matter and uses this knowledge in daily life, industrial scale, and practical chemistry and shares them with the society.				X	
2	Performs experiments, collects data, interprets, evaluates results, defines problems parallel to current technological developments, produces solutions against problems encountered in the laboratory.		X			
3	Calculates and processes chemical information and data.			X		
4	Applies her/his knowledge and understanding of chemistry to the solution of unconventional qualitative and quantitative problems.				X	
5	Defines and comprehends chemical concepts and theories in Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry, Biochemistry.				X	
6	Can conduct research in the light of scientific data on any subject in the field of chemistry.					X
7	Writes, presents, discusses scientific material, and presents it orally to a knowledgeable audience.			X		
8	Brings a chemical approach to the solution of environmental problems, makes environmental analyzes and reports.		X			
9	Knows a foreign language at a level to read and understand the basic terms and processes of the chemist profession.			X		
10	Can use computer software and information and communication technologies at the level required by the field.				X	
11	Adapts and transfers the knowledge gained in the field to secondary education.			X		
12	Apart from the field of chemistry, she/he gains knowledge in different branches of science that she feels close to.				X	

13	Carries out a study independently, makes group work and gains the awareness of taking responsibility.				**X**	
14	They can develop a positive attitude towards lifelong learning and constantly renew their professional knowledge and skills.				**X**	
15	Have sufficient awareness of the universality of social rights, social justice, quality culture and protection of cultural values, environmental protection, occupational health and safety.			**X**		