

Basic Sciences **Division**

Department of Chemistry

Inorganic Chemistry Lab II



CUCEI



1.- GENERAL INFORMATION

Learning unit: Inorganic Chemistry Lab II		Department: Chemistry		Course format Lab	
Prerequisites(P) None	Corequisites (CO) Inorganic Chemistry II	Ascribed Academy Chemistry		Module M2: Synthesis, purification and chemical transformation.	
Type Basic particular mandatory	Lecture hours 0	Practice Hours 3 hrs. per week	Total hours 51 hrs.	Credits 3	

Degree in which this class is taught: B.S in Chemistry.

2. GENERIC COMPETENCIES

Students ...

- apply the acquired knowledge in Inorganic Chemistry II to carry out the lab practices.
- are able to analyze the chemical structures and bonds of the compounds with metals of blocks d and f.
- are able to then synthesize this type of compounds by analyzing their chemical, magnetic and spectroscopic properties.
- recognize the transcendence and application of coordination chemistry in labs and industries.

3.- SPECIFIC CHARACTERISTICS OF THE COMPETENCIES

Knowledge	• Coordination complexes structures and isomers. • Coordination complexes linking bond theories. • Electronic spectra of the coordination complexes. • Coordination complexes reactions and mechanisms.
Skills	• Adequate handling of lab reagents, materials and equipment. • Use of simple separation techniques. • Handling waste from the lab practices. • Use of a lab logbook. • Strict respect for the hygiene and safety rules of the lab.



Aptitudes	• Team work • Analysis, synthesis and evaluation skills. • Critical thinking • Work culture
Values	• Solidarity • Honesty • Responsibility • Discipline

4.- TRANSVERSAL COMPETENCIES

☐	Foreign Language (English)
☒	Critical, analytical and synthetic thinking.
☒	Oral and written expression
☒	Professional ethics
☐	Administration of human and material resources
☐	Leadership and sustainability
☐	Creativity, innovation and entrepreneurship
☐	Other



5.- COURSE CONTENT OF THE LEARNING UNIT

Practices

- Practice 1: Properties of the transition metals part 1.
- Practice 2: Properties of the transition metals part 2.
- Practice 3: Synthesis of the chloride-amine cobalt complexes.(III)
- Practice 4: Characterization of coordination complexes.
- Practice 5: Copper and Dimethyl sulfoxide (DMSO) complexes.
- Practice 6: Synthesis of linkage isomers $[\text{Co}(\text{NH}_3)_5(\text{ONO})]\text{Cl}_2$ and $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)\text{Cl}_2]$
- Practice 7: Synthesis of geometric isomers: cis and trans - bis copper (glycinate) (II) monohydrate
- Practice 8: Synthesis of tris sulfate (thiourea) copper (I)
- Practice 9: Preparation of copper acetate.
- Practice 10: Chemical equilibrium and influence of temperature in cobalt complexes.
- Practice 11: Solubility equilibrium of complex ions.
- Practice 12: Synthesis of chrome tris (acetylacetonate) (III)
- Practice 13: Preparation of tetrachloronickelate (II) from hexamine nickel (II)
- Practice 14: Spectrochemistry series.

6.- ASSESSMENT



Numeric grade



7.- GRADING CRITERIA OF THE LEARNING UNIT

Indicator of evaluation	Percentage
Departmental exams	0
Partial exam	0
Homework	0
Research activities	0
Practice reports	70
Class participation	0
Lab logbook	30

8.- REQUIRED MATERIAL (for students)

☒	Calculator
☒	Periodic table
☒	Lab coat
☐	Text book
☐	Workbook
☐	Tables of standard potential, table of mobility, etc.

9.-SPECIFIC CONTENT BY LEARNING UNITS

Content unit	Generic competency of the content unit	Topics	Class hours	Professor activities	Student activities	Bibliography
Unit 1 Chemistry of transition metals.	Recognize and predict the physical and chemical properties of	Practice 1: Properties of the transition metals part 1. Practice 2: Properties of	3	Professor... -guides students through the practices, making sure	Students... -carry out each one of the practices in due time and manner,	Brown Le May, <i>Química General,</i>



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	block b elements.	the transition metals part 2.		they carry out all the steps in order to reach the objectives in due time and manner.	following all the lab rules. -read and understand each practice before the actual day in order to reach the stated objectives	
				-makes sure students follow the lab rules.	Use their logbook, make calculations and turn in a report after each practice.	

[illegible]



Unit 3 Coordination complex isomers	Distinguish different types of isomerism that are present in the coordination complexes.	Practice 6: Synthesis of linkage isomers $[\text{Co}(\text{NH}_3)_5(\text{ONO})]\text{Cl}_2$ and $[\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$ Practice 7: Synthesis of geometric isomers: cis and trans - bis copper (glycinate) (II) monohydrate	3	Professor... -guides students through the practices, making sure they carry out all the steps in order to reach the objectives in due time and manner. -makes sure students follow the lab rules.	Students... -carry out each one of the practices in due time and manner, following all the lab rules. -read and understand each practice before the actual day in order to reach the stated objectives Use their logbook, make calculations and turn in a report after each practice.	Shriver, Atkins, 2009, <i>Inorganic Chemistry</i>. 5th Ed., W. H. Freeman,
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Unit 4 Chemical coordination: bonding theories.	Reaffirm the concepts about the current theories to describe chemical bonding in the compounds with metals from block b.	Practice 8: Synthesis of tris sulfate (thiourea) copper (I) Practice 9: Preparation of copper acetate.	3	Professor... -guides students through the practices, making sure they carry out all the steps in order to reach the objectives in due time and manner. -makes sure students follow the lab rules.	Students... -carry out each one of the practices in due time and manner, following all the lab rules. -read and understand each practice before the actual day in order to reach the stated objectives Use their logbook, make calculations and turn in a report after each practice.	Miessler, Gary L., Tarr, Donald, A 2014. <i>Inorganic Chemistry</i>. 5th Ed., Pearson,
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Unit 5 Chemical coordination: reactions and mechanisms	Evaluate the reactivity of the coordination complexes and observe the effects of temperature and concentration changes over the chemical equilibrium.	Practice 10: Chemical equilibrium and influence of temperature in cobalt complexes. Practice 11: Solubility equilibrium of complex ions. Practice 12: Synthesis of chrome tris (acetylacetonate) (III) Practice 13: Preparation of tetrachloronickelate (II) from hexamine nickel (II)	3	Professor... -guides students through the practices, making sure they carry out all the steps in order to reach the objectives in due time and manner. -makes sure students follow the lab rules.	Students... -carry out each one of the practices in due time and manner, following all the lab rules. -read and understand each practice before the actual day in order to reach the stated objectives Use their logbook, make calculations and turn in a report after each practice.	Shriver, Atkins, 2009, <i>Inorganic Chemistry</i>. 5th Ed., W. H. Freeman,
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 Unit 6 Coordination chemistry: Electronic spectra.	Determine the spectroscopic properties of the coordination complexes.	Practice 14: Spectrochemistry series.	3	Professor... -guides students through the practices, making sure they carry out all the steps in order to reach the objectives in due time and manner. -makes sure students follow the lab rules.	Students... -carry out each one of the practices in due time and manner, following all the lab rules. -read and understand each practice before the actual day in order to reach the stated objectives Use their logbook, make calculations and turn in a report after each practice.	Miessler, Gary L., Tarr, Donald, A 2014. <i>Inorganic Chemistry</i>. 5th Ed., Pearson,
COURSE EVIDENCES (Deliverables) - Reports - Logbook						



10.-PROFESSOR'S PROFILE

Bachelor, Master or Doctorate degree in Chemistry, Chemical Engineering or related degrees.

11.-AUTHORS OF THE LEARNING UNIT

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12.-MODIFICATION AND UPDATE

March 22, 2017