

WOLLO UNIVERSITY
COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE
DEPARTEMENT OF CHEMISTRY

INORGANIC CHEMISTRY II COURSE OUTLINE

Program	B.Sc in Chemistry					
Module Name	Chemistry of elements					
Module Number	03					
Module code	Chem-M2031					
Course Title	Inorganic Chemistry II					
Course Code	Chem2032					
Pre-requisite	Chem2031					
Module coordinator name and address	BesfatAmare					
Instructor(s) name and address	BesfatA,0913288475,besfat05@gmail.com					
Lecture days, Hours & room	TBA					
Cr.Hrs/ECTS	3/5					
Work load	Lecture	Tutorial	Lab.	Home study	Assessment	Total
	48	16	-----	66	5	135
Target group	2 nd year chemistry students					
Semester	Semester II					
Mode of delivery	Semester based					
Status of the course	Core Compulsory					

Course Description

Group properties of transition elements: general physical and chemical properties, variable oxidation states, stoichiometric and non-stoichiometric compounds, catalytic properties etc, coordination compounds (historical development, nomenclature, isomerism, VBT, CFT, MOT), metals and metallurgical processes, descriptive chemistry of transition and inner transition elements (electronic structure, oxidation states, occurrences, isolations, reactions and uses of selected d-block and f-block elements, and chemistry of their compounds).

Learning Outcomes

After completion of this course, students should be able to:

- have a clear understanding of the group properties of the transition elements
- explain coordination compounds with respect to their formation, nomenclature, geometry, isomerism and bonding theories (VBT, CFT and MOT)
- describe metallurgical process in metals
- have a general overview of the descriptive chemistry of transition elements

Course Outline and Schedule

Week	Contents	Teaching method	Learner's Activity	Readings
1 & 2	<p>1. Chemistry of d-block elements</p> <p>1.1 General physical properties of the elements</p> <p>1.1.1 Density, melting and boiling points</p> <p>1.1.2 Trends in the periodic table: size, ionization energy, electronegativity, etc.</p>	<p>Brain storming</p> <p>Gapped lecture</p> <p>Group discussion</p> <p>Presentation</p> <p>Pair work</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take notes</p> <p>Ask questions on unclear ideas</p>	<ul style="list-style-type: none"> • <u>Sulekh Chandra</u> "Inorganic chemistry (vol.II)" (p1-127) • <u>P.A.Cox</u> "Instant notes in inorganic chemistry" (p189-221) • Philip Matthews "Advanced chemistry(physical& instrumental)" (p 535-538) • R.D.Madan''Selected topics in inorganic chemistry''(p250-270)
3	<p>1.2 General chemical properties</p> <p>1.2.1 The inherent variable oxidation states and reactivity</p> <p>Non-stoichiometric compounds</p>	<p>Gapped lecture</p> <p>Group discussion</p> <p>Presentation</p> <p>Pair work</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take notes</p>	<ul style="list-style-type: none"> • <u>P.A.Cox</u> "Instant notes in inorganic chemistry" (p189-221) • R.D.Madan''Selected topics in inorganic chemistry''(p 250-270)
Quizzes (10 %)				
4	<p>1.3 Catalytic properties of the metals in the synthesis of:</p> <p>1.3.1 Organic compounds</p> <p>1.3.2 Inorganic compounds</p>	<p>Gapped lecture,</p> <p>Pair work</p> <p>Group discussion and presentation,</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take notes</p>	<p><u>P.A.Cox</u> "Instant notes in inorganic chemistry" (p 235-253)</p> <p>R.D.Madan''Selected topics in inorganic chemistry''(p250-270)</p>

5-7	<p>1.4 Studies with specific Reference to first series of transition metals</p> <p>1.4.1 Occurrence</p> <p>1.4.2 Importance and</p> <p>1.4.3 compounds of the metals</p>	<p>Gapped lecture</p> <p>pair work</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take notes</p>	<p>Catherine. Housecroft & AlanG. Sharpe "Inorganic chemistry" (p593-644)</p> <p>R.D.Madan''Selected topics in inorganic chemistry''(p250-270)</p>
Presentation (10 %)				
8 & 9	<p>2. Chemistry of f-block elements</p> <ul style="list-style-type: none"> General physical and chemical properties Density, melting and boiling points, spectra, etc. Trends in the periodic table: <ul style="list-style-type: none"> size, IE, EN, etc. Reactivity Occurrence and separation of their compounds 	<p>Gapped lecture</p> <p>Pair work</p> <p>Presentation</p> <p>Pair work</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take notes on the lesson</p>	<ul style="list-style-type: none"> Philip Matthews_ "Advanced chemistry(physical& instrumental)" (p 541-549) R.D.Madan''Selected topics in inorganic chemistry''(p271-331 Philip Matthews "Advanced chemistry(physical& instrumental)" (p 541-549) R.D.Madan''Selected topics in inorganic chemistry''(p271-331)
Group assignment (10%)				
9	<p>General physical & chemical properties of the actinides</p> <ul style="list-style-type: none"> Density, melting & boiling points, spectra....etc Trends in the periodic table: size, IE,EN.....etc Reactivity Occurrence and separation of their compounds 	<p>Gapped lecture</p> <p>Group discussion and Presentation</p> <p>Questioning and answering</p>	<p>Active participation in discussion</p> <p>Listen to a lecture</p> <p>Take note</p> <p>Asking and answering questioning</p>	<ul style="list-style-type: none"> P.A.Cox "Instant notes in inorganic chemistry" (p227-230) Philip Matthews "Advanced chemistry(physical& instrumental)"(p 741-748) Philip Matthews "Advanced chemistry (physical & instrumental)" (p 741-748) R.D.Madan''Selected topics in inorganic chemistry''(p271-331)
Test 1(10%)				
11 & 12	<p>3. Coordination chemistry of transition metals</p> <ul style="list-style-type: none"> Definition 	<p>Gapped lecture</p> <p>Group discussion</p>	<p>Active participation in discussion</p>	<p>Sulekh Chandra "Inorganic chemistry(vol.II)" (p165-173)</p> <p>R.D.Madan''Selected topics in</p>

	<ul style="list-style-type: none"> nomenclature and isomerism 	Presentation Pair work Questioning and answering	Listen to a lecture Take notes Asking and answering questioning	inorganic chemistry''(p 271-331)
13	Valence bond theory	Gapped lecture Pair work Group discussion Demonstration and Presentation	Active participation in discussion Listen to a lecture Take notes	Philip Matthews "Advanced chemistry(physical& instrumental)" (p 77-80) Sulekh Chandra "Inorganic chemistry(vol.II)" (p 157-195) R.D.Madan''Selected topics in inorganic chemistry''(p271-331)
14 & 15	Crystal field theory Molecular orbital theory	Gapped lecture Pair work Group discussion Demonstration and Presentation	Active participation in pair work Listen to a lecture Take notes on the lesson Asking and answering questioning	Catherine E. Housecroft & Alan G. Sharpe "Inorganic chemistry" (p557-566) Sulekh Chandra "Inorganic chemistry(vol.II)" (p 157-195) R.D.Madan''Selected topics in inorganic chemistry''(p271-331) Philip Matthews "Advanced chemistry(physical& instrumental)" (p 87-92)
16	Final examination (50%)			

Mode of Assessment

continuous assessment (not more than 10% for each assessments)	50%
End of Semester Examination	50%