هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Inorganic Chemistry II
Course Code:	CHEM326-3
Program:	Bachelor of Science in Chemistry
Department:	Department of Physical Sciences
College:	College of Science
Institution:	Jazan University
Version:	TP-153 (2024)
Last Revision Date:	31/1/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3 hrs.)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐ Elective		

3. Level/year at which this course is offered: (5th Level--- 3rd Year.)

4. Course general Description:

Course title	Course code	Contact Hours			Credit Hours	Year	Level	Prerequisite	Corequisite
		Lec	Tut	Lab					
Inorganic Chemistry II	CHEM326-3	3	0	0	3	3rd	5th	CHEM225-3	CHEM327-2

This course aims to identify the transition elements, their location in the periodic table, their electronic structure, the study of their physical and chemical properties, as well as the study of the coordination compounds of the transition elements and their chemical bonding theories, and an introduction to the chemistry of lanthanides and actinides.

5. Pre-requirements for this course (if any)**:**

CHEM225-3

6. Co-requisites for this course (if any)**:**

CHEM327-2

7. Course Main Objective(s):

1. **Understanding the general properties of the transitional elements.**
2. **Recognizing the meaning of the coordination compounds as well as identify the rules used to name them.**
3. **knowing and applicating of the different theories that explain the bonding in complexes as well as determining their magnetic properties.**
4. **Distinguishing between different types of coordination compound's isomers.**
5. **Understanding and interpretation of the electronic spectrum of the coordination compounds.**
6. **Knowing the methods of separation and properties of lanthanides and actinides and study the properties of their compounds and coordination compounds.**

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	$(3 \times 15) = 45$	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding;** *Upon completion of the course, students are able to:*			
1.1	***Demonstrate abroad knowledge of the properties of d & f elements, nomenclature, isomerism of transition metals complexes and lanthanides's separation, and preparation of actinides. (I)***	**K(1)**	***Lecture / Open discussion in class***	***Objective Questions***
1.2	***Describe the theories that explain the bonding in transition elements complexes, their properties, and***	**K(2)**	***Lecture / Open discussion in class***	***Objective questions, Essay questions***

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	Lanthanide's separation and Actinide's preparation. (I)			
2.0	**Skills;** *Upon completion of the course, students are able to:*			
2.1	***Solve and interpret problems related to the properties and measurements of transition elements compounds and the compounds of Lanthanides and actinides. (I)***	**S(1)**	***lecture / Open discussion in class***	***Essay questions, Solving problems***
2.2	***Make effective use of communication, and online technology about the course topics in order to improve their basic knowledge in writing (report / poster) with a good verbal and clear scientific language. (I)***	**S(5)**	***project-based learning***	***Research presentation rubric***
3.0	**Values, autonomy, and responsibility;** *Upon completion of the course, students are able to:*			
3.1	***Recognize the chemist's professional and ethical responsibilities. (I)***	**V(2)**	***Research activities***	***Ethic Rubric check***

C. Course Content

No	List of Topics	Contact Hours
1.	Definition of the transition elements and their location in the periodic table and their electronic structure	2
2.	General properties of transition elements (Size, Density, chemical Activity, …….etc)	6
3.	The double salts and coordination compounds – Werner's work	2
4.	The effective atomic number rule - The valence bond theory	3
5.	The crystal field theory – Octahedral complexes – Tetragonal distortion of octahedral complexes (Jahn- Teller distortion) – Square planar complexes - Tetrahedral complexes.	4
6.	Chelates - magnetism - ligand field theory	3
7.	Molecular orbital theory	3
8.	Nomenclature of coordination compounds	3
9.	Isomerism	2
10.	Electronic spectra of the transition metal ions and complexes - Russell and Saunders coupling – Term symbols - Hund's rules - Orgel diagrams –Tanabe and Sugano diagrams	6
11.	Role of transitional elements in biological systems	1

12.	Electronic structure and general properties of lanthanides, their separation methods - Magnetic properties- Lanthanides contraction- Lanthanides complexes	6
13.	Electronic structure and general properties of actinides, their separation and preparation methods and their chemical properties - nuclear fission.	4
Total		$3 \times 15w = 45$

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	*Periodic Exams*	*During Semester*	*30%*
2.	*Assignments & Classroom Activities*	*During Semester*	*20%*
6.	*Final Exam*	*16-17*	*50%*
	Total		*100%*

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Concise Inorganic Chemistry, J. D. Lee, 5th ed., Oxford University Press, 2007.
Supportive References	1. العناصر الانتقالية الأساسية و كيمياء التناسق ، د. حسين محمد عبدالفتاح و د. سمير أبو القاسم عبداللطيف – 2012. 2. Inorganic Chemistry Principles of Structure And Reactivity, J. E. Huheey, E. A. Keiter, R. L. Keiter, 4th ed., Harper Collins, 1997 3. Advanced Inorganic Chemistry, F. A. Cotton, G. Wilkinson, C. A. Murill, and M. Bochmann, 6th ed., J. Wiley & Sons, 1999. 4. Inoganic Chemistry, Catherine E.House Croft and Alan G.Sharpe, Harlow, England ,2nd Ed., 2005.
Electronic Materials	Some course contents and materials are posted on Black board sites
Other Learning Materials	http://www.chemguide.co.uk/inorganic/transition/features.html http://www.chem.iitb.ac.in/~rmv/ch102/ic3.pdf

2. Required Facilities and equipment

Items	Resources
facilities	1 Lecture room(s) for groups of 50 students

Items	Resources
(Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	none

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect
Effectiveness of Students' assessment	Instructor & Course coordinator	Class room evaluation (direct & indirect
Quality of learning resources	Program coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Meeting (3)
DATE	12/03/2024 -02/09/1445