ATTACHMENT 2 (e)

Course Specifications

Kingdom of Saudi Arabia

The National Commission for Academic Accreditation & Assessment

Chemistry of Transition Elements

4023552-2

Course Specifications

(CS)

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2017**
College/Department : **Faculty of Applied Science/ Department of Chemistry**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Transition Elements / 4023552-2**
2. Credit hours: **2 (theoretical)**
3. Program(s) in which the course is offered: **Chemistry and Industrial Chemistry**
4. Name of faculty member responsible for the course: **Dr. Hoda El-Ghamry**
5. Level/year at which this course is offered: **5th level/3th year**
6. Pre-requisites for this course (if any): **Chemistry of the Main Group Elements**
7. Co-requisites for this course (if any): -
8. Location if not on main campus: **both on El-Abedyah and El-Zaher**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	■	What percentage?	**100%**
b. **Blended (traditional and online)**		What percentage?	
c. e-learning	☐	What percentage?	☐
d. Correspondence	☐	What percentage?	☐
f. Other	☐	What percentage?	☐

Comments:

B. Objectives

1. What is the main purpose for this course? By the end of this course student will be familiar with: a. The properties of the main transition elements. b. The properties of the inner transition elements depending on the periodic properties in the periodic table in addition to a comparative studies of the elements in their groups. c. The spectroscopic and magnetic properties of the transition elements.
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • Encourage students to carry out reports in the field of chemistry of transition elements. • Using different learning sources of the course, so that the students make use of more than one reference. • The use of smart teaching halls for lectures.

C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
• The site transition elements in the periodic table.	1	2
• d-block elements, first transition series (3d), second transition series (4d) and third transition series (5d).	2	4
• f-block elements: lanthanides series (4f) and actinides series (5f).	1	2
• Differences between d-block and f-block elements.	1	2
• Comparisons between 4d and s, p block elements.	1	2
• Characteristic properties of first transition series.	1	2
• Magnetic properties from crystal field theory.	1	2

• Electronic distribution of electrons in d orbitals on octahedral complexes.	1	2
• Comparison between the properties of first transition series (3d) with the second transition series (4d) and third transition series (5d).	1	2
• Comparative studies of transition elements in their groups; scandium group, titanium group, vanadium group, chromium group, manganese group, iron, cobalt & nickel groups, copper group, and zinc group.	2	4
• f-block elements: studies of lanthanides and actinides in comparison with scandium group in terms of abundance, electronic configuration, oxidation states and lanthanides contraction.	1	2
• Spectroscopic and magnetic properties – difference between 4f and 5f and its effect on chemical behavior.	1	2

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	28	-		-		28
Credit	2	-				2

3. Additional private study/learning hours expected for students per week.

- Each student spends 2 hrs each weak in preparing reports and their discussions.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Describe the site of transition elements in the periodic table.	• Lectures • Scientific discussion • Library visits • Web-based study	• Periodic and final exams. • Web-based student performance systems. • Reports.
1.2	Recall d-block elements		
1.3	Know the f-block elements by its two series; lanthanides (4f) and actinides (5f).		
1.4	Describe the characteristic properties of first transition series.		
1.5	Identify the magnetic properties from crystal field theory.		
1.6	Recognize the electronic distribution of electrons in d orbitals on octahedral complexes.		
1.7	Remember the transition elements in their groups; scandium group, titanium group, vanadium group, chromium group, manganese group, iron group, cobalt group, nickel group, copper group, and zinc group.		
1.8	List lanthanides and actinides (f-block elements) in comparison with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction).		
1.9	Recognize the spectroscopic and magnetic properties of the d- and f-block elements		
2.0	**Cognitive Skills**		
2.1	Explain the site of transition elements in the periodic table.	• Lectures	• Periodic and

2.2	Compare between d-block and f-block elements.	• Scientific discussion • Library visits • Web-based study	final exams. • Web-based student performance systems. • Reports.
2.3	Differentiate between d-block elements with s & p block elements.		
2.4	Clarify the characteristic properties of first transition series.		
2.5	Compare between the properties of first transition series (3d) with the second transition series (4d) and third transition series (5d).		
2.6	Subdivide the f-block elements into lanthanides and actinides and compare them with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction)		
2.7	Predict the spectroscopic and magnetic properties of the d- and f-block elements		
3.0	**Interpersonal Skills & Responsibility**		
• Ability to communicate results of work to classmates. Ability to work in a team to perform a specific task.		• Scientific discussion • Web-based study	• Web-based student performance systems.
4.0	**Communication, Information Technology, Numerical**		
• Predict the site of the transition elements in the periodic table. • Interpret the properties of the transition elements in their groups including scandium group, titanium group, vanadium group, chromium group, manganese group, iron group, cobalt group, nickel group, copper group, and zinc group. • Enhancing the ability of students to use computers and internet.		• Lectures • Scientific discussion • Library visits • Web-based study	• web-based student performance systems • individual and group presentations

• Interpret chemical data • Present chemical data orally. • Know how to write a report.		

5.0	**Psychomotor**
5.1	NOT APPLICABLE
5.2	

5. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
4	Final Exam. (2 hours exam)	16	50 %
5	**Total**	**100 %**	

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

- Office hours: During the working hours weekly.
- Academic Advising for students.
- Availability of Staff members to provide counselling and advice.

E. Learning Resources

2. List Essential References Materials (Journals, Reports, etc.)

- Lecture hand outs available on the coordinator website

1. List Required Textbooks

- R. Gopalan " *Textbook of Inorganic Chemistry 1st Edition"* **2011,** *CRC Press*.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc) • Eleanor Crabb, Elaine Moore, Lesley Smart "*Concepts in Transition Metal Chemistry*" **2010**, Royal Society of Chemistry. • Kazuo Nakamoto "Infrared and Raman Spectra of Inorganic and Coordination Compounds" **2009,** John Wiley &Sons.
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.) • **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software: None

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Classrooms capacity (30) students.

2. Computing resources (AV, data show, Smart Board, software, etc.) • Room equipped with computers and projectors**.**
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • No other requirements.

G. Course Evaluation and Improvement Processes

1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Questionnaire evaluation of the course in particular.
2 . Other Strategies for Evaluation of Teaching by the Program/Department Instructor • Preparation of a course report and study of the results of the students to give us indication about the planned outputs and the extent to which student's benefits.

3. Processes for Improvement of Teaching • Application of e-learning. • Exchange of experiences internal and external. • Review of strategies proposed. • Providing new tools for learning.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Check marking of a sample of exam papers, or student work. • Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • Periodic Review of the contents of the syllabus and modify the negatives. • Consult other staff of the course. • Hosting a visiting staff to evaluate of the course. • Workshops for teachers of the course.

Faculty or Teaching Staff: **Dr. Hoda El-Ghamry**

Signature: _____ **Date Report Completed: 12/1/2019**

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: 20/1/2019**