Kingdom of Saudi Arabia

The National Commission for

Academic Accreditation & Assessment

Course Specifications

Chemistry of Transition Metals

(402223-3)

2016

Course Specifications

Institution: **Umm Al-qura University**	Date of Report: **2016**
College/Department : **Faculty of Applied Science/ Chemistry Department**	

A. Course Identification and General Information

1. Course title and code: **Chemistry of Transition Metals** / 402223-3
2. Credit hours: **3**
3. Program(s) in which the course is offered. **Chemistry program**
4. Name of faculty member responsible for the course: **Dr. Naeema Yarkandi**
5. Level/year at which this course is offered: **4th level/2nd year**
6. Pre-requisites for this course (if any): Chemistry of the Main Group Elements (402221-2)
7. Co-requisites for this course (if any):
8. Location if not on main campus: **All campus (El-Abedyah, El-Zaher and Elaziziah)**
9. Mode of Instruction (mark all that apply)

a. Traditional classroom	☐	What percentage?	☐
b. **Blended (traditional and online)**	■	What percentage?	**100%**
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) **The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course**

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
a. Site of transition elements in the periodic table.	1	3
b. d-block elements: first transition series (3d), second transition series (4d) and third transition series (5d).	1	3
c. f-block elements: lanthanides (4f) and actinides (5f).	1	3
d. Differences between d-block and f-block elements.	1	3
e. Comparisons between 4d and s, p block elements.	1	3
f. Characteristic properties of first transition series.	1	3
g. Magnetic properties from crystal field theory.	1	3
h. Electronic distribution of electrons in d orbitals on octahedral complexes.	1	3
i. Comparison between the properties of first transition series (3d) with the second transition series (4d) and third transition series (5d).	1	3

j. Comparative studies of 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	3
k. Studies of lanthanides and actinides (f-block elements) in comparison with scandium group (abundance, electronic configuration, oxidation states and lanthanides contraction).	2	6
l. Spectroscopic and magnetic properties – difference between 4f and 5f as well as its effect on chemical behavior	2	6

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

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	42	-		-		42
Credit	3	-				3

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

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	• Exams • web-based student performance systems • portfolios
1.2	Define d-block elements		
1.3	Define 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	List 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	Identify 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	Reorganize the site of transition elements in the periodic table.	• Lectures • Scientific discussion • Library visits • Web-based study	• Exams • web-based student performance systems • portfolios
2.2	Compare between d-block and f-block elements.		
2.3	Differentiate between 4d and s, p block elements.		
2.4	Estimate 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	Predicte the spectroscopic and magnetic properties of the d- and f-block elements		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Show the position of transition elements in the periodic table.	• Lectures • Scientific discussion • Web-based study	• Exams • web-based student performance systems
3.2	Evaluate the differences between d-block and f-block elements.		
4.0	**Communication, Information Technology, Numerical**		
4.1	Illustrate the site of the transition elements in the periodic table.	• Lectures • Scientific discussion • Library visits	• web-based student performance systems
4.2	Interpret comparatively 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.	• Web-based study	• individual and group presentations
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	--	10%
2	Midterm 1 Exam	--	20
3	Midterm 2 Exam	--	20
4	Final Exam	16	50%
	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)

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

E. Learning Resources

1. List Required Textbooks

- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "*Organic Chemistry, 11th Edition, International Student Version*" **2013**, John Wiley & Sons.
- John McMurry's "*Organic Chemistry, 8th edition, International Edition*" **2011**, Brooks/Cole.

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

- Lecture Hand outs available on the coordinator website.

3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)

- Amit Arora "*Introductory Organic Chemistry*" **2006**, Discovery Publishing House New Delhi
- M. Casey, J. Leonard, B. Lygo, G. Procter "*Advanced Practical Organic Chemistry*" 1990, Springer US.

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.

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.**
- **Providing hall of teaching aids including computers and projector.**

2. Computing resources (AV, data show, Smart Board, software, etc.)

- **Room equipped with computer and projector and TV.**

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

Complete the questionnaire evaluation of the course in particular.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor

- **Observations and the assistance of colleagues.**
- **Independent evaluation for extent to achieve students the standards.**
- **Independent advice of the duties and tasks.**

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3 Processes for Improvement of Teaching

- **Workshops for teaching methods.**
- **Continuous training of member staff.**
- **Review of strategies proposed.**

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. Naeema Yarkandi

Signature: Date Report Completed: 2016

Received by: Dr Hatem Altass Department Head

Signature: _____ Date: _____