



**ATTACHMENT 2 (e)**

**Course Specifications**

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation & Assessment**

# **Organometallic Chemistry**

**4024575-2**  
**Course Specifications**  
**(CS)**





## Course Specifications

Institution: <b>Umm Al-qura University</b>	Date of Report: <b>2017</b>
College/Department : <b>Faculty of Applied Science/ department of chemistry</b>	

### A. Course Identification and General Information

1. Course title and code: <b>Organometallic Chemistry/ 4024575-2</b>	
2. Credit hours: <b>2 (theoretical)</b>	
3. Program(s) in which the course is offered. <b>Chemistry</b>	
4. Name of faculty member responsible for the course: <b>Dr. Hoda El-Ghamry</b>	
5. Level/year at which this course is offered: <b>7<sup>th</sup> level/4<sup>th</sup> year</b>	
6. Pre-requisites for this course (if any): <b>Coordination Chemistry</b>	
7. Co-requisites for this course (if any):	
8. Location if not on main campus: <b>both on El-Abedyah and El-Zaher</b>	
9. Mode of Instruction (mark all that apply)	
a. Traditional classroom	<input checked="" type="checkbox"/> What percentage? <b>100%</b>
b. Blended (traditional and online)	What percentage?
c. E-learning	<input type="checkbox"/> What percentage? <input type="checkbox"/>
d. Correspondence	<input type="checkbox"/> What percentage? <input type="checkbox"/>
f. Other	<input type="checkbox"/> What percentage? <input type="checkbox"/>
Comments:	

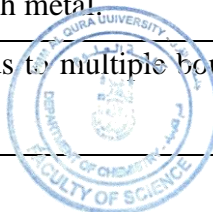


## B Objectives

<p>1. What is the main purpose for this course?</p> <p>By the end of studying of this course the student should fully understand:</p> <p>a. The basic concepts of chemistry of organometallic compounds including their classifications and nomenclature.</p> <p>b. The chemical and physical properties of organometallic compounds as well as their economic importance.</p>
<p>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)</p> <ul style="list-style-type: none"> <li>• Encourage students to carry out reports in the field of organometallic chemistry.</li> <li>• Using different learning sources of the course, so that the students make use of more than one reference.</li> <li>• The use of smart teaching halls for lectures.</li> </ul>

## 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
• History and nomenclature of $\sigma$ -bonded and $\pi$ -bonded complexes.	1	2
• Eighteen electron rule – oxidation number.	1	2
• Preparation of organometallic compounds: direct reactions between metals and alkyl halides.	1	2
• Preparations involve organometallic compounds: reaction with organic halides, reaction with free metals and their compounds.	1	2
• Substitution reactions: substitution of hydrogen with metal.	1	2
• Addition reactions: addition of metallic compounds to multiple bonds and electrochemical methods.	1	2





• Structure and bonding in organometallic compounds: $\sigma$ -bonded organometallic compounds – complexes of alkynes and alkenes- $\pi$ -bonded organometallic compounds	2	4
• Application of organometallic compounds in organic preparations: organolithium compounds, organomagnesium compounds, organocopper compounds, organoaluminium compounds, organosilicon compounds, organoiron compounds.	3	6
• Organometallic complexes of transition metals – unsaturated hydrocarbons.	1	2
• Catalytic applications of organometallic compounds.	2	4

## II-General scheme for identification of organic aliphatic unknown

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 week in preparing reports and their discussions.
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4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy:
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	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Recognize the nomenclature of $\sigma$ -bonded and $\pi$ -bonded complexes.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Periodic and final exams.</li> </ul>
1.2	Identify the eighteen electron rule and oxidation		



	numbers.		
1.3	List the methods of synthesis of organometallic compounds.	<ul style="list-style-type: none"> <li>• Library visits</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• Web-based student performance systems.</li> <li>• Reports.</li> </ul>
1.4	Describe structure and bonding in organometallic compounds.		
1.5	Memorize the application of organometallic compounds in organic preparations: organolithium compounds, organomagnesium compounds, organocopper compounds, organoaluminium compounds, organosilicon compounds, organoiron		
1.6	Recall some catalytic application of organometallic compounds.		
<b>2.0</b>	<b>Cognitive Skills</b>		
2.1	Explain the nomenclature of $\sigma$ -bonded and $\pi$ -bonded organometallic compounds.	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Library visits</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• Periodic and final exams.</li> <li>• Web-based student performance systems.</li> <li>• Reports.</li> </ul>
2.2	Apply the eighteen electron rule to the organometallic compounds.		
2.3	Summarize the preparation methods of the organometallic compounds.		
2.4	Explain the structure and bonding in organometallic compounds.		
2.5	Interpret examples of organometallic compounds such as organolithium, organomagnesium, organocopper, organoaluminium, organosilicon, organoiron.		
<b>3.0</b>	<b>Interpersonal Skills &amp; Responsibility</b>		
NOT APPLICABLE			
<b>4.0</b>	<b>Communication, Information Technology, Numerical</b>		
	<ul style="list-style-type: none"> <li>• Evaluate the different methods of preparation of organometallic compounds</li> <li>• Illustrate reactions of different organometallic compounds.</li> <li>• Use information and communication technology.</li> <li>• Use IT and communication technology in gathering and interpreting information and ideas.</li> <li>• Use the internet as a means of communication and a source of information.</li> <li>• Encourage students to use internet for searching</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Scientific discussion</li> <li>• Library visits</li> <li>• Web-based study</li> </ul>	<ul style="list-style-type: none"> <li>• web-based student performance systems</li> <li>• individual and group presentations</li> </ul>



	certain electronic journals regarding topics of the course. <ul style="list-style-type: none"> <li>Scientific writing.</li> <li>Use his/her observations to solve problems.</li> </ul>		
<b>5.0</b>	<b>Psychomotor</b>		
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	<b>Total</b>		<b>100 %</b>

#### D. Student Academic Counseling and Support

<p>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)</p> <ul style="list-style-type: none"> <li>Office hours: During the working hours weekly.</li> <li>Academic Advising for students.</li> <li>Availability of Staff members to provide counseling and advice.</li> </ul>
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#### E. Learning Resources

<p>1. List Required Textbooks</p> <ul style="list-style-type: none"> <li>Lecture Hand outs available on the coordinator website</li> </ul>
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2. List Essential References Materials (Journals, Reports, etc.)

- James E. Huheey, "Inorganic Chemistry: Principles of Structure and Reactivity", 4<sup>th</sup> Edition, 2006, Pearson Education India.
- B.D. Gupta, Anil J. Elias "Basic Organometallic Chemistry: Concepts, Syntheses and Applications" 2013, Universities Press.

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

- R.H. Crabtree "The Organometallic Chemistry of the Transition Metals" 6<sup>th</sup> ed. 2014, Wiley publisher.
- Leah Renold, *Applied Organometallic Chemistry and Catalysis*, 2005, Oxford University Press.

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: Non

## 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

