



<b>Form: Course Syllabus</b>	<b>Form Number</b>	EXC-01-02-02A
	<b>Issue Number and Date</b>	2963/2022/24/3/2 5/12/2022
	<b>Number and Date of Revision or Modification</b>	2/(10/12/2023)
	<b>Deans Council Approval Decision Number</b>	50/2023
	<b>The Date of the Deans Council Approval Decision</b>	26/12/2023
	<b>Number of Pages</b>	06

1.	<b>Course Title</b>	Special topics in inorganic chemistry
2.	<b>Course Number</b>	0353422
3.	<b>Credit Hours (Theory, Practical)</b>	BSc. in Chemistry
	<b>Contact Hours (Theory, Practical)</b>	0303
4.	<b>Prerequisites/ Corequisites</b>	Science
5.	<b>Program Title</b>	Science
6.	<b>Program Code</b>	Chemistry
7.	<b>School/ Center</b>	Fourth Year
8.	<b>Department</b>	Spring 2023/2024
9.	<b>Course Level</b>	BSc. In Chemistry
10.	<b>Year of Study and Semester (s)</b>	4 <sup>th</sup> year
11.	<b>Other Department(s) Involved in Teaching the Course</b>	NA
12.	<b>Main Learning Language</b>	English
13.	<b>Learning Types</b>	<input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
14.	<b>Online Platforms(s)</b>	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Exambuilder
15.	<b>Issuing Date</b>	-
16.	<b>Revision Date</b>	25/2/2024

**17. Course Coordinator:**

Name: Deeb Taher	Contact hours: 10.30-11.30 (sum, Tue)
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**18. Other Instructors:**



**Dr. Fawwaz Khalili, Prof.**

**Dr. Murad AlDamen, Prof.**

**Dr. Afnan Hunaiti**

**Dr. Hazem Amarne**

### 19. Course Description:

As stated in the approved study plan.

### 20. Program Intended Learning Outcomes: (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program), **the program's student outcomes must fulfill the above ABET student outcomes. You can add new outcomes for your program, but all the six ABET-outcomes must be included.**

SO-1. Problem Solving: Graduates will be able to apply mathematical and scientific knowledge to identify, formulate, and solve technical or scientific problems relevant to the discipline of chemistry.

SO-2. Design: Graduates will be able to use their understanding of chemistry concepts and principles to formulate and design systems, processes, procedures, or programs to meet desired goals and outcomes.

SO-3. Experimental Skills: Graduates will be able to design, conduct, and analyze experiments or test hypotheses, utilizing appropriate chemical techniques and scientific judgment to draw meaningful conclusions.

SO-4. Communication: Graduates will be able to communicate scientific information effectively and accurately to a range of audiences, including both technical and non-technical audiences.

SO-5. Ethics and Global Context: Graduates will understand and apply ethical and professional responsibilities in the context of the impact of technical and scientific solutions on global, economic, environmental, and societal issues.

SO-6. Teamwork: Graduates will be able to work effectively as part of a team, establishing goals, planning tasks, meeting deadlines, and analyzing risk and uncertainty in the context of chemistry-related projects and initiatives.

SO-7. Handling Chemicals: An ability to apply the proper procedures for safe handling of chemicals.



**21. Course Intended Learning Outcomes:** (Upon completion of the course, the student will be able to achieve the following intended learning outcomes)

- CLO-1. Hydrogenation and hydroelementation of alkenes.
- CLO-2. Transformations of alkenes and alkynes.
- CLO-3. Oxidation of olefins.
- CLO-4. C-H activation and functionalization of alkanes and arenes.
- CLO-5. Carbonylation and carboxylation reactions.
- CLO-6. Organometallic complexes in organic synthesis.

Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analysing	evaluating	Creating
1	×	×				
2	×	×				
3	×	×				
4	×	×				
5	×	×				
6	×	×				
7	×	×				

**22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program:**

Program SOs Course CLOs	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)	SO (6)	SO (7)
1	×	×					
2	×	×					
3	×	×					
4	×	×					
5	×	×					
6	×	×					
7	×	×					

**23. Topic Outline and Schedule:**



Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types (Face to Face/ Blended/ Fully Online)	Platform Used	Synchronous / Asynchronous	Evaluation Methods	Learning Resources
1	1.1	Hydrogenation of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
	1.2	Hydrogenation of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
	1.3	Asymmetric hydrogenation	CLO-1	Blended		S	Quizzes + Exam	textbook
2	2.1	Asymmetric hydrogenation	CLO-1	Blended		S	Quizzes + Exam	textbook
	2.2	Hydroboration of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
	2.3	Hydroboration of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
3	3.1	Hydrocyanation of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
	3.2	Hydrocyanation of olefins	CLO-1	Blended		S	Quizzes + Exam	textbook
	3.3	Hydroamination of olefins and alkynes	CLO-1	Blended		S	Quizzes + Exam	textbook
4	4.1	Hydroamination of olefins and alkynes	CLO-1	Blended		S	Quizzes + Exam	textbook
	4.2	Ziegler-Natta-type olefin polymerization	CLO-2	Blended		S	Quizzes + Exam	textbook
	4.3	Ziegler-Natta-type olefin polymerization	CLO-2	Blended		S	Quizzes + Exam	textbook
5	5.1	Metathesis of alkenes, alkynes and cycloalkenes	CLO-2	Blended		S	Quizzes + Exam	textbook
	5.2	Metathesis of alkenes, alkynes and cycloalkenes	CLO-2	Blended		S	Quizzes + Exam	textbook
	5.3	Olefin dimerization and oligomerization	CLO-2	Blended		S	Quizzes + Exam	textbook
6	6.1	Olefin dimerization and oligomerization	CLO-2	Blended		S	Quizzes + Exam	textbook
	6.2	Olefin isomerization	CLO-2	Blended		S	Quizzes + Exam	textbook
	6.3	Olefin isomerization	CLO-2	Blended		S	Quizzes + Exam	textbook
7	7.1	Historic introduction and radical-type oxidation	CLO-3	Blended		S	Quizzes + Exam	textbook
	7.2	Ethylene oxidation to acetaldehyde: Wacker process	CLO-3	Blended		S	Quizzes + Exam	textbook
	7.3	Ethylene oxidation to acetaldehyde: Wacker process	CLO-3	Blended		S	Quizzes + Exam	textbook
8	8.1	Epoxidation of olefins	CLO-3	Blended		S	Quizzes + Exam	textbook
	8.2	Epoxidation of olefins	CLO-3	Blended		S	Quizzes + Exam	textbook
	8.3	Hydroxylation by metal-oxo complexes	CLO-3	Blended		S	Quizzes + Exam	textbook
9	9.1	Hydroxylation by metal-oxo complexes	CLO-3	Blended		S	Quizzes + Exam	textbook
	9.2	Phase-transfer catalysis in oxidation chemistry	CLO-3	Blended		S	Quizzes + Exam	textbook



	9.3	Phase-transfer catalysis in oxidation chemistry	CLO-3	Blended		S	Quizzes + Exam	textbook
10	10.1	Introduction	CLO-4	Blended		S	Quizzes + Exam	textbook
	10.2	Alkanes and cycloalkanes	CLO-4	Blended		S	Quizzes + Exam	textbook
	10.3	Aromatics	CLO-4	Blended		S	Quizzes + Exam	textbook
11	11.1	Carbonylation of methanol: Monsanto process	CLO-5	Blended		S	Quizzes + Exam	textbook
	11.2	Carbonylation of methanol: Monsanto process	CLO-5	Blended		S	Quizzes + Exam	textbook
	11.3	Olefin hydroformylation: oxo process	CLO-5	Blended		S	Quizzes + Exam	textbook
12	12.1	Carbonylation of alkenes and alkynes in the presence of a nucleophile: the Reppe reaction	CLO-5	Blended		S	Quizzes + Exam	textbook
	12.2	Carbonylation of alkenes and alkynes in the presence of a nucleophile: the Reppe reaction	CLO-5	Blended		S	Quizzes + Exam	textbook
	12.3	Carbonylation of aryl halides in the presence of a nucleophile	CLO-5	Blended		S	Quizzes + Exam	textbook
13	13.1	Carbonylation of aryl halides in the presence of a nucleophile	CLO-5	Blended		S	Quizzes + Exam	textbook
	13.2	Catalysis of CO <sub>2</sub> transformation	CLO-5	Blended		S	Quizzes + Exam	textbook
	13.3	Protection and stabilization of unsaturated organic derivatives and fragments	CLO-6	Blended		S	Quizzes + Exam	textbook
14	14.1	Nucleophilic and electrophilic reactions on hydrocarbon ligands	CLO-6	Blended		S	Quizzes + Exam	textbook
	14.2	General methods of C-C bond formation using the oxidative addition of an organic halide or a related electrophile	CLO-6	Blended		S	Quizzes + Exam	textbook
	14.3	Extension of palladium catalysis to the formation of C-O and C-N bonds	CLO-6	Blended		S	Quizzes + Exam	textbook
15	15.1	Oxidative coupling reactions of alkynes with other unsaturated fragments for the formation of cyclic and heterocyclic compounds	CLO-6	Blended		S	Quizzes + Exam	
	15.2	Metal-carbene complexes in organic synthesis	CLO-6	Blended		S	Quizzes + Exam	
	15.3	Examples of asymmetric catalysis	CLO-6	Blended		S	Quizzes + Exam	



#### 24. Evaluation Methods:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Homework	10	All	All	Every week	Face to Face
Presentation	10	All	All	Every week	Face to Face
Quizzes	10	All	All	Every week	Face to Face
Mid	30	All	All	8	Face to Face
Final	50	All	All	16	Face to Face

#### 25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.): A previous knowledge on simple arithmetic/mathematic skills is needed as well as how to use the scientific calculator.

#### 26. Course Policies:

##### A. Attendance policies:

Students should attend at least 85% of the total number of lectures.

##### B- Absences from exams and submitting assignments on time:

Students who miss an exam must submit an acceptable excuse and then a makeup exam will be appointed.

##### C- Health and safety procedures:

Followed according to university regulations.

##### D- Honesty policy regarding cheating, plagiarism, misbehavior:

Followed according to university regulations.

##### E- Grading policy:



As per in section 24

The letter grade scale is adopted.

F- Available university services that support achievement in the course:

## 27. References:

A- Required book(s), assigned reading and audio-visuals:

Organometallic Chemistry and Catalysis, Didier Astruc (Author)

B- Recommended books, materials, and media:

## 28. Additional information:

This course is required by almost all students in scientific faculties at the University of Jordan.

Name of the Instructor or the Course Coordinator: **Dr. Deeb Taher, Prof.**      Signature:      Date: 24-9-2024

Name of the Head of Quality Assurance  
Committee/ Department: **Dr. Haytham Saadeh, Prof.**      Signature:      Date:

Name of the Head of Department: **Dr. Firas Awwadi, Prof.**      Signature:      Date:

Name of the Head of Quality Assurance  
Committee/ School or Center: **Dr. Murad A. AlDamen, Prof.**      Signature:      Date:

Name of the Dean or the Director: **Dr. Mahmoud I. Jaghoub, Prof.**      Signature:      Date: