



<b>Form: Course Syllabus</b>	<b>Form Number</b>	EXC-01-02-02A
	<b>Issue Number and Date</b>	2/3/24/2022/2963 05/12/2022
	<b>Number and Date of Revision or Modification</b>	
	<b>Deans Council Approval Decision Number</b>	2/3/24/2023
	<b>The Date of the Dean Council Approval Decision</b>	23/01/2023
	<b>Number of Pages</b>	06

1.	<b>Course Title</b>	<b>Spectroscopy of Organic Compounds</b>
2.	<b>Course Number</b>	<b>0303733</b>
3.	<b>Credit Hours (Theory, Practical)</b>	3
	<b>Contact Hours (Theory, Practical)</b>	3
4.	<b>Prerequisites/ Corequisites</b>	-
5.	<b>Program Title</b>	
6.	<b>Program Code</b>	
7.	<b>School/ Center</b>	School of Science
8.	<b>Department</b>	Chemistry
9.	<b>Course Level</b>	Master
10.	<b>Year of Study and Semester (s)</b>	Second Semester 2024-2025
11.	<b>Other Department(s) Involved in Teaching the Course</b>	
12.	<b>Main Learning Language</b>	
13.	<b>Learning Types</b>	●Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online
14.	<b>Online Platforms(s)</b>	<input type="checkbox"/> Moodle   ●Microsoft Teams
15.	<b>Issuing Date</b>	14/11/2024
16.	<b>Revision Date</b>	14/11/2024

**17. Course Coordinator:**

Name: Prof. Dr. Amal Alaboudi	Contact hours: 4:00 – 5:30 Sunday & Tuesday
Office number: 108	Phone number: 22132
Email: <a href="mailto:alaboudi@ju.edu.jo">alaboudi@ju.edu.jo</a>	



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**18. Other Instructors:**

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**19. Course Description:**

Examines molecular structure through IR, MS, and 1D/2D NMR spectroscopy. Covers foundational theory, advanced techniques, fragmentation, spin-spin and heteronuclear coupling, enabling comprehensive structural analysis of organic compounds.
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**20. Program Student Outcomes (SO's):** (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program)

- SO1. Demonstrate comprehensive knowledge and understanding of chemistry topics, achieving expertise in foundational research principles.
- SO2. Develop independent research skills to solve complex problems, focusing on analytical and critical thinking.
- SO3. Improve communication of scientific knowledge through structured reports, presentations, and discussions.
- SO4. Engage in activities that enhance practical scientific skills and improve professional expertise.
- SO5. Maintain ethical standards in research.

**21. Course Intended Learning Outcomes (CLOs):**

Upon completion of the course, the student will be able to:

1. **Analyze** and interpret molecular structure data from IR, MS, and 1D/2D NMR spectroscopy, demonstrating comprehensive knowledge in spectroscopy.
2. **Apply** principles of fragmentation, spin-spin coupling, and heteronuclear coupling in organic structural analysis, using critical thinking to solve complex spectroscopic problems.
3. **Effectively communicate** detailed spectroscopic data interpretations through structured reports and presentations, enhancing clarity in scientific communication.
4. **Perform** hands-on spectroscopic analyses, demonstrating proficiency in using relevant instrumentation and methods for structure elucidation.



Course CLOs	The learning levels to be achieved					
	Remembering	Understanding	Applying	Analyzing	evaluating	Creating
1		x	x	x	x	
2		x	x	x	x	
3		x	x	x	x	
4		x	x	x	x	

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

Program SO's	SO (1)	SO (2)	SO (3)	SO (4)	SO (5)
Course CLO's					
CLO (1)	•	•			
CLO (2)		•		•	
CLO (3)			•		
CLO (4)				•	•



### 23. Topic Outline and Schedule:

Week	Lecture	Topic	CLO/s Linked to the Topic	Learning Types Face to Face (FF) Blended (BL) Fully Online (FO)	Platform Used	Synchronous (S) Asynchronous (A)	Evaluation Methods	Learning Resources
1	1.1	Molecular formulas and what can be learned from them	CLO (1-4)	FF	on campus	S	quiz	textbook
	1.2	Infrared spectroscopy	CLO (1-4)	FF	on campus	S		textbook
2	2.1	Infrared spectroscopy	CLO (1-4)	FF	on campus	S	quiz	textbook
	2.2	Mass spectrometry part one: basic theory, instrumentation, and sampling techniques	CLO (1-4)	FF	on campus	S		textbook
3	3.1	Mass spectrometry part two: fragmentation and structural analysis	CLO (1-4)	FF	on campus	S		textbook
	3.2	Mass spectrometry part two: fragmentation and structural analysis	CLO (1-4)	FF	on campus	S	quiz	textbook
4	4.1	Nuclear magnetic resonance spectroscopy part one: basic concepts	CLO (1-4)	FF	on campus	S		textbook
	4.2	Nuclear magnetic resonance spectroscopy part one: basic concepts	CLO (1-4)	FF	on campus	S		textbook
5	5.1	Nuclear magnetic resonance spectroscopy part one: basic concepts	CLO (1-4)	FF	on campus	S		textbook
	5.2	Nuclear magnetic resonance spectroscopy part one: basic concepts	CLO (1-4)	FF	on campus	S	quiz	textbook
6	6.1	Nuclear magnetic resonance spectroscopy part two: carbon-13 spectra, including heteronuclear coupling with other nuclei	CLO (1-4)	FF	on campus	S		textbook



	6.2	Nuclear magnetic resonance spectroscopy part two: carbon-13 spectra, including heteronuclear coupling with other nuclei	CLO (1-4)	FF	on campus	S		textbook
7	7.1	Nuclear magnetic resonance spectroscopy part two: carbon-13 spectra, including heteronuclear coupling with other nuclei	CLO (1-4)	FF	on campus	S		textbook
	7.2	Nuclear magnetic resonance spectroscopy part two: carbon-13 spectra, including heteronuclear coupling with other nuclei	CLO (1-4)	FF	on campus	S	Midterm	textbook
8	8.1	Nuclear magnetic resonance spectroscopy part three: spin-spin coupling	CLO (1-4)	FF	on campus	S		textbook
	8.2	Nuclear magnetic resonance spectroscopy part three: spin-spin coupling	CLO (1-4)		on campus	S		textbook
9	9.1	Nuclear magnetic resonance spectroscopy part three: spin-spin coupling	CLO (1-4)		on campus			textbook
	9.2	Nuclear magnetic resonance spectroscopy part three: spin-spin coupling	CLO (1-4)	FF	on campus	S	quiz	textbook
10	10.1	Nuclear magnetic resonance spectroscopy part four: other topics in one-dimensional nmr	CLO (1-4)	FF	on campus	S		textbook
	10.2	Nuclear magnetic resonance spectroscopy part four: other topics in one-dimensional nmr	CLO (1-4)	FF	on campus	S		textbook
11	11.1	Nuclear magnetic resonance spectroscopy part five: advanced nmr techniques	CLO (1-4)	FF	on campus	S		textbook
	11.2	Nuclear magnetic resonance spectroscopy part five: advanced nmr techniques	CLO (1-4)	FF	on campus	S		textbook
12	12.1	Nuclear magnetic resonance spectroscopy part five: advanced nmr techniques	CLO (1-4)	FF	on campus	S	quiz	textbook
	12.2	Ultraviolet spectroscopy	CLO (1-4)	FF	on campus	S		textbook
13	13.1	Ultraviolet spectroscopy	CLO (1-4)	FF	on campus	S		textbook
	13.2	Combined structure problems		FF	on campus	S		textbook



14	14.1	Combined structure problems		FF	on campus	S		textbook
	14.2	Presentations by Students		FF	on campus	S		textbook
15	15.1	Presentations by Students		FF	on campus	S		textbook
	15.2	Presentations by Students		FF	on campus	S		textbook
16					on campus		Final Exam	

#### 24. Evaluation Methods:

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

Evaluation Activity	Mark	Topic(s)	CLO/s Linked to the Evaluation activity	Period (Week)	Platform
Midterm	30	IR, MS, <sup>1</sup> H-NMR & <sup>13</sup> C-NMR	CLO (1-4)	6	on campus
Quizzes and presentations	30	Quizzes: After each topic Presentation Evaluation	CLO (1-4)	11	on campus
Final	40	All Material	CLO (1-4)		on campus

#### 25. Course Requirements:

(e.g.: students should have a computer, internet connection, webcam, account on a specific software/platform...etc.): **Internet, computer, textbook, and references.**

**26. Course Policies: The following (A – E) will be addressed per the University of Jordan's regulations.**

A- Attendance policies:

B- Absences from exams and submitting assignments on time:



C- Health and safety procedures:

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

E- Grading policy:

F- Available university services that support achievement in the course: **Internet, textbooks and e-library**

## 27. References:

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

**Introduction to Spectroscopy, 5th Edition**

**By: Donald L. Pavia, Gary M. Lampman, George S. Kriz, James A. Vyvyan**

B- Recommended books, materials, and media:

**1) Spectroscopic Identification of Organic Compounds" By Silverstein, Webster & Kiemle  
7<sup>th</sup> Edition, Wiley & Sons, 2005**

**2. Nuclear Magnetic Resonance: Basic Principles, By Atta Ur-Rahman, 1986, Springer New York**

## 28. Additional information:

Name of the Instructor or the Course Coordinator:

Amal Al-Aboudi

Signature:

Amal Alaboudi

Date:

14 Nov 2024

The Head of Graduate Studies Committee/  
Department Chemistry

**Dr. Murad AlDamen, Prof.**

Signature:

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Date:

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The Head of Department of Chemistry

**Dr. Murad AlDamen, Prof.**

Signature:

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Date:

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Vice Dean for Graduate Studies and Scientific  
Research / School of Science

**Dr. Kamal Sweidan, Prof.**

Signature:

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Date:

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The Dean of School of Science

**Dr. Mahmoud I. Jaghoub, Prof.**

Signature:

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Date:

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