



**Course Syllabus**  
**According to JORDAN National Qualification**  
**Framework (JNQF)**

**Course Name:** Chemistry of Natural Products

**Course Number:** 11014117

## General Course Information:

Course title	Chemistry of Natural Products
Course number	11014117
Credit hours	3 Credit hours
Education type	3 hours [Hybrid]
Prerequisites/corequisites	-
Academic Program	Bachelor
Program code	01
Faculty	Faculty of science
Department	Department of Chemistry
Level of course	4st year
Academic year /semester	Second semester 2021/2022
Awarded qualification	BSc degree of chemistry
Other department(s) involved in teaching the course	Faculty of science
Language of instruction	English
Date of production/revision	2021/2022

## Course Coordinator:

Coordinator's name	Dr.Dalia Ali
Office No	330
Office Phone extension number	2729
Office Hours	Su:11-12 Mo: 1-2 Tu:8-9 We:2-3
Email	<a href="mailto:gada.edris@iu.edu.jo">mailto:gada.edris@iu.edu.jo</a> <a href="mailto:Dalia.ali@iu.edu.jo">Dalia.ali@iu.edu.jo</a>

## Course Description (English/Arabic):

English	This course imparts knowledge to students on different active metabolites of natural origin including their biosynthetic pathways, methods of isolation, structural elucidations and their therapeutic uses. The course also covers principles of chromatographic techniques used in the discovery of new drugs from natural sources.
Arabic	مقدمة في المستقلبات النشطة ذات الاصل الطبيعي بما في ذلك مساراتهم الحيوية; طرق العزل; تحديد التركيب الهيكلي لبعض المركبات الكيميائية واستخداماتهم العلاجية; مبادئ التقنيات الكروماتوغرافية المستخدمة في اكتشاف أدوية جديدة من مصادر طبيعية

## Text Book: Author(s), Title, Publisher, Edition, Year, Book website.

Raymond cooper and George Nicola, Natural products chemistry: source, separation and structures, CRC press, 1<sup>st</sup>, 2018

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

Paul M Dewick, Medicinal natural products: A biosynthetic approach, John Wiley and sons, 3<sup>rd</sup>, 2009

**References:** Author(s), Title, Publisher, Edition, Year, Book website.

**Course Educational Objectives (CEOs):**

1.	Study isolation and purification methods of secondary metabolites and predict the suitable method for the isolation of active ingredients in plants
2.	Study the biosynthesis of secondary metabolites and major biosynthetic pathways

**Intended Learning Outcomes (ILO's):**

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	Descriptors**
A	Knowledge and Understanding:				
A1	Identify the difference between natural products class resources	1	2	k	k
B	Intellectual skills:				
B1	Explain the methods of active isolation ingredients in plants.	1,2	3	c	c
B2	Estimate the correct method of biosynthesis and synthesis of natural products	1,2	4	c	c
C	Subject specific skills:				
C1					
C2					
C3					
C4					
D	Transferable skills:				
D1					

**\*Bloom Taxonomy Levels**

Level #	1	2	3	4	5	6
Level Name	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis

**\*\* Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

**Program Learning Outcome (PLOs):**

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (Chemistry) program will demonstrate:	Descriptors**		
	K	S	C

1.	Describe the fundamental scientific principles and theories across the four subfields of chemistry (Organic, inorganic, analytical and physical).	✓		
2.	Identify and confirm chemical compounds structures as well as determine chemical composition	✓		
3.	Establish and concludes mechanisms of physical and chemical processes in addition to the ability of mastering qualitative and quantitative determination			✓
4.	Solve the scientific problems using different mechanisms and procedures based on critical thinking		✓	
5.	Conduct scientific experiments in chemistry			✓
6.	Commitment and interest in lifelong learning, and collaborate effectively with other people in a team			✓
7.	Prepare logical, organized and concise written reports, and oral and poster presentations that effectively communicate chemical content to other scientists.		✓	
8.	Commitment to the ethical principles of chemical research.			✓
9.	Find information about chemistry through databases and information		✓	
10.	Evaluation of calculations in chemistry experiments and information analysis using computer software.			✓
11.	Demonstrate safety laboratory techniques.		✓	

**\*\* Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

**Weekly Schedule** (please choose the type of teaching)

**Face to Face**

**Hybrid (2 Lectures Face – To - Face +1 Lecture Asynchronous)**

**Hybrid (1 Lectures Face – To - Face +1 Lecture Asynchronous)**

**Online (2 Lectures Synchronous +1 lecture Asynchronous)**

Week	First Hour (Synchronous)	Second Hour (Synchronous)	Third Hour (Asynchronous)	Ach. ILOs	Ach. PLOs	Descriptors*
1	Introduction to Natural Products	Introduction to Natural Products	Introduction to Natural Products	A1	2	K
2	Introduction to Natural Products	Introduction to Natural Products	Introduction to Natural Products	A1	2	K
3	Natural products: Extraction and Separation	Natural products: Extraction and Separation	Natural products: Extraction and Separation	A1	2	K
4	Natural products: Extraction and Separation	Natural products: Extraction and Separation	Natural products: Extraction and Separation	A1	2	K
5	Alkaloids	Alkaloids	Alkaloids	B1	3	C
6	Alkaloids	Alkaloids	Alkaloids	B1	3	C
7	Alkaloids	Alkaloids	Alkaloids	B2	4	C
8	Alkaloids	Alkaloids	Alkaloids	B2	4	C
9	Terpenes	Terpenes	Terpenes	B1	3	C

10	Terpenes	Terpenes	Terpenes		B2	4	C
11	Steroides	Steroides	Steroides		B1	3	C
12	Steroides	Steroides	Steroides		B2	4	C
13	Flavnoides	Flavnoides	Flavnoides		B1	3	C
14	Flavnoides	Flavnoides	Flavnoides		B1	4	C
15	Final Exam						

\* K: Knowledge, S: Skills, C: Competency

### Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- (3 hrs online)
- Home works
- Discussion Forums
- Quizzes
- Other Interactive online activities

### Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

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

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **20%**
- Midterm **30%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

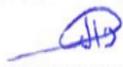
### Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: <https://elearn.iu.edu.jo/>**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

## Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching

## Responsible Persons and their Signatures:

<b>Course Coordinator</b>	Dr. Dalia Ali	<b>Completed Date</b>	6/ 3 / 2022
		<b>Signature</b>	
<b>Received by</b> (Department Head)	Dr. Manal Al Khabas	<b>Received Date</b>	/ /
		<b>Signature</b>	