



## Syllabus: Pharmacognosy and Phytochemistry (#1317031313) Second Semester 2021 /2022

COURSE INFORMATION	
<b>Course Name:</b> Pharmacognosy and Phytochemistry (Dual face-to-face and online education) <b>Semester:</b> First <b>Department:</b> Department of Pharmaceutical Chemistry <b>Faculty:</b> Pharmaceutical Sciences	<b>Course Code:</b> 1317031313 <b>Section:</b> 1 <b>Core Curriculum:</b> 2013 Study Plan
<b>Day(s) and Time(s):</b> to be assigned <b>Classroom:</b> Pharmaceutical Sciences (to be assigned later on)	<b>Credit Hours:</b> 3 <b>Prerequisites:</b> 1317031211
COURSE DESCRIPTION	
<p>Study of basic information on pharmacognosy and medicinal plants regarding classification and identification of their components. Providing information on different naturally occurring secondary metabolites. The course will emphasize the chemical, biological and therapeutic activities of these compounds and the different constituents used in the pharmaceutical industry...</p>	
DELIVERY METHODS	
<p>The course will be delivered through a combination of active and online learning strategies. These will include:</p> <ul style="list-style-type: none"> <li>PowerPoint lectures and active classroom-based discussion</li> <li>Teams recorded lectures</li> <li>Relevant films and documentaries</li> <li>E-learning resources: e-reading assignments and practice quizzes through Model and Microsoft Team</li> </ul>	
FACULTY INFORMATION	
<b>Name</b>	Dr. Rand Shahin

<b>Academic Title:</b>	Assistant Professor
<b>Office Location:</b>	Third Floor
<b>Telephone Number:</b>	Extension: 3442
<b>Email Address:</b>	r.shahin@hu.edu.jo
<b>Office Hours:</b>	Monday 10:30-1:00 Tuesday 10:00-11:00 <i>Please send an e-mail (<a href="mailto:r.shahin@hu.edu.jo">r.shahin@hu.edu.jo</a>) to meet.</i>

## REFERENCES AND LEARNING RESOURCES

### Reading List

1. (textbook) Textbook of Pharmacognosy and Phytochemistry, Shah B. and Seth A., 2010.
2. Trease and Evan Pharmacognosy- 15th edition -2002
3. Pharmacognosy, phytochemistry, medicinal plants- Jean Bruneton, Paris-France 2nd edition.
4. (Website) <http://www.umm.edu/health/medical/altmed>

## STUDENT LEARNING OUTCOMES MATRIX

An alignment matrix of the **program** ILOs of the Bachelor of 'Pharmaceutical Sciences at The Hashemite University, the **course** ILOs and knowledge, skills and competencies as mentioned in the Jordan National Qualifications Framework (JNQF)

Field according to (JNQF)	Required to achieve (according to (JNQF))	Core curriculum learning outcomes	B.Sc. Pharmacy Program ILOs	Course Objectives	Course Student ILOs				Assessment Method
					A	B	C	D	
<b>Knowledge</b>	<p><b>A. Knowledge and Understanding: When students have completed the program they will be able to:</b></p> <p><b>A1.</b> Identify the biological source, morphology, cultivation, collection, drying, packing, storage, natural synthetic pathways, medical as well as non medical uses of medicinal plants, plant secretions, animal and marine products</p> <p><b>A2.</b> Recognize the effect of environmental and processing factors on the quality of crude drugs,</p> <p><b>A3.</b> Students will able to explain the role of natural products as the source of many drugs and pharmaceutical ingredients</p> <p><b>A4.</b> The student should be able to extract drugs from natural sources using different techniques</p> <p><b>A5.</b> Identify the different chemical structures, biosynthetic origin, extraction, characterization, pharmacological action, uses, natural occurrence and distribution for a number of significant phytochemical groups like glycosides; both Phenolic and terpenoidal, different alkaloidal types, tannins, flavonoids and volatile oil</p>	Foundational Knowledge	Learner						Lectures and Videos
<b>Skills</b>	<p><b>B. Essential for Practice and Care (Intellectual Skills):</b> When students have completed the course they will be able to:</p> <p><b>B1.</b> Provide patient-centered care as the medication expert of natural products ( this includes: collecting and interpreting evidence about natural products, in addition to, prioritizing, formulating assessments and recommending,</p>	Essentials for Practice and Care	Approach to Practice and Care	Caregiver Manager Promoter Provider Creative Thinker & Problem-Solver					Lectures and Videos

	<p>implementing, and monitoring medications related to natural products.</p> <p><b>B2.</b> Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness related to medications of natural origin</p> <p><b>B3.</b> Drug-Formulation -Centered Skills- Provide formulator &amp; quality control skills related to drug products of natural origin(collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, and document activities)..</p>		<p>Educator</p> <p>Advocate</p> <p>Collaborator</p> <p>Includer</p> <p>Communicator</p>									
	<p><b>C. Approach to Practice Pharmacy: When students have completed the programme they will be able to:</b></p> <p><b>C1.</b> Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution related to natural products.(<b>Problem solver</b>)</p> <p><b>C2.</b> Patient Advocacy (Advocate) - Assure that patients’ best interests regarding natural drugs and products are represented.</p> <p><b>C3. Educator (Educator)</b> – Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding regarding the natural drugs and products.</p> <p><b>C4. Communication (Communicator)</b> – Effectively communicate verbally and nonverbally when Interacting with an individual, group, or organization especially in the topic of natural drugs and products.</p>											
<b>Competencies</b>	<b>D. Personal and Professional</b>	Personal & Professional	Self-aware									Lectures and Videos



## ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

### **Special Needs Section:**

**Tel:** 00962-5-3903333 **Extension:** 4209

**Location:** Students Affairs Deanship/ Department of Student Welfare Services

**Email:** [amalomoush@hu.edu.jo](mailto:amalomoush@hu.edu.jo)

[amalomoush@staff.hu.edu.jo](mailto:amalomoush@staff.hu.edu.jo)

## COURSE REGULATIONS

### ***Participation***

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student's responsibility to monitor the frequency of their own absences. Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

On average, students need to spend 15 hrs of study and preparation weekly. At the beginning of the lectures, be on time and don't leave before the end of the lecture without an accepted excuse. If you missed a class, it is your responsibility to find out about any announcements or assignments you have missed. For any clarification, please communicate your instructor at her posted office hours or by appointment. Listen well to the lecture, if you have a question, ask your instructor. You will find the course material at the course team after the lecture.

### ***Plagiarism***

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of The Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

- Use of the work, ideas, images or words of someone else without his/her permission or reference to them.
- Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.
- Misrepresentation of the sources that were used.

**The instructor has the right to fail the coursework or deduct marks where plagiarism is detected**

### ***Late or Missed Assignments***

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

### ***Missed Assessments***

In all cases of assessment, students who fails to attend an exam on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a failure grade for this part of the assessment

- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with university regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

### ***Cheating***

Cheating, academic misconduct, fabrication and plagiarism will not be tolerated, and the university policy will be applied. Cheating policy: The participation, the commitment of cheating will lead to applying all following penalties together:

- Failing the subject, he/she cheated at
- Failing the other subjects taken in the same course
- Not allowed to register for the next semester
- The summer semester is not considered as a semester

### ***Student Complaints Policy***

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-

academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

## COURSE ASSESSMENT

### *Course Calendar and Assessment*

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus

Students will be graded through the following means of assessment:

Assessment	Grade Weighting	Deadline Assessment
First Exam	30%	~ 6 <sup>th</sup> week
Second Exam	30%	~ 10 <sup>th</sup> week
Final Exam	40%	~ 15 <sup>th</sup> /16 <sup>th</sup> week

### **Description of Exams**

Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. Exam will consist of a combination of multiple choice, short answer, match, true and false and/or descriptive questions.

**Homework:** Will be given for each chapter, while the chapter in progress you are supposed to work on them continuously and submit in next lecture when I finish the chapter.

You are also expected to work on in-chapter examples, self-tests and representative number of end of chapter problems. The answers of self-tests and end of chapter exercises are given at the end of the book.

**Quizzes:** Unannounced quizzes will be given during or/and at the end of each chapter based upon the previous lectures. It will enforce that you come prepared to the class.

No make-up exams, homework or quizzes will be given. Only documented absences will be considered as per HU guidelines.

### **Description of Exams**

Test questions will predominately come from material presented in the lectures and the lectures themselves. Semester exams may be conducted during the regularly scheduled lecture period. Exam may consist of a combination of multiple choice, short answer, match, true and false, and/or descriptive questions.

No make-up exams will be given. Only documented absences will be considered as per HU guidelines. Make-up exams may be different from regular exams in content and format.



Grades are not negotiable and are awarded according to the following criteria:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

## WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

*“Lecture hours and weeks are approximate and may change as needed”*

Course Contents					
Topics	Topic Details	ILOs	Reference No.	Teaching Procedure	Assessment
Introduction to Pharmacognosy	History, definition, and classification of drugs of natural origin	A1-5 B1-2 C1-4	Ref. 1 : chapters 1, 2, 3 Ref. 2: Chapter 1 and 2	Lecturing,	First exam
Plant morphology	Morphology of different parts of medicinal plants	A1-5 B1-2 C1-4	Ref. 1 : chapters 4,5 Ref. 2: Chapter 1 and 2	Lecturing,	First exam
Herbal drugs processing	Cultivation, collection and processing of herbal drug	A1-5 B1-2 C1-4	Ref. 1 : chapters 6, 7, 8, 9 Ref. 2: Chapter 1 and 2	Lecturing,	First exam
Crude drugs processing	Extraction techniques and quality control of herbal products and drug adulteration	A1-5 B1-2 C1-4	Ref. 1 : chapters 6, 7, 8, 9 Ref. 2: Chapter 1 and 2	Lecturing,	First exam
Photosynthesis and overview of	Photosynthesis and overview of synthetic pathway to plant secondary metabolites:	A1-5 B1-2	Chapter 5	Lecturing,	1 <sup>st</sup> exam

synthetic pathway	<ul style="list-style-type: none"> <li>Acetate-malonate pathway</li> <li>Acetate-mevalonate pathway (mevalonic acid pathway)</li> <li>Shikimic acid pathway</li> <li>Amino acid pathway</li> </ul> <p>A brief about Complex polysaccharides (dextran, starch, cellulose, inulin, gums, mucilage, pectin should be mentioned during these lectures</p>	C1-4			
Acetate-malonate pathway	Acetate-malonate pathway: and synthesis of fatty acids, polyketides, prostaglandins	A1-5 B1-2 C1-4	Chapter 13 and 17	Lecturing,	Second exam
Acetate-Mevalonate pathway and synthesis of Terpenes	(definition, classification, biosynthesis, origin of 5-carbons isoprene unit, head to tail coupling and tail-to-tail coupling of isoprene units); Monoterpenes (definition, biogenesis, natural sources, classification, medicinal and non-medicinal uses). <ul style="list-style-type: none"> <li>Volatile Oils (definition, classifications, natural sources, medicinal and non medicinal uses);</li> <li>Sesquiterpenes (definition, biogenesis, natural sources, classification, pharmacological and toxicological effects).</li> </ul>	A1-5 B1-2 C1-4	Chapter 13	Lecturing,	Second exam
Cont. Acetate-mevalonate pathway	Diterpenes (definition, biogenesis, natural sources & classification); <ul style="list-style-type: none"> <li>Diterpenes pharmacological and toxicological effects</li> <li>Triterpenes (definition, biogenesis, natural sources, classification, pharmacological and toxicological effects).</li> <li>Tetraterpenes</li> </ul>	A1-5 B1-2 C1-4	Chapter 13	Lecturing,	Second exam
Amino acid pathway (Alkaloids)	(definition, classification, distribution in nature, localization, nomenclature, physico-chemical properties, extraction, detection, isolation, purification, biosynthetic origin and pharmacological activities)	A1-5 B1-2 C1-4	Chapter 13 and 15	Lecturing,	Second exam
Cont. Amino acid pathway	(Alkaloids) Quinoline, tropane, pyridine, imidazole and indole alkaloids, isoquinoline, purine, steroidal and proto- alkaloids	A1-5 B1-2 C1-4	Chapter 13 and 15	Lecturing,	2 <sup>nd</sup> exam
Cont. Amino acid pathway	(Alkaloids) Quinoline, tropane, pyridine, imidazole and indole alkaloids, isoquinoline, purine, steroidal and proto- alkaloids	A1-5 B1-2 C1-4	Chapter 13 and 15	Lecturing,	Final exam
Glycosides: Steroidal Glycosides	.; cardiac glycosides (definition, natural sources, classification & structures, SAR, chemical identification of the aglycone and the sugar moiety, therapeutic indication, toxicity and interactions).	A1-5 B1-2 C1-4 D1-2	Chapter 16	Lecturing,	Final exam
Cont. glycosides	Saponins glycosides (definition, natural sources, classification, physical and biological properties)	A1-5 B1-2 C1-4 D1-2	Chapter 16	Lecturing,	Final exam

Flavanoids	Flavanoids	A1-5 B1-2 C1-4 D1-2	miscillinius	Lecturing,	Final exam
Tannins	Tannins		Chapter 20	Lecturing,	Final exam

*Last updated on 20/ 3/ 2022 by : Dr. Rand Omar Shahin*