Syllabus: Pharmacognosy and Phytochemistry (#131703313)
Summer Semester 2024 /2025

COURSE INFORMATION	
Course Name: Pharmacognosy and Phytochemistry **Learning method:** Hybrid learning **Semester:** First **Department:** pharmaceutical chemistry **Faculty:** Pharmaceutical Sciences	**Course Code:** 131703313 **Section:** As per semester **Core Curriculum**: 2019 Study Plan **JNQF Level:** 7
Day(s) and Time(s): According to HU courses timetable/semester **Classroom:** As per semester **Date prepared:** January 2020 **Date updated:** July 2024	**Credit Hours:** 3 **Prerequisites**: 1317031211

COURSE DESCRIPTION

The course is designed to provide the student with the basic information about pharmacognosy & phytochemistry, in terms of nomenclature, taxonomy, monographs, methods for extraction, characterization, detection of active ingredient in medicinal plants, pharmacologically active compounds obtained from natural origin mainly plant origin, secondary metabolites such as alkaloids, cardiac glycosides and anthraquinone glycosides. The chemical structures of these studied phytochemicals will be granted much interest. This course is intended to introduce pharmacy students to the concept of the drugs from natural resources according to their biosynthetic origin. Isolation/identification and the biological activities of the plant constituents of Acetate-malonate pathway, Acetate-mevalonate pathway (mevalonic acid pathway), Shikimic acid pathway and Amino acid pathway. The student has to recognize the classes of compound found in the above pathway and study its main chemical and pharmacological properties, and is expected to be able to relate it to its botanical source, use, toxicity and interactions with other drugs. The course also has a provided the information on different naturally occurring classes of secondary metabolites including flavoniods, fixed oil, glycoside, tannins,alkaloids aand volatile oil

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These include:

- PowerPoint lectures and active classroom-based discussion

Students will be encouraged to participate and be actively involved in the learning process. Lectures will start with questions to inquire about the students' prior knowledge of the topic. These questions will also be repeated at the end of the lecture to gain insight into the students' competences (to verify whether students have understood the topic). During delivering the lecture presentation, time will be given to allow students to reflect about what they have learnt and think in and discuss some examples of short case studies.

- Relevant films and documentaries
- Video lectures
- E-learning resources: e-reading assignments and practice clinical case studies through Model and Microsoft Team

FACULTY INFORMATION

Name	**Dr Dana A. Atoum**
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Office Hours:	**As announced per semester** ***Please send an e-mail (dana.atoum@hu.edu.jo) to meet at any other time.***

REFERENCES AND LEARNING RESOURCES

Required Textbook(s):.

1. Trease and Evan Pharmacognosy- 16th edition -2009
2. Medicinal Natural Products, Third edition; 2009. Paul M. Dewick, Wiley Publication

Recommend textbook and Additional Resources:

3. Pharmacognosy, phytochemistry, medicinal plants- Jean Bruneton, Paris-France 2nd edition.
4. Textbook of Pharmacognosy and Phytochemistry, Shah B. and Seth A., 2010.

Useful Web Resources:

As per each lecture.

COURSE OBJECTIVES

The objectives of this course are:

1. To realize the role of the natural products in discovery of drugs and their application in eradicating ailments and studying the taxonomy of the official naturally occurring crude drugs, the major official references, The course explains the methods used for the production of secondary metabolites in vitro by plant tissue and cell culture which is widely used these days for production of secondary metabolites
2. To explain the various extraction and isolation techniques used in phytochemistry
3. The course will provide the biosynthetic pathways for the formation of the different classes of secondary metabolites; therapeutic and toxicological activities of these substances, chemical ecology of these substances, identification methods of bioactive substances belonging to these pathways and the knowledge of the mechanism of action and structure activity relationship of these constituents is explained

COURSE INTENDED LEARNING OUTCOMES (CILOs)

A. Knowledge and Understanding

A1. 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.

A2. Recognize the effect of the environmental and processing factors on the quality of crude drugs.

A3. Explain the role of natural products as the source of many drugs and pharmaceutical ingredients.

A4. The student should be able to extract drugs from natural sources using different techniques.

A5. 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 oils.

B. Essential for Practice and Care

B1. Provide patient-centered care as a medication expert of natural products (this includes: collecting and interpreting evidence about natural products, in addition to, prioritizing, formulating assessments and recommending, implementing, and monitoring medications related to natural products.

B2. Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness related to mediciations of natural origin.

B3. Drug-Formulation -Centered Skills- Provide formulator & quality control skills related to drug products of natural origin(collect and interpret evidence, prioritize,

formulate assessments and recommendations, implement,and document activities).

C. Approach to Practice Pharmacy

C1. Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution related to natural products **(Problem solver)**.

C2. Patient Advocacy **(Advocate)** - Assure that patients' best interests regarding natural drugs and products are represented.

C3. Educator **(**Educator) – Educate all audiences by determining the most effective and enduring ways.

to impart information and assess understanding regarding the natural drugs and products.

C4. Communication (Communicator) – Effectively communicate verbally and nonverbally when

interacting with an individual, group, or organization especially in the topic of natural drugs and products**.**

D. Personal and Professional Development

D1. Discuss the occurrences of side effects, overdose and interactions with herbal products which occur frequently for which a patient may seek medical care.

D2 Self-awareness (Self-aware) – Examine and reflect on personal knowledge, skills, abilities, believes,

biases, motivation, and emotions that could enhance or limit personal and professional growth regrding his role as a pharmacist and the medication expert in the field of natural drugs and products.

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**
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, students should be on time and should not leave before the end of the lecture without an accepted excuse. **If the student missed a class, it is him/her responsibility to find out about any announcements or assignments they have missed.** For any clarification, students should communicate with their instructor at her posted office hours or by appointment. Students should listen well to the lecture, if anyone has a question, he/she should ask the instructor. Students can find the course material at the course Microsoft team/Model after the lecture.

Sharing of course materials is forbidden. No course material including, but not limited to, course outline, lecture hand-outs, videos, exams, and assignments may be shared online or with anyone outside the class. Any suspected unauthorized sharing of materials, will be reported to the university's Legal Affairs Office. If a student violates this restriction, it could lead to student misconduct procedures.

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

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 disconduct, 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:

Course Assessment Plan

Assessment	Grade Weighting	Deadline Assessment	CILOs			
			A	B	C	D
First Exam	30 %	(3-14/11/2024)	A	B	C	D
Second Exam	30 %	(15-26/12/2024)	A	B	C	D
Quizzes/ Homework/ Assignments /Projects/poster	0%	During the semester			C	D
Final Exam	40 %	(12-23/01/2025)	A	B	C	D

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.

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 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"

Note: For the 2 lecture periods per week (S/T, M/W), one lecture period covers 1.5 lecture hours (75 minutes). The course content specifies chapters of the textbook that will be included in exams.

All lectures are delivered by hybrid learning.

Course Content					
Week Number	**No. of Hours**	**CILOs**	**Subject**	**Delivery Methods**	**Assessment Methods**
1	**3**	A B C	Introduction to Pharmacognosy	Active Classroom-Based Discussions	Exams Quizzes Homework Project

1	**3**	A B C	Herbal drugs processing	PowerPoint Lectures Active Classroom-Based Discussions	Exams Quizzes Homework Project
2	**3**	A B C D	Morphology of different parts of medicinal plants	PowerPoint Lectures Active Classroom-Based Discussions	Exams Quizzes Homework Project
2	**6**	A B C D	A taxonomic Approach to the Study of Medicinal Plants and Animal- Derived Drugs and standardization	PowerPoint Lectures Active Classroom-Based Discussions	Exams Quizzes Homework Project
3	**3**	A B C	Photosynthesis and overview of synthetic pathway	PowerPoint Lectures Online lecture	Exams Quizzes Homework Project
3-4	**4**	A B C	Acetate-malonate pathway -Monoterpenes -synthesis of fatty acid -polyketides -prostaglandins -Volatile Oil	PowerPoint Lectures Active Classroom-Based Discussions	Exams Homework Project
4	**3**	A B C D	Acetate-Mevalonate pathway and synthesis of Terpenes -Sesquiterpenes -Diterpenes -Triterpenes -Tetraterpenes	Active Classroom-Based Discussions	Exams Homework Project
5	**4**	A	Shikimic acid pathway		

	3 **1**	B C D	-phenyl propeyl derivavtive -tannains		
5-6	**12** **3** **3** **3** **3** **2**	A B C D	Amino acid pathway (Alkaloids -definition, classification, distribution in nature -Quinoline, isoquinoline alkaloids -Tropan alkaloids - indole and proto-alkaloids -pyridines, purrolizidines alkaliods	Online lecture PowerPoint Lectures Active Classroom-Based Discussions	Exams Quizzes Homework Project
7	**2**	A B C D	Glycosides: -Saponins glycosides (definition, natural sources, classification, physical and biological properties) -Steroidal Glycosides	PowerPoint Lectures	Exams Quizzes Homework Project
7	**1**	A B C D	Flavonoids	PowerPoint Lectures Active Classroom-Based Discussions	Exams Quizzes Homework Project

8	**-**		**University Final Exams**		