

Jordan University of Science and Technology
Faculty/College of Pharmacy
Department of Department of Medicinal Chemistry and Pharmacognosy

Course Specifications

Title & Instructor	
Course Title	Advanced Chemistry of Natural Products
Course Number	PHAR 575
Prerequisites	Chemistry of Natural Products, Organic Chemistry, Medicinal Chemistry, Biochemistry, and Pharmacology
Course Website	NA
Instructor	Dr Feras Q. Alali; Dr Tamam M. El-Elimat
Office Location	---
Office Phone	----
Office Hours	-----
E-mail	falali@just.edu.jo ; telimat@just.edu.jo

Course Aims and Objectives	
The main aim of this course is to provide students with advanced understanding and knowledge of the chemistry of natural products.	
Objectives	Weights
1) To distinguish between primary versus secondary metabolites	10%
2) To understand the chemical reactions commonly encountered in natural products	10%
3) To comprehend the role of vitamins and co-enzymes in natural products chemistry	10%
4) To understand the most common biosynthetic techniques	20%
5) Given a natural product, students should be able to recognize the primary building blocks	20%
6) Given a natural products, students should be able to recognize the natural product class	15%
7) Given a natural products, students should be able to design a biosynthetic scheme	15%

Course Description
This course covers the basic principles of biosynthesis of natural products. It emphasizes general techniques used in biosynthesis, main chemical reactions and natural drugs examples.

Text Book & References	
Title	Medicinal Natural Products: A Biosynthetic Approach
Author(s)	Paul M. Dewick
Publisher	John Wiley & Sons
Year	2009
Edition	Third
Book Website	http://onlinelibrary.wiley.com/book/10.1002/9780470742761

References	<ul style="list-style-type: none"> - The Biosynthesis of Secondary Metabolites. 2nd ed. (1989) Richard Herbert. - Trease and Evans Pharmacognosy. William C. Evans. 2009, 16th edition, Elsevier.
-------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Intended Student Learning Outcomes (ISLOs)		
Upon successful completion of this course, students should be able to:		
ISLOs	Related Objective(s)	Reference(s)
Build advanced understanding of compounds of natural origin and their contribution to drug discovery and development	1, 3	Chapter 2/ Handouts
To build advanced knowledge about biosynthetic reactions and their mechanisms	2, 7	Chapter 2
Impart an understanding of natural product structures and the way they are put together by living organisms	4	Chapters 3, 4, 5, 6, and 7
Breakdown complicated natural product structures into simpler fragments and building blocks	5	Chapters 3, 4, 5, 6, and 7
Recognize the different structural classes of natural products	6	Chapters 3, 4, 5, 6, and 7

Teaching & Learning Methods
<ul style="list-style-type: none"> - Lectures, open discussion, seminars, and visual aids

Assessment		
Assessment Type	Expected Due Date	Weight
First Exam	-----	25%
Second Exam	-----	25%
Report and Seminar		10%
Final Exam	-----	40

Useful Resources
<ul style="list-style-type: none"> - Class notes and handouts - Catalogue of Life: http://www.catalogueoflife.org/col/ - National Center for Complementary and Integrative Health, National Institutes of Health (NIH). Available online at https://nccih.nih.gov - American Botanical Council: http://abc.herbalgram.org

Course Content		
Week	Topics	Chapter in Text/handouts
1	Introduction: Biogenetic theories and biosynthetic pathways, Primary and secondary metabolites, Techniques for biosynthesis, Stereochemistry and biosynthesis, Reactions of special importance in secondary metabolism, the role of natural products in drug discovery and development.	Chapter 2/ Handouts
2	Polyketides: Fatty acids, prostaglandins, and thromboxanes; simple phenols, erythromycins, and tetracyclines; Miscellaneous polyketides drugs.	Chapter 3

3	Shikimic Acid Pathway: Main pathway leading to aromatic moieties, benzoic acid and cinnamic acid derivatives, coumarin, lignan, neolignan, flavonoid, isoflavonoid, flavonolignan, and terpenoid quinones.	Chapter 4
4	Terpenes and Steroids: Hemiterpenes and Monoterpenes, Sesquiterpenes, Diterpenes, Triterpenes, and Steroids.	Chapter 5
5	Alkaloids: Ornithine and lysine derived, nicotinic acid derived, phenylalanine and tyrosine derived, tryptophan derived, histidine derived, purine derived, and terpenoid derived	Chapter 6

Additional Notes	
Exams	All exams are closed book and notes. The final exam is comprehensive (covers all the material). Incomplete exams need approval from the dean
Cheating	<p>Prohibited; The commitment of the acts of cheating and deceit such as copying during examinations, altering examinations for re-grade, plagiarism of homework assignments, and in any way representing the work of others as your own is dishonest and will not be tolerated. Standard JUST policy will be applied</p> <p>المادة 7: إذا ضُبط الطالب أثناء الامتحان أو الاختبار متلبساً بالغش فتوقع عليه العقوبات التالية مجتمعة أ- اعتباره راسباً في ذلك الامتحان أو الاختبار. ب- الغاء تسجيله في بقية المساقات المسجل لها في ذلك الفصل. ج- فصله من الجامعة لمدة فصل دراسي واحد، و هو الفصل التالي للفصل الذي ضبط فيه.</p>
Attendance	<p>Excellent attendance is expected. JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 10% of the classes that are not excused. If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.</p>
Participation	Excellent participation is expected
Withdraw	Last day of courses withdrawal (without reimbursement of tuition fees) is -----