



# Course Specifications

<b>Course Title:</b>	Chemistry of Natural Products
<b>Course Code:</b>	4024571-2
<b>Program:</b>	Chemistry program
<b>Department:</b>	Chemistry
<b>College:</b>	Faculty of applied science
<b>Institution:</b>	Umm Al-Qura University



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## A. Course Identification

<b>1. Credit hours:</b> 2
<b>2. Course type</b> a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/> b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> 7 <sup>th</sup> level / 4 <sup>rd</sup> year
<b>4. Pre-requisites for this course (if any):</b> Organic reactions and Preparations
<b>5. Co-requisites for this course (if any): not applicable</b>

## 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	100 %
2	Blended	-	-
3	E-learning	-	-
4	Correspondence	-	-
5	Other	-	-

## 7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
<b>Contact Hours</b>		
1	Lecture	30
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify)	-
	<b>Total</b>	<b>30</b>
<b>Other Learning Hours*</b>		
1	Study	30
2	Assignments	8
3	Library	3
4	Projects/Research Essays/Theses	3
5	Others (specify)	20
	<b>Total</b>	<b>64</b>

\* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

## B. Course Objectives and Learning Outcomes

<b>1. Course Description</b> Structural study of different natural products, classification, nomenclature, methods of preparation, study of the various properties and their reactions.
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## 2. Course Main Objective

- By the end of this course the student will be familiar with nomenclature, structure elucidation, general properties and methods of preparation of natural products
- The students will be mentioned to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

## 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge:</b>	
1.1	Recognize the natural abundance of natural products	K3
1.2	Name different natural products classes	K1
1.3	Know the methods of isolation from plants of natural products	K4
1.4	Describe the different methods of extraction of the natural products	K4
1.5	Familiar with the general properties of different natural products and their relation with the molecular structure	K2
1.6	Select the proper method of elucidation of structure of an natural products	K1
1.7	Identify the natural products	K2
1.8	Write a mechanism for a natural product transformation	K5
1.9	Recognize the importance of natural products and their impact on the human body	K5
1.10	Memorize different names of natural products with general structure	K2
1.11	Outline the different uses of natural products	K5
1.12	Study of vitamins. classification, importance and examples of the most famous vitamins	K5
<b>2</b>	<b>Skills :</b>	
2.1	Compare each class of natural products through its structure	S1
2.2	Explain the different strategies for preparation of natural products	S3
2.3	Analyze the reasons for the unique properties in some natural products	S4
2.4	Predict the benefits and harms of various natural products	S5
2.5	Summarize the different methods for the preparation of various natural products	S6
<b>3</b>	<b>Competence:</b>	
3.1	Evaluate the different methods of preparation of natural products	C3
3.2	Demonstrate a synthetic pathways for synthesis of natural products	C4
3.3	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	C4
3.4	Use the computer and the internet to search for sources of new researches and collect the researches which help in writing reports on topics related to syllabus.	C2
3.5	Interpret chemical data	C4
3.6	Present chemical data orally.	C1
3.7	Know how to write a report.	C2

## C. Course Content

No	List of Topics	Contact Hours
1	Definition, classification, nomenclature and Identification of natural products: Terpenoids – Steroids – Alkaloids	3



2	Terpenoids: Introduction and isolation from plants – general structure and nomenclature – classification – general methods of determination of the molecular structures and their preparations.	10
3	Steroids: Introduction and their natural abundance – the difference between steroid compounds – nomenclature – structure elucidation of steroids – methods of preparation of steroids.	10
4	Alkaloids: Introduction and methods of extractions – general properties – classification of alkaloids, structure elucidation of alkaloids and methods of their preparation.	7
<b>Total</b>		

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge</b>		
1.1	Recognize the natural abundance of natural products	Lectures	Exams
1.2	Name different natural products classes	Lectures	Exams
1.3	Know the methods of isolation from plants of natural products	Lectures	Exams
1.4	Describe the different methods of extraction of the natural products	Lectures	Exams
1.5	Familiar with the general properties of different natural products and their relation with the molecular structure	Lectures	Exams
1.6	Select the proper method of elucidation of structure of an natural products	Lectures Library visits	Exams
1.7	Identify the natural products	Lectures	Exams
1.8	Write a mechanism for a natural product transformation	Scientific discussion	web-based student performance systems
1.9	Recognize the importance of natural products and their impact on the human body	Web-based study	long and short essays posters lab manuals
1.10	Memorize different names of natural products with general structure	Lectures	Exams
1.11	Outline the different uses of natural products	Web-based study	Exams
<b>2.0</b>	<b>Skills</b>		
2.1	Compare each class of natural products through its structure	Lectures	Exams
2.2	Explain the different strategies for preparation of natural products	Lectures	Individual and group presentations
2.3	Analyze the reasons for the unique properties in some natural products	Scientific discussion	web-based student performance systems
2.4	Predict the benefits and harms of various natural products	Web-based study	Poster
2.5	Summarize the different methods for the preparation of various natural products	Lectures	Exams
<b>3.0</b>	<b>Competence</b>		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Evaluate the different methods of preparation of natural products	Library visits	Individual and group presentations
3.2	Demonstrate a synthetic pathways for synthesis of natural products	Scientific discussion	Web-based student performance systems
3.3	The ability to conduct a successful style of dealing with data analysis, describing his strategy in the image and draw conclusions from them	Lectures	Web-based student performance systems
3.4	Use the computer and the internet to search for sources of new researches and collect the researches which help in writing reports on topics related to syllabus.	Scientific discussion	Individual and group presentations
3.5	Interpret chemical data	Scientific discussion	Individual and group presentations
3.6	Present chemical data orally.	Scientific discussion	Individual and group presentations
3.7	Know how to write a report.	Scientific discussion	Individual and group presentations

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework or activities.	--	10 %
2	First Periodic Exam.	6	20 %
3	Second Periodic Exam.	12	20 %
8	Final Exam.(2 hours exam)	16	50 %

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

- We have faculty members to provide counseling and advice.
- Office hours: During the working hours weekly.
- Academic Advising for students.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	<ul style="list-style-type: none"> <li>• <u>Raymond Cooper, George Nicola</u> "Natural Products Chemistry : Sources, Separations and Structures, 1<sup>st</sup>Edition" 2014, CRC Press.</li> <li>• <u>Rensheng Xu, Yang Ye, Weimin Zhao</u> "Introduction to Natural Products Chemistry, 1<sup>st</sup>Edition" 2011, CRC Press</li> <li>• <u>Sujata V. Bhat, B.A. Nagasampagi, Meenakshi Sivakumar</u> "Chemistry of natural products , 1<sup>st</sup>Edition" 2005, Springer.</li> </ul>
<b>Essential References Materials</b>	<ul style="list-style-type: none"> <li>• <u>P.M. Dewick</u> "Medicinal Natural Products: A Biosynthetic Approach", 2nd Edition, Wiley &amp; Sons, 2002 and 3rd Edition, Wiley &amp; Sons, 2009.</li> <li>• <u>J. R. Hans Editor E. W. Abel</u> "Natural Products : The Secondary Metabolites" Copyright: 2003.Print ISBN: 978-0-85404-490-0</li> <li>• <u>T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder</u> "Organic Chemistry, 11th Edition, International Student Version" (2013), John Wiley &amp; Sons.</li> </ul>
<b>Electronic Materials</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.chemweb.com">http://www.chemweb.com</a></li> <li>• <a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a></li> <li>• <a href="http://www.rsc.org">http://www.rsc.org</a></li> </ul>
<b>Other Learning Materials</b>	Computer-based programs/CD, professional standards or regulations and software.

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	<ul style="list-style-type: none"> <li>• Classrooms capacity (30) students.</li> <li>• Providing hall of teaching aids including computers and projector.</li> </ul>
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	<ul style="list-style-type: none"> <li>• Room equipped with computer and projector and TV.</li> </ul>
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	<ul style="list-style-type: none"> <li>• No other requirements.</li> </ul>

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students, Faculty, Program Leaders	Complete the questionnaire evaluation of the course in particular.

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Extent of achievement of course learning outcomes	Department Instructor	<ul style="list-style-type: none"> <li>• Observations and the assistance of colleagues.</li> <li>• Independent evaluation for extent to achieve students the standards.</li> <li>• Independent advice of the duties and tasks.</li> </ul>
Improvement of Teaching	Department Instructor	<ul style="list-style-type: none"> <li>• Workshops for teaching methods.</li> <li>• Continuous training of member staff.</li> <li>• Review of strategies proposed.</li> <li>• Providing new tools for learning.</li> <li>• The application of e-learning.</li> <li>• Exchange of experiences internal and external.</li> </ul>
Verifying Standards of Student Achievement	The member teaching staff of a sample of student work	<ul style="list-style-type: none"> <li>• Check marking of a sample of exam papers, or student work.</li> <li>• Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.</li> </ul>
Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.	Department Instructor	<ul style="list-style-type: none"> <li>• Periodic Review of the contents of the syllabus and modify the negatives.</li> <li>• Consult other staff of the course.</li> <li>• Hosting a visiting staff to evaluate of the course.</li> <li>• Workshops for teachers of the course.</li> </ul>



Evaluation Areas/Issues	Evaluators	Evaluation Methods

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

Council / Committee	
Reference No.	
Date	3/3/1441 H

Received by: Dr. Ismail Althagafi

Department Head

Signature:



Date: 20/12/2019

