



## Course Specifications

<b>Course Title:</b>	<b>Plant Secondary Metabolites</b>
<b>Course Code:</b>	<b>2014209-3</b>
<b>Program:</b>	<b>Bachelor in Botany</b>
<b>Department:</b>	<b>Biology Department</b>
<b>College:</b>	<b>College of Sciences</b>
<b>Institution:</b>	<b>Taif University</b>

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## A. Course Identification

<b>1. Credit hours:</b> 3 hr
<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> Level 1 <sup>st</sup> / 1 <sup>st</sup> year
<b>4. Pre-requisites for this course (if any):</b> Plant Hormones (2014109-3)
<b>5. Co-requisites for this course (if any):</b>

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

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	6hr/week	100%
2	Blended		-
3	E-learning		-
4	Distance learning		-
5	Other		-

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	30
2	Laboratory/Studio	30
3	Tutorial	-
4	Others (specify)	-
	<b>Total</b>	<b>60</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course deals with studying the difference between primary and secondary plant products, the metabolic linkage between primary and secondary compounds, factors affecting plant secondary production, principle groups of plant secondary metabolites, as well as biosynthesis, functions and classification of terpenoids, phenolic compounds, alkaloids, glycosides and non-protein amino acids.

## 2. Course Main Objective

The aim of the course is to give the students broad theoretical and practical skills by studying the biosynthesis, accumulation and importance of plant secondary products, recognizing the difference between primary and secondary plant products, describing the metabolic linkage between primary and secondary compounds and explaining factors affecting plant secondary production as well as biosynthesis, functions and classification of terpenoids, phenolic compounds, alkaloids, glycosides and non-protein amino acids.

## 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding</b>	
1.1	Recognize facts, principles and scientific terminology used in studies of plant secondary metabolites.	K1
1.3	Identify technical requirements and routine procedures used to investigate plant secondary metabolites.	K3
<b>2</b>	<b>Skills :</b>	
2.1	Apply different biological concepts related to plant secondary metabolites using professional and academic skills.	S1
2.2	Investigate relatively complex scientific problems, facts and opinions related to plant secondary metabolites.	S2
<b>3</b>	<b>Values:</b>	
3.1	Gain personal and leadership skills needed to achieve individual or group assignments.	V1

## C. Course Content

No	List of Topics	Contact Hours
1	<b>Chapter 1:</b> Introduction and difference between primary and secondary plant products. Metabolic linkage between primary and secondary compounds.	3L 3P
2	Metabolic linkage between primary and secondary compounds.	3L 3P
3	<b>Chapter 2:</b> Factors affecting production of plant secondary compounds. Principle groups of plant secondary compounds.	3L 3P
4	Principle groups of plant secondary compounds.	3L 3P
5	<b>Chapter 3:</b> Biosynthesis, functions and classification of terpenoids.	3L 3P
6	Biosynthesis, functions, classification of phenolic compounds	3L 3P
7	Biosynthesis, functions, classification of alkaloids	3L 3P
8	Biosynthesis, functions, classification of glycosides	3L 3P
9	Biosynthesis, functions, classification of non-protein amino acids.	3L 3P
10	General Revision	3L 3P
<b>Total</b>		<b>30L+30P</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
1.0	<b>Knowledge and Understanding</b>		
1.1	Recognize facts, principles and scientific terminology used in studies of plant secondary metabolites.	Concept maps	Paper-based exams
1.2	Identify technical requirements and routine procedures used to investigate plant secondary metabolites.	Problem solving	Practical reports Practical exam
2.0	<b>Skills</b>		
2.1	Apply different biological concepts related to plant secondary metabolites using professional and academic skills.	Interactive learning	Paper-based exams Practical reports
2.2	Investigate relatively complex scientific problems, facts and opinions related to plant secondary metabolites.	Discovery learning	Paper-based exams Practical reports
3.0	<b>Values</b>		
3.1	Gain personal and leadership skills needed to achieve individual or group assignments.	Brain storming	Assignments

### 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Assignments and activities: 1- Written Assignment Power-point presentation		10
2	Midterm Exam		20
3	Periodic Exam		10
4	Practical Reports	Continuous	15
5	Final Practical Exam		5
6	Final Exam		40

\*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 :**

6 hours per week for academic advice and consultations

Teaching staff is also available using Blackboard web site and Taif University “Edugate” System

## F. Learning Resources and Facilities

## 1. Learning Resources

<b>Required Textbooks</b>	Lixin Zhang and Arnold L. Demain, 2005. Natural Products Drug Discovery and Therapeutic medicine. Humana Press Inc. Harinder P.S. Makkar, P. Siddhuraju, Klaus Becker, 2007. Plant Secondary Metabolites. Humana Press Inc.
<b>Essential References Materials</b>	Plant Physiology and Biochemistry Journals J Med Plant Res J Essential Oil Res
<b>Electronic Materials</b>	Blackboard website Website of Saudi digital Library
<b>Other Learning Materials</b>	Computer-based programs and professional software

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	- Classrooms for 40 students\lecture. - Laboratory for 20 students\ lab activity
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data Show projectors Smart blackboard
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	- Slide projector. - Permanent slides. - Preserved specimens

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Indirect
Quality of learning resources	Program committee Staff members Students	Indirect
Extent of achieving the course learning outcomes	Staff members Students	Direct Indirect

**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

<b>Council / Committee</b>	<b>Biology Department</b>
<b>Reference No.</b>	<b>Committee number 14 - Academic Year 1442-1443H</b>
<b>Date</b>	<b>22\5\2022G – 21\10\1443H</b>