



# Course Specification

— (Bachelor)

Course Title: Recent approaches in analysis of medicinal plants

Course Code: 421 PHG-3

Program: Pharmaceutical Sciences

Department: Pharmacognosy

College: College of Pharmacy

Institution: Najran University

Version: 1

Last Revision Date: 25-12-2023

## Table of Contents

<b>A. General information about the course:</b> .....	3
<b>B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods</b> .....	4
<b>C. Course Content</b> .....	5
<b>D. Students Assessment Activities</b> .....	6
<b>E. Learning Resources and Facilities</b> .....	6
<b>F. Assessment of Course Quality</b> .....	7
<b>G. Specification Approval</b> .....	7



## A. General information about the course:

### 1. Course Identification

1. Credit hours: ( 3 h (2+1)

#### 2. Course type

A. ☐ University ☐ College ☐ Department ☐ Track ☒ Program  
B. ☒ Required ☐ Elective

3. Level/year at which this course is offered: ( Level 7<sup>th</sup> / 4<sup>th</sup> year)

#### 4. Course general Description:

This course provide the students the knowledge about plant constituents (2ry metabolites) origin, structures, extraction, isolation and uses. In addition to knowledge concerning their identification, separation, and analysis with various chromatographic and spectroscopic techniques.

#### 5. Pre-requirements for this course (if any):

Pharmacognosy – 2 (321 PHG-3)

#### 6. Co-requisites for this course (if any):

None

#### 7. Course Main Objective(s):

1. Acquire knowledge about the different classes of plant constituents, their common structural features, and their uses.
2. Acquire knowledge about different extraction procedures and the chromatographic techniques used for isolation.
3. Acquire basic knowledge about different spectroscopic techniques used for structural determination

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4	Distance learning		



### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
Total		60

### B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the classes of plant constituents and their properties.	K3	Lectures laboratory work	1. Written exams 2. Assignments Practical exam
1.2	Recognize the different extraction and chromatographic techniques.	K3	Lectures laboratory work	1. Written exams 2. Assignments Practical exam
2.0	Skills			
2.1	Prescribe drug for disease treatment and control	S3	Lectures laboratory work	1. Written exams 2. Assignments Practical exam
2.2	Interpret simple UV, IR, and NMR spectra for identifying small molecules	S3	Lectures laboratory work	1. Written exams 2. Assignments 3. Practical exam
3.0	Values, autonomy, and responsibility			
3.1	Use properly and confidently the tools and equipments in the biotechnology laboratory following ethics and rules of biotechnology lab. and its safety procedures.	V4	Practice session	1. Observation card 2. Practical Exam



## C. Course Content

No	List of Topics (Theoretical)	Contact Hours
1.	Alkaloids (introduction).	2
2.	Proto-alkaloids	2
3.	Pyridine, Piperidine, pyrrolidine, quinolizidine alkaloids.	2
4.	Tropane, Quinoline, and isoquinoline.	2
5.	- Indole alkaloids. Beta carboline alkaloids	2
6.	- Imidazole Alkaloids - Purine alkaloids	2
7.	- Volatile oils (introduction). - Methods of extraction of volatile oils.	2
8.	- Non-oxygenated V.O. Monoterpenes and Diterpenes, Triterpenes	2
9.	- Oxygenated V.O. (alcohol, phenols, aldehyde, ketones, oxides, peroxides)	2
10.	- Glycosides (introduction). - Simple Phenolics compounds, Cyanogenic, Thioglycosides,	2
11.	- Flavonoids. - Anthracene, and cardiac glycosides, and Tannins.	2
12.	- Chromatography (Introduction, classification, terminology, and mode of chromatographic separation). - TLC and paper chromatography.	2
13.	- Liquid and gas chromatography. Qualitative and quantitative HPLC analysis.	2
14.	- Introduction to structural elucidation, UV, and IR spectroscopy	2
15.	- Introduction to structural elucidation $^1\text{H}$ and $^{13}\text{C}$ NMR, and mass spectrometry	2
Total		30
No	List of Topics (Practical)	Contact Hours
1.	Introduction and identification of the lab content and lab manual	2
2.	Qualitative identification of carbohydrates-mono and disaccharides.	2
3.	Qualitative identification of carbohydrates-polysaccharides.	2
4.	Qualitative identification of anthraquinones and flavonoids	2
5.	Qualitative identification of cardiac glycosides	2
6.	Qualitative identification of tannins and Saponins	2
7.	Qualitative identification of VO	2
8.	Qualitative identification of solanaceous alkaloids	2
9.	Qualitative identification of purine alkaloids	2
10.	Qualitative identification of nux-vomica alkaloids	2
11.	Practical applications of thin layer chromatography and 2-dimensional TLC	2
12.	Separation of colored materials by column chromatography	2
13.	Separation of sugars by paper chromatography	2





14.	Principle HPLC components and methods of elution techniques	2
15.	Practical exam.	2
Total		30

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz-1	4 <sup>th</sup> week	5
2.	Midterm exam	8 <sup>th</sup> week	20
3.	Individual assignments	Weekly	5
4.	Quiz-2	12 <sup>th</sup> week	5
5.	Practical quiz	15 <sup>th</sup> week	5
6.	Observation card in lab	15 <sup>th</sup> week	5
7.	Final practical Exam	15 <sup>th</sup> week	15
8.	Final exam	17 <sup>th</sup> week	40
Total			100

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

## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> <li>- Trease and Evans, Pharmacognosy, T.E, Walis, Pharmacognosy Ashtosh Kar, Pharmacognosy and Pharmacobiotechnology,</li> <li>ii- The Hand Books of Natural Flavonoids; Harborne, J., B. and Baxter, H.; John Wiley &amp; Sons Ltd.(1999).</li> <li>iii- Natural Products Isolation; Canell, R. J. P, Humana Press. (1998).</li> <li>iv- Chromatographic Analysis of pharmaceuticals; Adamovics</li> </ul>
Supportive References	<ul style="list-style-type: none"> <li>1-Trease and Evans, pharmacognosy, 15<sup>th</sup> Ed., Saunders Company, Nottingham, U.K., William Charles Evans.(2003).</li> <li>2- Handout from power point presentation</li> </ul>
Electronic Materials	www.dlaf.nu.edu.sa
Other Learning Materials	<p>Videos and lectures available the webpages</p> <p><a href="https://www.slideshare.net/jelalalaban5/group-4-ppt-44950682">https://www.slideshare.net/jelalalaban5/group-4-ppt-44950682</a></p> <p><a href="https://www.slideshare.net/MarwaFayed1/seeds-52154912">https://www.slideshare.net/MarwaFayed1/seeds-52154912</a></p>

### 2. Required Facilities and equipment





Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	1. A Suitable lecture room equipped with data show, internet, and sufficient number of seats. 2. Suitable laboratories equipped with health and safety tools, internet, and sufficient number of seats.
<b>Technology equipment</b> (projector, smart board, software)	1. Computer 2. Internet access 3. Data show
<b>Other equipment</b> (depending on the nature of the specialty)	1. Water bath 2. TLC 3. Rotavab 4. Sonicator 5. Electronic balance

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Head of department Students	Indirect Questionnaires (indirect)
Effectiveness of Students assessment	Faculty members Students	Indirect Questionnaires (indirect)
Quality of learning resources	Student Peer reviewer	Direct Indirect
The extent to which CLOs have been achieved	Faculty members Students	Direct Questionnaires (indirect)
Other		

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

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>PHARMACOGNOSY DEPARTMENT COUNCIL</b>
<b>REFERENCE NO.</b>	<b>14450612-0511-00010</b>
<b>DATE</b>	<b>25-12-2023</b>

