

## Course specification of Phytochemistry

**University:** University of Benghazi

**Faculty:** Faculty of Pharmacy

**Course title:** Phytochemistry

### Course specification

Program on which the course is given: Bachelor Degree in Pharmaceutical Sciences

Department offering the course: Pharmacognosy

Academic year / Level: Second year

### A- Basic Information

**Title:** Phytochemistry

**Credit Hours:** 4hr/week

**Lecture:** 3hr/week

**Practical:** 3hr/week

**Total:** 6hr/week

### B- Professional Information

#### 1 – Overall aim of course

- Upon successful completion of this course, the students should illustrate the 2ry plant metabolites e.g. (volatile oils, carbohydrates, alkaloids, glycosides, bitter principles, tannins and resins & resin combinations)
- Students should be able to apply this knowledge correctly in phytomedicine.

#### 2 – Intended learning outcomes of course (ILOs)

##### a- Knowledge and understanding:

The student should be able to:

- a1. Give an account on the chemistry, biological activity of volatile oils, carbohydrates, alkaloids, glycosides, bitter principles, tannins and resins.
- a2. Describe the mechanism of action of these biologically active components and their structure activity relationship.
- a3. Recognize or draw the chemical structure of such biologically active compounds.
- a4. Enumerate the physical and chemical properties of active and inactive chemicals (synthetic, biotech or natural) and the effect that these properties have on the design and formulation of medicines.
- a5. Illustrate the concepts of chemistry of biologically active natural products e.g. volatile oils, carbohydrates, alkaloids, glycosides, bitter principles, tannins and resins.

##### b- Intellectual skills

The student should be able to:

- b1. Analyze plant extract and identify their biologically active constituents by different

chemical and physical methods, especially for volatile oils, carbohydrates, alkaloids, glycosides, bitter principles, tannins and resins.

b2. Design and perform chromatographic technique for isolation of volatile oils, carbohydrates, alkaloids, glycosides, bitter principles, tannins and resins from their natural sources.

b3. Select the appropriate methods of isolation, synthesis, purification, identification, and standardization of active substances from different origins.

### c- Professional and practical skills

The student should be able to:

c1. Use and design methods to separate biologically active secondary metabolites from plant extracts.

c2. Perform experiments for the detection of the biologically active secondary metabolites

c3. Analyze herbal drugs for the purpose of using such skill in determining adulteration of herbal drugs, controlling the quality of produced medicinal agents, and discovering new drug entities.

### d- General and transferable skills

The student should be able to:

d1. Work effectively in team.

d2. Demonstrate written and oral communication skills.

d3. Performing online computer search to develop information technology skills and knowing how to retrieve information from a variety of sources.

d4. Keeping up with the pharmaceutical literature and with new developments of the pharmacy profession and pharmaceutical industry and appreciating the need for independent life-long continuing education, starting the day after the student graduates

## 3- Theoretical Contents

	Topic	No. of hours
1-	Volatile oils, Terpenes, Oxygenated terpenes	15
2-	Carbohydrates Introduction, Classification, Biosynthesis, Reactions & Uses	12
3-	Basics of Chromatography	8
4-	Alkaloids, General reactions Phenylalkyl amine, Pyridine, Pyrrolizidine, Piperine, Quinoline Isoquinoline alkaloids, Quinolizidine Tropolone, Purine & Tropane alkaloid	18
5-	Glycosides, Anthracene glycosides, flavonoids Steroidal cardio-active glycosides Terpenoid glycosides, Miscellaneous glycosides	18

6-	Bitter principles	
7-	Tannins	
8-	Isoprenoids	12
	<b>Total</b>	<b>82</b>

#### **4- Teaching and learning methods**

4.1- Lectures (Tools: board, overhead projector, data show).

4.2- Practical Session (Tools: labs.,boards, instruments, chemicals, glasswares, equipments).

4.3- Assignments, seminars, researches and posters.

#### **5- Student assessment methods**

5.1- Written exam(s) **to assess** knowledge, understanding and intellectual skills.

5.2- Practical exam(s) **to assess** practical skills.

5.3- Periodic exam(s) **to assess** understanding and intellectual skills.

#### **Evaluation of assessments**

Periodic Examinations & Mid Term. 20%

Final-Term Written Examination 60%

Practical Examination 20 %

Total 100%

#### **6- List of references**

6.1- Course notes

Lecture and practical notes

6.2- Essential & Recommended books

Trease, G.E.& Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd, 15th ed., 2002.

6.4- Periodicals, Web sites, ... etc

<http://www.pubmed.com>

<http://www.botanical.com>

<http://www.herbmed.com>

#### **7- Facilities required for teaching and learning**

Study halls, Laboratories, equipment, chemicals, glasswares, books, audiovisual tools.

#### **Course coordinator:**

Dr. Fatma Elshibani, Ph.D., Lecturer of Pharmacognosy and Phytochemistry

**Head of Department:** Associate Prof. Salmin Alshalmani

**Date: 09/2018**