PHILADELPHIA UNIVERSITY

Faculty of pharmacy

Department of Pharmaceutical Sciences

Second Semester 2018/2019

COURSE SYLLABUS FOR
PHARMACOGNOSY AND PHYTOCHEMISTRY

Course title: Pharmacognosy and Phytochemistry	**Course code:** 0210221
Course Level: 2nd year	**Course prerequisite (s) and/or co-requisite (s):** Phytochemistry and Pharmacognosy Laboratory **Prerequisite:** Pharmaceutical Organic Chemistry (2) (Course code: 0510210).
Pharmacognosy Lecture Time: **Dr. Yousef Abusamra:** Sun/Tues/Thu: 9.10 – 10 11.10 – 12.00 Mon/Wed: 12.45 – 2.00	**Number of credit hours:** 3

Academic staff:

Name	Rank	Office No. and location	Office hours	E-mail address
Dr. Yousef Abusamra	Assistant professor	**408** Faculty of Nursing – 1st Floor	**Sun/Tues/Thu:** 10.00 – 11.00 12.00- 13.00 **Mon/Wed:** 9.00 -9.45 11.00 – 12.30	yabusamra@philadelphia.edu.jo

Course module description:

The course is designed to provide the student with the basic information about pharmacognosy & phytochemistry, in terms of nomenclature, taxonomy, monographs, quality control, methods for extraction, characterization, detection of active ingredient in medicinal plants, complementary and alternative medicine (CAM), pharmacologically active compounds obtained from natural origin mainly plant origin, secondary metabolites as alkaloids, cardiac glycosides and anthraquinone glycosides. The chemical structures of these studied phytochemicals will be granted much interest. The student has to recognize the chemical structure mostly with its main features, and is expected to be able to relate it to its botanical source, use, toxicity and interactions with other drugs. Special emphasis will be made on those products used in pharmacy as prescription only medicine, controlled drugs and OTC. The course also has a mention of examples of semi-synthetic or synthetic drugs related to naturally occurring drugs, such as opium alkaloids.

Course module objectives:

This course will provide students with the knowledge of:

1- Pharmacognosy including: taxonomy of the official naturally occurring crude drugs, the major official references, The course explains the methods used for the production of secondary metabolites in vitro by plant tissue and cell culture which is widely used these days for production of secondary metabolites
2- The course will provide the biosynthetic pathways for the formation of the above secondary metabolites
3- The knowledge of the mechanism of action and structure activity relationship of these constituents is explained. The therapeutic value and toxicology of these natural constituents is also discussed.

Course / module components Course /module academic calendar:

Week	Basic and support material to be covered
1	**Introduction, definitions: crude drug, advanced crude drug, allopathic medicine, alternative medicine.**
2	**Classification, indigenous and cultivated plants, factors involved in production of plants, official drugs, monographs.**
3	**Quality control**
4	**Tissue culture.**
5	**ALKALOIDS:** Introduction Nomenclature, Classification Physiological significance, Detection, isolation, and Biosynthesis.
6 **FIRST EXAMINATION**	**Amino alkaloids and Biosynthesis:** Ephedrine and pseudo ephedrine, cathine and cathinone, mescaline, muscarine, and colchicine
7	**Pyridine alkaloids and Biosynthesis :** Nicotine, trigonelline, epibatidine **Piperdine alkaloids and Biosythesis :** Coniine, arecoline, lobeline, pelletierine.
8	**Pyrrolizidine alkaloids:** Distribution in the plants and mechanism of hepatotoxicity **Tropane alkaloids and Biosynthesis:** Hyoscyamine and atropine, scopolamine, cocaine.
9	**Quinoline alkaloids and Biosynthesis:** Cinchona alkaloids, campetothecine
10	**Quinolizidine alkaloids and Biosynthesis:** Sparteine, lupine, anagyrine **Isoquinoline alkaloids and Biosynthesis:** Berberine and protoberine
11 **SECOND EXAMINATION**	**Tetrahydroisoquinoline alkaloids:** Emetine and cephaline.
12	**Bisbenzylisoquinoline alkaloids:** Tubocurarine. **Benzophenanthridine alkaloids and Biosynthesis :** Sanguinarine. **Indole alkaloids and Biosynthesis:** Physostigmine, psilocin and psilocybin.
13	**Terpinoid indole alkaloids and Biosynthesis:** Ergot alkaloids, vinca rosea alkaloids, strychnine and brucine from Strychnos

	nux-vomica. **Imidazole alkaloids:** Pilocarpine from, Pilocarpus species.
14	**Diterpene alkaloids:** Taxol from Taxus baccata, aconitine from *Aconitum napellus*.
15	**CARDIAC GLYCOSIDES:** Digitalis, Strophanthus, squill, oleander
16 **FINAL EXAMINATION**	**ANTHRAQUINONES:** Cascara, Rhubarb, Senna, Aloe, Carmine, Hypericin.

Support material (s) (vcs, acs, etc).

- **Study guide (s) (if applicable)**

- **Homework and laboratory guide (s) if (applicable).**

Teaching methods:

- Lectures, discussion groups, tutorials, problem solving, debates, etc.

Assessment instruments:

- **Short reports and/ or presentations, and/ or Short research projects.**
- **Quizzes.**
- **Homework.**
- **Final exam.**

Allocation of marks	
Assessment instruments	**Mark**
First examination	20
Second examination	20
Final examination	40
Reports, research projects, Quizzes, Home, works, Projects	20
Total	**100**

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module references:

Text Books:

1- . Pharmacognosy Trease and Evans. **16th** Edition, **2009**, Published by ELBS, London **ISBN 978-0702029332**

2. Drugs of Natural Origin, **7th** edition **2015** Gunnar Samuelsson

Swedish Pharmaceutical Press , **ISBN 978—91-980942-5-1.**

Reference books:

1. Medicinal natural products, a biosynthetic approach, 3rd edition, 2009 Paul Dewick,
John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom , **ISBN 0 471 49640**

2. Pharmacognosy , phytochemistry, Medicinal Plants. **2nd** edition Jean Bruneton: Springer Verlag, **2008**, **ISBN: 1898298130, 2743000287**

Journals:

1-Phytochemistry
2-Natural Products Research
3-Journal of Phytochemistry
4-Phytoterapia
5-Pharmaceutical Biology

Websites:

1. **Phytochemical** and Ethnobotanical Databases
1. **Phytochemistry** | Research Gate