Jerash University
Faculty of pharmacy
Department of pharmaceutical science
2016/2017

Course Syllabus

Course Title: Pharmacognosy and Phytochemistry	**Course code: 1101217**
Course Level: Second year	**Course prerequisite (s) and/or co requisite (s):** **co requisite: Pharmacognosy and Phytochemistry laboratory:** **prerequisite : Organic chemistry (2) :**
Lecture Time: S+T 08:00 - 09:30	**Credit hours: 3 hours**

Academic Staff Specifics

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Name	Rank	Office Number and Location	Office Hours	E-mail Address
Dr. Abdel Hadi Al Jafari	Doctor	Office (412) Faculty of Pharmacy, Phone (504)	11:00 – 13:00	abdelhadi.aljafari@jpu.edu.jo

Course module description: The course is designed to provide the student basic information about pharmacognosy & phytochemistry: nomenclature, taxonomy, monograph, quality control, method for extraction characterization, detection of active ingredient in medicinal plants, complementary and alternative medicine and medical herbalism, pharmacologically active compound which came from natural origin mainly plant origin, secondary metabolite as glycosides, Phenolic, terpenoidal compound and alkaloid are all discussed in details.

Course module objectives: Pharmacognosy and phytochemistry course provides the basic information on pharmacognosy including: taxonomy of the official naturally occurring crude drugs, the major official references, sources and identification techniques. Crude natural drugs production and processing, the effect of such procedures on the biological activity and quantity of active including cultivation, collection, drying, packing, transporting and storing are discussed. Medicinal uses and choice of extraction method of natural drugs are discussed. In addition, the course discusses the quality control of herbal and other naturally occurring drugs. Student is introduced into the most commonly applied and recognized alternative and complementary therapies (CAM), their principles, efficacies and possible side effects which are necessary for modern pharmacy practice with emphasis on patient counseling and the use of different herbal products in the pharmacy and the choice of CAM.

Phytochemistry part of the course discusses the major pharmaceutically important secondary metabolites from natural sources (Phenolic, steroids, terpenoids glycosides and alkaloids) of pharmaceutical interest. It provides the basic phytochemical knowledge about the natural source, classification, extraction, detection, isolation, pharmacological and toxicological effects. The course extends to the chemistry of natural pesticides as well as drugs of marine origin

Text book:

1. Trease and Evans' Pharmacognosy

By W C Evans, 15th Edition (2002). Saunders; ISBN: 0702026182

2. Complementary Therapies for Pharmacists

By Steven B Kayne (2002). Pharmaceutical Press; ISBN: 0 853694303

3. Pharmacognosy, Phytochemistry, Medicinal plants

By Jean Bruneton (1995), English edition. Levoisier Publishing, Paris; ISBN: 1898298130

In addition to the above, the students will be provided with handouts by the lecturer. The above textbooks cover the course material in detail. However, additional practical tips, examples and conclusions are discussed in details by the lecturer and the student will be responsible for the additional material.

Teaching methods

Lectures, seminar, tutorials, using seminars provided with data show for colored photos and instrument, in addition to case study.

Learning outcomes:

Knowledge and understanding, by the end of this course, students should be able to:

1. Identify the biological source, morphology, cultivation, collection, drying, packing, storage, medical well as non medical uses of medicinal plants, plant secretions, animal and marine products,

2. Recognize the effect of environmental and processing factors on the quality of crude drugs

3. Set up quality control procedures involved in quantitative and qualitative evaluation and detection of adulterants in drugs from natural sources,

4. Extract drugs from natural sources using different techniques,

5. Implement and conduct various chromatographic techniques as a major part of quality control of herbal drugs,

6. Handle and use different types of surgical dressings,

7. Understand and recommend the current trends in complementary and alternative therapies,

8. Use different references for official drugs from natural origins

9. identify the different chemical structures, biosynthetic origin, extraction, characterization, pharmacological action, uses, natural occurrence and distribution for a number of significant phytochemical groups like glycosides; both Phenolic and terpenoidal, different alkaloidal types

Cognitive skills (thinking and analysis):

Interactive learning by participating the student into the lectures content.

- Communication skills (personal and academic).

Review concept at office hours

- Practical and subject specific skills (Transferable Skills).

Doing homework and simple reports.

Assessment instruments

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**20**
Second examination	**20**
Final examination: 50 marks	**40**
Reports, research projects, Quizzes, Home works, Projects	**20**
Total	**100**

Documentation and academic honesty

- Documentation style (with illustrative examples)
- **Taking headlines/notes from the text book with further elaborated/detailed discussion**.
- Avoiding plagiarism.

Course/module academic calendar

week	Basic and support material to be covered
(1)	Introduction to Pharmacognosy and contribution to pharmacy industry Plant nomenclature and taxonomy; Herbal Monographs and official references for natural products..
(2)	Cultivation and collection of crude drugs; Drying, packaging and storing crude drugs; Deterioration of crude drugs, its eradication and prevention, macro- and microscopic identification, therapeutic value, toxicity, contra- indications, drug-herb interactions,
(3)	Extraction techniques; Adulteration and quality control of drugs from natural origin using macro- and microscopic examination, chromatography and spectroscopy.
(4)	Introduction to alternative and complementary therapies
(5)	Herbal Monographs and official references for natural products. Jordanian medicinal plants
(6) First examination	Scope of Phytochemistry; Glycosides (definition, classification, therapeutic value, chemical properties & tests for identification).
(7)	Phenolic Glycosides; Anthraquinone Glycosides (definition, natural sources, classification, relationships of anthraquinone derivatives, extraction, separation, characterization and pharmacological effects).
(8)	Flavonoids (definition, natural sources, classification, biogenesis, extraction, isolation, identification and therapeutic applications)
(9)	Anthocyanins (definition, natural sources, classification, extraction, isolation, identification, therapeutic applications). Coumarins (definition, natural sources,

	classification, biosynthesis, furanocoumrarins and pyranocoumarins pharmacological properties and photo-toxicity);
(10)	Terpenes (definition, classification, biosynthesis, origin of 5-carbons isoprene unit, head to tail coupling and tail-to-tail coupling of isoprene units); Monoterpenes (definition, biogenesis, natural sources, classification, medicinal and non-medicinal uses). Volatile Oils (definition, classifications, natural sources, medicinal and non medicinal uses); Sesquiterpenes (definition, biogenesis, natural sources, classification, pharmacological and toxicological effects).
(11) Second examination	Diterpenes (definition, biogenesis, natural sources & classification); Diterpenes pharmacological and toxicological effects Triterpenes (definition, biogenesis, natural sources, classification, pharmacological and toxicological effects).
(12)	Steroidal Glycosides; cardiac glycosides (definition, natural sources, classification & structures, SAR, chemical identification of the aglycone and the sugar moiety, therapeutic indication, toxicity and interactions).
(13)	Saponins (definition, natural sources, classification, physical and biological properties) Tetraterpenes and Caretonoids (definition, natural sources, biogenesis, classification and therapeutic values).
(14)	Alkaloids (definition, classification, distribution in nature, localization, nomenclature, physico-chemical properties, extraction, detection, isolation, purification, biosynthetic origin and pharmacological activities)
(15) Specimen examination (Optional)	Quinoline, tropane, pyridine, imidazole and indole alkaloids, isoquinoline, purine, steroidal and proto- alkaloids
(16)	**Final Examination**

Expected workload:

On average students need to spend 1 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*: Students will be expected to give the same attention to these references as given to the Module textbook(s)*

1. Herbal Medicines, A Guide for Health Care Professionals

By Carol A. Newal, Linda A. Anderson and J. David Phillipson. (1997). The Pharmaceutical Press, London, UK; ISBN: 0853692890

2. The Complete German Commission E Monographs, Therapeutic Guide to Herbal Medicines

By Mark Blumenthal, Warner R. Busse, Licia Goldberg, Joerg Gruenwald, Tara Hall, Chance E. Riggins and Robert S. Riste, English Edition (1999). American Botanical Council; ISBN: 096555550X

3. Drugs of Natural Origin, A Textbook of Pharmacognosy

By Gunnar Samuelsson (1992), English edition. Swedish Pharmaceutical Press, Stockholm; ISBN: 9186274422