Course specifications of Applied Pharmacognosy

University: Benghazi University

Faculty: Faculty of Pharmacy

Course specifications

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

Department offering the course: Pharmacognosy

Academic year / Level: Third year

A- Basic Information

Title: Applied Pharmacognosy

Credit Hours: 3hr/week

Lecture: 2hr/week

Tutorial: ---------

Practical: 3hr/week

Total: 5hr/week

B- Professional Information

1 – Overall aim of course

- After attending this course the students would be expected to deal with the general principles of quality control of herbal medicine: definitions, documentation, packaging systems, the finished product, the quarantine.
- Students should be able to deal with quality control laboratory scheme including quantitative chromatographic analysis of herbal products, storage, preservation, marker determination, validation and applications of the proposed schemes.
- In addition students will be capable of independently using the different spectroscopic methods to elucidate the structures of pure natural products applying different methods of spectral analysis e.g. UV, IR, Ms and NMR, also the application of GC and HPLC in the analysis of herbal constituents.

2 – Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

The student should be able to:

a1. Give an account on the general principles of quality control, chromatographic analysis of herbal products, storage and preservation of herbal drugs, marker determination, validation and applications of analysis of herbal tea bags.

a2. Describe the application of GC and HPLC in the analysis of herbal constituents.

a3. Recognize the structure of pure active natural products applying different methods of spectral analysis e.g. UV., IR, Ms and NMR.

a4. Implement/Perform standard industrial and/or pharmaceutical instrumentation and laboratory procedures and applying such skill in aromatherapy.

a5. Define Complementary therapies, including herbal therapies.

a6. Enumerate the concepts of chemistry of biologically active natural products viz, carbohydrates, glycosides, tannins, bitter principles, alkaloids, volatile oil and unorganized drugs in addition to principle of chromatography that covers theories and applications in natural product analysis.

a7. Enumerate the principle of Plant cell and tissue culture that covers theories and applications in natural product production.

a8**.** Identify different classes of marine natural products.illustrate the most important biologically active constituents from marine

a9. Identify different classes of tumor inhibitors from natural products clinically use.

a10. Identify different classes of hallucinogenics & drug abuse and methods of detection.

b- Intellectual skills

The student should be able to:

b1. Solve spectroscopic problems of pure natural products.

b2. Design and perform chromatographic technique for isolation of secondary metabolites from their natural sources.

b3. Apply qualitative and quantitative analytical and biological methods for QC and assay of raw materials as well as pharmaceutical preparations.

b4. 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. Analyze herbal mixtures in the lab.

c2. Use the microscope to decide the components of a given unknown herbal mixture is pure or adulterated.

c3. Determine the pharmacopoeial constants of the herbal mixture.

c4. Identify different classes of natural compounds using spectroscopic methods.

c5. apply samples to be analyzed using certain chromatographic techniques GC and HPLC.

c6. structural elucidation of samples by measuring UV absorbance of natural products using the UV spectrophotometer and they analyze it by themselves

c7. Implement/Perform standard industrial and/or pharmaceutical instrumentation and laboratory procedures and applying such skill in quality control of pharmaceuticals. Apply validation aspect effectively.

c8. Analyze herbal drugs for the purpose of using such skill in determining adulteration of herbal dugs, 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-	- Quality Control of Herbal Preparations	6
2-	- Herbal Drug Interactions - Aromatherapy - Phytotherapy	9
3-	- Natural Products & Modern Medicine	4
4-	- Advanced Chromatographic Techniques	8
5-	- Phytochemical Screening - Extraction and Isolation of Active Constituents	8
6-	- Biosynthesis of 2^{ry} metabolites	3
7-	- Plant Cell and Tissue Culture - Plant Biotechnology	10

8-	- Marine Natural Products	6
9-	- Tumor Inhibitors From Plants	4
10-	- Hallucinogenics & Drug Abuse	4
11	- Structural Elucidation of Natural Products	4
12-	- Toxic Plants in Libya	2
	Total	**68**

4– Teaching and learning methods

4.1- Lectures (Tools: board, overhead projector, data show). The lectures were added on the internet site of the faculty to be available to the students all the time as an *e*learning.

4.2- Practical Session (Tools: labs., boards, instruments, chemicals, glassware, equipments). They were allowed to apply samples to the equipments available as the GLC, HPLC and UV spectrophotometers. Examine the runs and analyze the data obtained.

4.3- Assignments, seminars, researches and posters.

5- Student assessment methods

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

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

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

weighting 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 prepared by instructors

6.2- Essential & Recommended books

Trease, G.E. and Evans, W.C.; "Pharmacognosy", W.B. Saunders Publishers, Ltd, 17th ed., 2012.

2D NMR spectroscopy, Silverstein.

6.4- Periodicals, Web sites, … etc

http://www.pubmed.com

7- Facilities required for teaching and learning

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

Course coordinator:

Dr. Salmin Alshalmani, Ph.D., Associate Professor of Pharmacognosy and **Phytochemistry**

Head of Department: Dr. Salmin Alshalmani.

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