

SCHOOL OF HEALTH SCIENCES

UNIVERSITY OF PATRAS SCHOOL OF HEALTH SCIENCES DEPARTMENT OF PHARMACY UNDERGRADUATE STUDIES' COURSES



COURSE DESCRIPTION: PHARMACOGNOSY I COURSE CODE: PHA-C23-NEW

Retrieved from the website of the Department of Pharmacy pharmacy.upatras.gr

PHARMACOGNOSY I COURSE DESCRIPTION

1. GENERAL

SCHOOL	HEALTH SCIENCES				
SEPARTMENT	PHARMACY				
LEVEL OF COURSE	UNDERGRADUATE				
COURSE CODE	PHA-C23-NEW	SEMESTER OF STUDIES 6th		6th	
COURSE TITLE	PHARMACOGNOSY				
INDEPENDENT TEACHING ACTIVITIES		TEACHING HOURS PER WEEK	ECTS CREDITS		
Lectures		4	6		
Laboratory courses			4	0	
COURSE TYPE	Scientific Field course				
PREREQUISITE COURSES:	-				
TEACHING AND ASSESSMENT LANGUAGE:	Greek				
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes [Instructed/Guided self study in english for Erasmus+ Students]				
COURSE WEBPAGE (URL)	http://www.pharmacy.upatras.gr/images/DS/PHA-C23-EN.pdf				

2. LEARNING OUTCOMES

Learning Outcomes

This course aims at acquiring knowledge, skills and competences related to Level 6 of the European Qualifications Framework for Lifelong Learning.

Specifically, upon successful completion of the course, the students are expected to:

- 1. have valid knowledge and comprehension of fundamental principles about Pharmacognosy and Phytotherapy, supported by scientific textbooks and recent data acquired from research in this scientific field.
- 2. know the regulatory framework of market authorization of herbal medicinal products by the European Medicines Agency
- 3. have acquired laboratory skills concerning the basic techniques in the field, like distillation, extraction, isolation and separation techniques, and structure identification.
- 4. possess a deep understanding of the science and can use it in a professional way.
- 5. can inform and consult experts and the general public patients about the herbal medicinal products

General Abilities

• Data and information searching, analysis and combination, using the appropriate technologies and databases

- Team work
- Promotion of free, creative and inductive reasoning
- Work in an interdisciplinary environment
- Exercise of criticism and self-criticism
- Respect to the natural environment

3. COURSE CONTENT

Lectures

Introductory concepts-Herbal drug terminology-Strategies of studying aromatic and medicinal plants (ethnopharmacology, random screening, chemical ecology). Strategies of pharmacognostic research. The contribution of pharmacognosy to drug discovery.

Herbal medicinal products. Regulatory framework of European Medicines Agency. Food supplements: an overview

Secondary metabolism. Basic routes of biosynthesis and categorization of natural products. Carbohydrates (monosaccharides, antibiotics, disaccharides, gums and mucilage, products of sugar reduction, glycosides)-Relevant herbal drugs

Structure, origina and medicinal uses of carbohydrates: monosaccharides and their reduction products, disaccharides, herbal polysaccharides, glycosaminoglycans, gums and mucilages. Characteristic herbal drugs. Plant fibres. Bee products.

Natural Products originating biosynthetically from the shikimic acid pathway

- Tannins: Categorization, structure, isolation-identification. Herbal sources and medicinal uses
- Representative phenylpropanes and phenolic acids/esters: biosynthesis and analytical determination. Main herbal drugs.
- Essential oils: isolation and characterization methods. Biological properties
- Lignans and lignin: biosynthesis and categorization. Representative herbal drugs.
- Coumarins and furanocoumarins: biosynthesis, structure, properties, representative herbal drugs

Natural products originating biosynthetically from the acetic acid pathway. Main biosynthetic pathways.

- Aromatic polyketides
- Lipids and Waxes. Fatty Acids, Triacylglycerols, alkyne derivatives: structure, properties, identification. Plant Oils: nutritional value and medicinal uses.
- Anthraquinones & Flavonoids: biosynthesis, structure, categorization, identification methods, biological properties-medicinal uses, relevant herbal drugs. Kawa pyrones, Rotenone, Macrolides.
- Terpenoid products of the mevalonic acid pathway: monoterpenes, cannabinoids, sesquiterpenes, diterpenes: structure, biosynthesis, chemical and biological properties, medicinal uses, representative herbal drugs.

Laboratory-Experiments

- Unit A: Liquid Chromatography Principles. Separation of aminoacids/bioactive components of analgesic drugs with TLC. Control of Esterification of the aminoacid carboxyl group
- Unit B: Essential Oils. Isolation of eugenol from the cloves with steam distillation and purification with liquid-liquid extraction and rotary evaporation of the final pure product.
- Unit C: Carbohydrates. Isolation of pectin from lemon pericarps. Sugar identification
- Unit D: Flavonoids. Isolation of hesperidine from orange fruit peels. Identification of hesperidine with UV and IR spectroscopy. Hesperidine hydrolysis.
- Unit E: Carotenoid-Chlorophylls. Separation of spinach natural dyes with column chromatography. Fraction collection and identification with chromatographic and spectroscopic techniques.
- Unit F: Presentation of scientific papers on pharmacognosy by groups of few students. Getting acquainted with existing sources of information, evaluation and organization of information

4. TEACHING AND LEARNING METHODS - ASSESSMENT

Teaching method Face to face

Use of information and communication technologies	 The teaching and learning process is supported by the Upatras e- class platform. The teaching material (lectures, tutorials, laboratory experimental protocols) is uploaded and stored on the e-class and it is freely accessible to all students, and their assignments are controled via the system. Teaching process is supported by Information and Communication Technologies (ICTs). 		
Teaching organization	Teaching Method	Semester Workload	
	Lectures	52	
	Laboratory work	15	
	Assignment and oral presentation	20	
	Unsupervised study	63	
	Total number of hours for the Course		
	(25 hours of work-load per ECTS credit)	150	
STUDENT ASSESSMENT	 Assessment language: Greek 1. Assessment of learning laboratory skills and methods of isolation and identification of natural products by oral and written tests during laboratory sessions and final written exams with questions of development, judgment and solving of problems 2. Assessment of the public oral presentation 3. Final Written Exams: Multiple choice questions, short answer questions and matching questions. Grades #1 and #2 count for 40% of the final grade and the rest is calculated from grade #3. 		

5. RECOMMENDED LITERATURE

Suggested Books:

- SAMUELSSON GUNNAR. Medicinal Products of Natural Origin-A textbook of Pharmacognosy. Translated by: Paul Cordopatis, Evy Manessi-Zoupa, George Pairas. Crete University Press, ISBN 978-960-524-015-8
- 2. C. Souleles. Pharmacognosy. Pigasso Editions, 1990
- 3. S. Katsiotis, P. Hantzopoulou. Aromatic Medicinal Plants and Essential oils. Editor: Kyriakidi Bros ISBN: 9604671863
- 4. Jean Bruneton. Pharmacognosy, Phytochemistry, Medicinal Plants, Intercept, 1999, ISBN 9781898298632
- 5. Paul M. Dewick. Medicinal Natural Products: A Biosynthetic Approach, 3rd Edition, John Wiley & Sons, Ltd, 9780470741689
- 6. European Medicines Agency. Herbal Monographs, http://www.ema.europa.eu/ema/index.jsp? curl=pages/medicines/landing/herbal_search.jsp
- 7. Paul Cordopatis & Vassiliki Magafa. Natural Product Isolation and Identification Methodology (Laboratory Guide). Patras University Publications. Patras 2005.

Suggested Journals

- Plant Medica
- Plant Medica Letters
- Journal of Natural Products
- Journal of Ethnopharmacology
- Phytotherapy Research
- Journal of Agricultural and Food Chemistry
- Bioorganic and Medicinal Chemistry
- Medicinal and Aromatic Plants
- Journal of Pharmaceutical and Biomedical analysis
- Journal of Chromatography