



UNIVERSITY OF  
**PATRAS**  
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

DEPARTMENT OF PHARMACY

SCHOOL OF HEALTH SCIENCES

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



COURSE DESCRIPTION: **PHARMACOGNOSY II**  
COURSE CODE: **PHA-D13-NEW**

**PHARMACOGNOSY II  
COURSE DESCRIPTION**

**1. GENERAL**

<b>SCHOOL</b>	HEALTH SCIENCES		
<b>SEPARTMENT</b>	PHARMACY		
<b>LEVEL OF COURSE</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>PHA-D13-NEW</b>	<b>SEMESTER OF STUDIES</b>	<b>7th</b>
<b>COURSE TITLE</b>	PHARMACOGNOSY II		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>	
Lectures	4	8	
Laboratory practice	4		
<b>COURSE TYPE</b>	Scientific Field course		
<b>PREREQUISITE COURSES:</b>	-		
<b>TEACHING AND ASSESSMENT LANGUAGE:</b>	Greek		
<b>THE COURSE IS OFFERED TO ERASMUS STUDENTS</b>	Yes [Instructed/Guided self study in english for Erasmus+ Students]		
<b>COURSE WEBPAGE (URL)</b>	<a href="http://www.pharmacy.upatras.gr/images/DS/PHA-D13-EN.pdf">http://www.pharmacy.upatras.gr/images/DS/PHA-D13-EN.pdf</a>		

**2. LEARNING OUTCOMES**

<b>Learning Outcomes</b>
<p>This course aims at acquiring knowledge, skills and competences related to Level 6 of the European Qualifications Framework for Lifelong Learning.</p> <p>Specifically, upon successful completion of the course, the students are expected to:</p> <ol style="list-style-type: none"> <li>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.</li> <li>2. know the regulatory framework of market authorization of herbal medicinal products by the European Medicines Agency</li> <li>3. have acquired laboratory skills concerning the basic techniques in the field, like distillation, extraction, isolation and separation techniques, and structure identification.</li> <li>4. possess a deep understanding of the science and can use it in a professional way.</li> </ol>
<b>General Abilities</b>
<ul style="list-style-type: none"> <li>• Searching, retrieval, analysis, and synthesis of data and information by use of mainstream technologies and laboratory-experimental tools.</li> </ul>

- 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
- Work in an international environment
- Exercise of criticism and self-criticism
- Respect to the natural environment

### 3. COURSE CONTENT

- Triterpenes, Saponins, Cardiac glycosides
- Tetraterpenes
- Aminoacids. Cardiotoxins, Neurotoxins-Snake Venoms
- Herbal drugs and natural products originating biosynthetically from amino acids -Alkaloids (Protalkaloids, alkaloids Erythropropleum, Pyridine and piperidine, Tropane ones, Pyrrolizidine, Quinolizidine, Isoquinoline, Benzylisoquinoline, bis-benzylisoquinoline ones, indole, ergot, rauwolfia, Strychnos, Catharanthus, Quinoline, Cinchona, Imidazole, Verartum, Solanum, Aconitum).
- Purines (Coffea beans, Tea leaves, Mate, Cola beans, Guarana, Cacao beans).

#### Laboratory courses

##### Unit A: Esters

1. Synthesis of acetic isopentylester
2. Synthesis of salicylic methylester

##### Unit B: Steroids

1. Isolation of cholesterol from gallstones
- 2a. Synthesis of 5 $\alpha$ , 6 $\beta$ -dibromocholesterol
- 2b. Synthesis of cholesterol from 5 $\alpha$ , 6 $\beta$ -dibromo-cholesterol

##### Unit C: Terpenes

1. Reduction of monoterpenes carrying an aldehyde group
2. Oxiadation of menthol to menthone

##### Unit D: Alkaloids

1. Isolation of nicotine from tobacco leaves
2. Isolation of piperine from black pepper
3. Piperine hydrolysis

##### Unit E: Peptides-Enzymes

1. Synthetic preparation of a dipeptide
2. Isolation of emulsion from almonds

##### Unit F: Purines

1. Isolation of caffeine from tea leaves
2. Isolation of caffeine from coffee beans

##### Unit G: Lipoids

1. Hydrolysis of trimyristin
2. Synthetic preparation of azelaic acid

##### Unit H: Natural Product Identification

1. Spectroscopic analysis
2. HPLC analysis of a herbal extract

## 4. TEACHING AND LEARNING METHODS - ASSESSMENT

<b>Teaching method</b>	Face to face	
<b>Use of information and communication technologies</b>	<ul style="list-style-type: none"> <li>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 controlled via the system.</li> </ul>	
	<ul style="list-style-type: none"> <li>Teaching process is supported by Information and Communication Technologies (ICTs).</li> </ul>	
<b>Teaching organization</b>	<b>Teaching Method</b>	<b>Semester Workload</b>
	Lectures	52
	Laboratory work	15
	Assignment and oral presentation	20
	Unsupervised study	113
	<b>Total number of hours for the Course (25 hours of work-load per ECTS credit)</b>	<b>200</b>
<b>STUDENT ASSESSMENT</b>	<p>Assessment language: Greek</p> <ol style="list-style-type: none"> <li>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</li> <li>Assessment of the public oral presentation</li> <li>Final Written Exams: Multiple choice questions, short answer questions and matching questions.</li> </ol> <p>Grades #1 and #2 count for 50% of the final grade and the rest is calculated from grade #3.</p>	

## 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
- C. Souleles. Pharmacognosy. Pigasso Editions, 1990
- S. Katsiotis, P. Hantzopoulou. Aromatic Medicinal Plants and Essential oils. Editor: Kyriakidi Bros ISBN: 9604671863
- Jean Bruneton. Pharmacognosy, Phytochemistry, Medicinal Plants, Intercept, 1999, ISBN 9781898298632
- Paul M. Dewick. Medicinal Natural Products: A Biosynthetic Approach, 3rd Edition, John Wiley & Sons, Ltd, 9780470741689
- European Medicines Agency. Herbal Monographs, [http://www.ema.europa.eu/ema/index.jsp?curl=pages/medicines/landing/herbal\\_search.jsp](http://www.ema.europa.eu/ema/index.jsp?curl=pages/medicines/landing/herbal_search.jsp)
- 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