



UNIVERSITY OF  
**PATRAS**  
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

DEPARTMENT OF PHARMACY

SCHOOL OF HEALTH SCIENCES

UNIVERSITY OF PATRAS  
SCHOOL OF HEALTH SCIENCES  
DEPARTMENT OF PHARMACY  
POSTGRADUATE PROGRAM: **DRUG DESIGN AND DEVELOPMENT**

COURSE TITLE: **NATURAL PRODUCTS IN DRUG DISCOVERY**  
CODE: **DPHA\_A01**

**NATURAL PRODUCTS IN DRUG DISCOVERY  
COURSE OUTLINE**

**1. GENERAL**

<b>SCHOOL</b>	HEALTH SCIENCES		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF PHARMACY		
<b>PARTICIPATING INSTITUTIONS</b>	-		
<b>TITLE of POSTGRADUATE PROGRAM</b>	DRUG DESIGN AND DEVELOPMENT		
<b>LEVEL</b>	POSTGRADUATE		
<b>COURSE CODE</b>	DPHA_A01	<b>SEMESTER</b>	B'
<b>COURSE TITLE</b>	NATURAL PRODUCTS IN DRUG DISCOVERY		
<b>INDEPENDENT TEACHING ACTIVITIES</b>	<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>	
Courses	3	5	
<b>COURSE TYPE</b>	Specialized Background		
<b>PREREQUISITE COURSES</b>	-		
<b>LANGUAGE of INSTRUCTION and EXAMINATIONS</b>	Greek		
<b>COURSE OFFERED to ERASMUS STUDENTS</b>	Yes, with guided self-study in English		
<b>COURSE (URL)</b>	<a href="http://www.pharmacy.upatras.gr/images/DS/DPHA_A01_EN.pdf">http://www.pharmacy.upatras.gr/images/DS/DPHA_A01_EN.pdf</a>		

**2. LEARNING OUTCOMES**

<b>Learning Outcomes</b>
<p>The purpose of this course is to acquaint postgraduate students with state-of-the-art technologies and specialized knowledge regarding the isolation, identification, analysis, preclinical and clinical evaluation of natural products and plant extracts for the purpose of their use in pharmaceutical products as well as with issues of their sustainable production and, finally, regulatory issues, particularly for herbal medicinal products. In summary, students will be aware of cutting-edge issues in the field of Pharmacognosy and, in general, Drug Discovery and Development.</p> <p>Upon successful completion of the course, students will be able:</p> <ol style="list-style-type: none"> <li>1. to critically evaluate the scientific achievements of the field</li> <li>2. to understand how to interact with other scientific fields</li> <li>3. to propose original research approaches</li> </ol>

4. to propose problem-solving strategies in the field of Drug Discovery and Development from natural products
5. to communicate with accuracy and clarity any scientific developments in the field to both specialist and non-specialist audiences.

#### General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working in an international environment
- Respect for the natural environment
- Criticism and self-criticism
- Production of free, creative, and inductive thinking

### 3. SYLLABUS

#### LECTURES

1. The role of traditional healing systems in drug discovery. Study strategies.
2. Natural products as active ingredients of pharmaceutical products.
3. Natural products from plants.
4. Natural products from microorganisms.
5. Natural products from marine organisms.
6. Natural products from other sources.
7. Techniques of extraction, fractionation, and isolation of natural products. Structural characterization. Techniques to avoid repeating the identification of the same natural products (dereplication).
8. Metabolomic approaches to the study of natural raw materials.
9. Biological evaluation approaches for natural products and special problems. Compounds that non-specifically interfere with the bioactivity assay.
10. Extracts and essential oils as medicinal products. Regulatory requirements, quality control. The issues of synergy and competition.
11. Sustainable production techniques of bioactive natural products.

#### STUDENT SEMINARS

The students present cases of natural products that were launched as drugs; everything from the discovery to the final approval.

### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b>	Face to face
<b>USE of INFORMATION and COMMUNICATIONS TECHNOLOGY</b>	<ul style="list-style-type: none"> <li>• Communication with students and learning processes are supported by the Upatras e-class platform.</li> <li>• The teaching process and student self-study are supported by Information and Communication Technologies (ICTs) offered by the Central Library and HEAL-Link .</li> </ul>

<b>TEACHING METHODS</b>	<b>Activity</b>	<b>Semester Workload</b>
	Lectures	39
	Self-study	30
	Seminar Preparation and Presentation by Students (literature search, preparation and oral presentation)	56
	<b>Course Total (25 hours of work-load per ECTS credit)</b>	<b>125</b>
<b>STUDENT PERFORMANCE EVALUATION</b>	Language of Evaluation: Greek / English	
	Written exams <ul style="list-style-type: none"> <li>Multiple choice questionnaires, Short answer questions, matching questions (20% of final grade)</li> </ul>	
	Oral presentation and examination <ul style="list-style-type: none"> <li>(80% of final grade)</li> </ul>	

## 5. RECOMMENDED BIBLIOGRAPHY

### **Related Academic Journals:**

Planta Medica,  
 Planta 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,  
 Fitoterapia,  
 Molecules,  
 Antioxidants.