



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: **CHEMISTRY OF NATURAL PRODUCTS**  
COURSE CODE: **PHA-C15-NEW**

## CHEMISTRY OF NATURAL PRODUCTS COURSE DESCRIPTION

### 1. GENERAL

<b>SCHOOL</b>	HEALTH SCIENCES		
<b>SEPARTMENT</b>	PHARMACY		
<b>LEVEL OF COURSE</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	PHA-C15-NEW	<b>SEMESTER OF STUDIES</b>	5th
<b>COURSE TITLE</b>	CHEMISTRY OF NATURAL PRODUCTS		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>TEACHING HOURS PER WEEK</b>	<b>ECTS CREDITS</b>
Lectures		4	5
<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-C15-EN.pdf">http://www.pharmacy.upatras.gr/images/DS/PHA-C15-EN.pdf</a>		

### 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 Chemistry of Natural Products, supported by scientific textbooks and recent data acquired from research in this scientific field.
2. Understand the strategies of synthesis of natural products and to suggest new ones.
3. Possess a deep understanding of the science and can use it in a professional way.

#### 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

- Introduction to chemistry of natural products
- Stereochemistry: definition, isomerism
- Chemistry and nomenclature of heterocyclic compounds
- Chemistry of amino acids (Properties, Stereochemistry, Methods of chemical synthesis)
- Chemistry of peptides (Introduction to peptide synthesis, Applications of synthetic peptides, Process of synthesizing peptides, *N*-terminal protecting groups, *C*-terminal protecting groups, Side chain protecting groups, Amino acid coupling, Peptide synthesis strategies)
- Chemistry of carbohydrates (Classification of Carbohydrates, Stereoisomers in Carbohydrates, Monosaccharides, Monosaccharide Derivatives, Reactions of Monosaccharides, Oligosaccharides, Polysaccharides)
- Chemistry of nucleic acids (Nomenclature, Structure analysis, Chemical synthesis of nucleic acids)
- Chemistry of terpenoids [The Isoprene Unit, Classification of Terpenes, Monoterpenes (acyclic monoterpenes, monocyclic monoterpenes, bicyclic monoterpenes), Sesquiterpenes, Diterpenes, Triterpens, Tetraterpenes]
- Chemistry of alkaloids (Classification, nomenclature, general properties, general methods for determining structure, stereochemistry, main categories: Phenylethylamine alkaloids, Pyrrolidine alkaloids, Pyridine & Piperidine alkaloids, Pyrrolidine and Pyridine alkaloids, Quinoline alkaloids, Isoquinoline alkaloids., Indole alkaloids, Phenanthrene alkaloids)
- Chemistry of steroids (Steroid Nomenclature, Types, Stereochemistry of steroids, Chemical synthesis)

### 4. TEACHING AND LEARNING METHODS - ASSESSMENT

Teaching method	Face to Face	
Use of information and communication technologies	<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) 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> <li>• Teaching process is supported by Information and Communication Technologies (ICTs).</li> </ul>	
Teaching organization	Teaching Method	Semester Workload
	Lectures	52
	Assignment and short projects	15
	Unsupervised study	58
	<b>Total number of hours for the Course (25 hours of work-load per ECTS credit)</b>	<b>150</b>

<b>STUDENT ASSESSMENT</b>	<p>Assessment language: Greek</p> <ol style="list-style-type: none"> <li>1. Final Written Exams: questions of development, judgment and solving of problems, short answer questions, matching questions.</li> <li>2. Assessment of a short project in the field of chemistry of natural products.</li> </ol> <p>Grade #2 counts for 10% of the final grade and the rest is calculated from grade #1</p>
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## 5. RECOMMENDED LITERATURE

### ***Suggested Books***

1. "Chemistry for Pharmacy Students", S. D. SARKER, L. NAHAR, Edition: 1η/2015, ISBN: 9789605830328, Editor: Parissianos Publications
2. "Organic Chemistry", JOHN McMURRY, Translation to Greek: A. Varvoglis, M. Orfanopoulos, I. Smonou et al, Edition: 4η/2012, ISBN: 9605240548, Editor: Crete University Press
3. "Chemistry of Natural Products", V. Ragoussis, Athens 1996, in greek
4. "Spectroscopy of Organic Compounds", D. Papaioannou, G. Stavropoulos, T. Tsegenidis, in Greek language only, University of Patras Publications Centre, Patras, 2005.
5. Notes of lecturers in Greek.

### ***Suggested Scientific Journals***

- Journal of Organic Chemistry
- Journal of Medicinal Chemistry
- Journal of Natural Products
- Bioorganic and Medicinal Chemistry
- Chemistry of Natural Compounds