



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: **SYNTHETIC ORGANIC CHEMISTRY**  
COURSE CODE: **PHA-B12-NEW**

**SYNTHETIC ORGANIC CHEMISTRY**  
**COURSE DESCRIPTION**

**1. GENERAL**

SCHOOL	HEALTH SCIENCES		
SEPARTMENT	PHARMACY		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	PHA-B12-NEW	SEMESTER OF STUDIES	3rd
COURSE TITLE	SYNTHETIC ORGANIC CHEMISTRY		
INDEPENDENT TEACHING ACTIVITIES		TEACHING HOURS PER WEEK	ECTS CREDITS
Lectures		4	8
Tutorials		2	
Laboratory Course		4	
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)	<a href="http://www.pharmacy.upatras.gr/images/DS/PHA-B12-EN.pdf">http://www.pharmacy.upatras.gr/images/DS/PHA-B12-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. In particular, the present course aims to introduce students to the field of Organic Synthesis, which is related with the synthesis and chemical transformations of organic compounds.

Upon successful completion of the course:

1. The students will be able to present and apply the basic synthetic methodologies for the interconversion of common functional groups, the construction of the carbon skeleton of organic compounds via C-C coupling reactions, as well as the synthesis of cyclic compounds from acyclic precursors/reagents.
2. They will be able to present and apply the basic principles of Organic Synthesis as well as the modern methodologies published in related textbooks and scientific journals.
3. They will be able to combine and apply the acquired knowledge to solve Organic Synthesis problems and suggest syntheses of already known or new bioactive compounds.

4. They will have acquired laboratory skills related to the application of Organic Synthesis techniques for the synthesis of simple organic compounds. Specifically, the students will be trained on how to set up, perform and work up organic reactions (handling of apparatuses and chemical reagents, preparation of anhydrous solvents), on the purification, isolation and identification techniques (distillation, extraction, filtration, thin layer chromatography, column chromatography, recrystallization, melting point determination) as well as on the use of related scientific equipment.
5. They will have acquired abilities to comprehend and solve interdisciplinary problems that involve organic synthesis issues.
6. They will have developed study skills necessary for their further scientific training and professional development

#### General Abilities

Data and information searching, analysis and combination, using the necessary technologies

Independent work

Team-work

Work in an international environment

Work in an interdisciplinary environment

Generation of new research ideas

### 3. COURSE CONTENT

Lectures-Tutorials

- Preparation and interconversion of functional groups
- C-C coupling reactions
- Methods for the synthesis of cyclic compounds

Laboratory course:

- Safety rules and procedures in the Organic Chemistry Laboratory. Glaseware, apparatuses and laboratory equipment, guidelines for keeping records of laboratory work.
- Synthesis of hexan-2-ol from hex-1-ene
- Synthesis of acetanilide
- Synthesis of benzophenone
- Synthesis of caprolactam
- Synthesis of ethyl acetoacetate ethylene acetal
- Aldol condensation of benzaldehyde with acetone

### 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, laboratory experimental protocols) is uploaded and stored on the e-class and it is freely accessible to all students.</li> <li>• Teaching process is supported by Information and Communication Technologies (ICTs).</li> </ul>

TEACHING ORGANIZATION	Teaching Method	Semester Workload
	Lectures	52
	Tutorials	26
	Laboratory work	18
	Private, unsupervised study	104
	<b>Total number of hours for the Course (25 hours of work-load per ECTS credit)</b>	
		<b>200</b>
STUDENT ASSESSMENT	Assessment language: Greek	
	Lectures-Tutorials	
	1) Written exams: Multiple choice questions, matching questions and problem solving (70% of the final grade).	
	Laboratory Course	
	2) Oral and written tests during the laboratory sessions, individual and teamwork laboratory projects and final written exams (multiple choice questions, problem solving) (30% of the final grade).	

## 5. RECOMMENDED LITERATURE

### **Suggested Books:**

1. D. Papaioannou, "*Synthetic Organic chemistry*", in Greek language only, Papazisis Publications, 1995.
2. Anastasios G. Varvoglis, "*Organic Chemistry*", Ziti Pelagia Publications, 2005.
3. J. McMurry, "*Organic Chemistry*", Translation to Greek: A. Varvoglis, M. Orfanopoulos, I. Smonou et al, University of Crete Publications, 2012.
4. Jonathan Clayden, Nick Greeves, Stuart Warren, "*Organic Chemistry*", 2nd Edition, Oxford University Press, 2012.
5. K. C. Nicolaou and E. J. Sorensen, "*Classics in Total Synthesis*", VCH, 1996.
6. S. Nikolaropoulos, "*Synthetic Organic Chemistry Experiments*", (Laboratory Handout).

### **Scientific Journals:**

Angewandte Chemie International Edition,  
 The Journal of Organic Chemistry,  
 Journal of the American Chemical Society,  
 Organic Letters,  
 Chemical Reviews,  
 Tetrahedron  
 Tetrahedron Letters  
 European Journal of Organic Chemistry,  
 Asian Journal of Organic Chemistry,  
 Synthesis,