



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: **MEDICINAL CHEMISTRY I**
COURSE CODE: **PHA-C25-NEW**

**MEDICINAL CHEMISTRY I
COURSE DESCRIPTION**

1. GENERAL

SCHOOL	HEALTH SCIENCES		
SEPARTMENT	PHARMACY		
LEVEL OF COURSE	UNDERGRADUATE		
COURSE CODE	PHA-C25-NEW	SEMESTER OF STUDIES	6th
COURSE TITLE	MEDICINAL CHEMISTRY I		
	INDEPENDENT TEACHING ACTIVITIES	TEACHING HOURS PER WEEK	ECTS CREDITS
	Lectures	5	7
	Tutorias	1	
	Laboratory practice	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)	http://www.pharmacy.upatras.gr/images/DS/PHA-C25-EN.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
<p>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 Medicinal Chemistry, which is related with the discovery, development, identification and synthesis of new bioactive compounds, the study of their metabolism, the interpretation of their mode of action at the molecular level and the construction of structure-activity relationships.</p> <p>Upon successful completion of the course:</p> <ol style="list-style-type: none"> 1. They will have valid knowledge and comprehension of fundamental principles about the discovery and development of new bioactive molecules, which can be used either as therapeutic agents or as chemical biology tools. 2. They will have comprehended how the structural features and physicochemical properties of the new compounds influence their pharmacodynamics and pharmacokinetics. 3. They will have valid knowledge and comprehension of the current approaches applied in the targeted design and discovery of new lead compounds based on the related molecular target information.

4. They will be able to combine and apply the acquired knowledge for solving problems related to molecular design of new candidate bioactive molecules against molecular targets (enzymes, receptors).
5. They will be also able to suggest structural modifications of the new compounds in the context of structure-activity relationship studies for optimizing their pharmacodynamics and pharmacokinetics.
6. They will have valid knowledge and comprehension of the discovery, design, synthesis, metabolism and molecular mode of action of already known therapeutic agents.
7. They will have valid knowledge and comprehension of recent medicinal chemistry research topics, published in relevant textbook and scientific journals.
8. They will have acquired abilities to understand and solve interdisciplinary problems that involve medicinal chemistry issues.
9. 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

- Introduction to drug discovery and development
- Structural features of compounds and pharmacologic activity
- Physicochemical and biopharmaceutical properties of drugs
- Enzymes, receptors, nucleic acids and miscellaneous molecular targets: Design of new bioactive compounds. Case studies in drug discovery
- Pharmacokinetics and drug metabolism.
- Strategies applied in the discovery of new lead compounds (serendipity in drug discovery, chemical modification, screening of compounds, rational drug design)
- Structural modifications strategies to optimize pharmacodynamics and pharmacokinetics
- Design of prodrugs
- Introduction to quantitative structure-activity relationships (QSAR)
- Diuretic drugs
- Antiarrhythmic drugs
- Antihypertensive drugs
- Nitrites and nitrates
- Hypolipidemic agents
- Anticoagulant drugs
- Antacids
- Gastric acid secretion inhibitors

- Cathartic drugs
- Antiemetic drugs

Laboratory course

- Synthesis of acetylosalicylic acid
- Synthesis of benzocaine
- Synthesis of a sulfanilamide derivative
- Synthesis of propranolol
- Synthesis of a phenothiazine derivative
- Synthesis, lipophilicity determination, and QSAR study of chalcone derivatives

4. TEACHING AND LEARNING METHODS - ASSESSMENT

Teaching method	Face to face.												
Use of information and communication technologies	<ul style="list-style-type: none"> • Teaching and learning processes are 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. • Teaching process is supported by Information and Communication Technologies (ICTs). 												
Teaching organization	<table border="0"> <thead> <tr> <th>Teaching Method</th> <th>Semester Workload</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>65</td> </tr> <tr> <td>Tutorials</td> <td>13</td> </tr> <tr> <td>Laboratory work</td> <td>18</td> </tr> <tr> <td>Unsupervised study</td> <td>79</td> </tr> <tr> <td>Total number of hours for the Course (25 hours of work-load per ECTS credit)</td> <td>175</td> </tr> </tbody> </table>	Teaching Method	Semester Workload	Lectures	65	Tutorials	13	Laboratory work	18	Unsupervised study	79	Total number of hours for the Course (25 hours of work-load per ECTS credit)	175
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STUDENT ASSESSMENT	<p>Assessment language: Greek</p> <p>Lectures-Tutorials</p> <ul style="list-style-type: none"> • Written exams: Multiple choice questions, short answer questions, matching questions and problem solving (70% of the final grade). <p>Laboratory Course</p> <ul style="list-style-type: none"> • 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. Graham L. Patrick, "An Introduction to Medicinal Chemistry", 5th Edition, Oxford University Press, 2013.
2. Thomas L. Lemke, David A. Williams, "Foye's Principles of Medicinal Chemistry", 7th Edition, Lippincott Williams and Wilkins, 2012.
3. Richard B. Silverman, "The Organic Chemistry of Drug Design and Drug Action", 3rd Edition Academic Press, 2014.
4. Gareth Thomas, "Medicinal Chemistry: An Introduction", 2nd Edition, Wiley, 2008.

Scientific Journals:

Journal of Medicinal Chemistry
ACS Medicinal Chemistry Letters
European Journal of Medicinal Chemistry
ChemBioChem, ChemMedChem
Bioorganic and Medicinal Chemistry
Bioorganic and Medicinal Chemistry Letters
Angewandte Chemie International Edition
Medicinal Research Reviews