



Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-340	Medicinal Chemistry III/ Φαρμακευτική Χημεία III	5
Prerequisites	Department	Semester
IMPH-240, IMPH-241	Health Sciences	Fall/Spring
Type of Course	Field	Language of Instruction
Compulsory	Pharmacy	Greek/English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Kalyvas Charalambos/Ms Maria Loizou	3 rd
Mode of Delivery	Work Placement	Corequisites
Face-to-Face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

- understand the molecular mechanisms of action of drugs and to educate the future pharmacists in the subject of pharmacology which combines with a targeted manner, chemistry with biology, i.e. the chemical compound with the living system and hence with life itself
- teach the students the pharmacology of the vast group of drugs acting on the Central and Peripheral Nervous System and nonsteroidal analgesics through analysis of drug design, synthesis, physicochemical properties, interactions with the biological target, structure activity relationships, selectivity, pharmacological potency, fate in the body with explanation of toxicity and metabolism

Learning Outcomes:

After completion of the course students are expected to be able to:

- Understand the synthesis of the important drug molecules used for pathologic conditions concerning CNS, Autonomic Nervous System and nonsteroidal analgesics
- Identify the physical and chemical properties of drugs acting on CNS, Autonomic Nervous System and nonsteroidal analgesics and ways to handle them

- Understand the relationship of the structural features with the activity of the corresponding drugs
- Report the mechanism of action of these drugs
- Understand the biotransformations, the selectivity, chemical qualitative and quantitative methods and interactions of these groups of drugs with other drugs and their contraindications
- List characteristic molecules used illegally as narcotic and addictive agents, from the pharmacochemical point of view

Course Content:

Synthetic strategy, origin-isolation, structure clarification, analysis, molecular mechanism of action, structure-activity relationships, selectivity, pharmacochemical activity, fate in the organism and metabolism, examples of quantification and chemical identification of the following groups of drugs:

- Agents acting on the central nervous system, such as anticonvulsants, drugs used in Parkinson's disease and Alzheimer's disease, antipsychotics, antidepressants, anxiolytics and hypnotics, stimulants
- Analeptics - Agonists/antagonists of Adenosine
- Methylphenidate and analogues
- Opioids and relevant drugs
- Cannabinoids
- General and topical anesthetics
- Acetylcholine agonists, acetylcholinesterase inhibitors, anti-alzheimer, hybrid molecules, acetylcholine antagonists (in parasympathetic postganglionic neurons, in neuromuscular synapses, in the autonomic ganglia)
- NSAIDs and selective lipoxygenase inhibitors, drugs for the treatment of rheumatoid arthritis (DMADs), anti-gout and anti-migraine drugs
- Platelet aggregation inhibitors, coumarin anticoagulants as vitamin K antagonists
- Statins
- Anticancer drugs & supportive treatment during chemotherapy
- Inhibitors of adenylyl cyclase inhibitors of PDEs

Laboratory work:

Laboratory 1: Synthesis of tetraethylammonium iodide and triethylammonium chloride

Laboratory 2: Synthesis of Benzocaine (Step 1)

Laboratory 3: Synthesis of Benzocaine (Step 2)
Laboratory 4: Synthesis of Benzocaine (Step 3)
Laboratory 5: Synthesis of Phenytoin (Step 1)
Laboratory 6: Synthesis of Phenytoin (Step 2)
Laboratory 7: Synthesis of 10-(2-cyanoethyl)phenothiazine
Laboratory 8: Synthesis of Barbituric acid
Laboratory 9: Synthesis of Warfarin

Learning Activities and Teaching Methods:

Lectures, class discussion, examples and tutorials, laboratory exercises

Assessment Methods:

Final exam, Midterm exam, Lab reports and exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Foyes Principles in Medicinal Chemistry	T. Lemke	Wolters Kluwer	2008	978-0-7817- 6879-5
An Introduction to Medicinal Chemistry	Graham Patrick	Oxford University Press	2009	978-0-19- 969739-7

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Organic, Medicinal and Pharmaceutical Chemistry	J.M. Beale; J.H. Block	Wolters Kluwer	2011	978-0-7817- 7929-6

Pharmaceutical Chemistry Organic, Vol.2	G.R. Chatwal; M. Arora	Himalaya Publishers	2008	EBOOK 978-1-28-280194-3
Textbook of Medicinal Chemistry, Vol.1	V. Alagarsamy	Elsevier	2010	978-81-312-2189-1
Textbook of Medicinal Chemistry, Vol.2	V. Alagarsamy	Elsevier	2010	978-81-312-2190-7
Fundamentals in Medicinal Chemistry	Gareth Thomas	John Wiley & Sons Editions	2003	0-470 84307 1
Principles of Organic Medicinal Chemistry	Nadendla, Rama Rao	New Age		E-BOOK