



Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-240	Medicinal Chemistry I/ Φαρμακευτική Χημεία I	6
Prerequisites	Department	Semester
IMPH-150, IMPH-151	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 Pyrkotis Constantina/Dr Myrallai Styliana/Ms Loizou Maria	2 nd
Mode of Delivery	Work Placement	Corequisites
Face-to-Face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

- understand functional group chemistry in the context of drug activity
- understand the structure-activity relationship of organic molecules, including heterocycles, in relation to their pharmaceutical applications
- understand how stereochemical factors and small molecule/macromolecule interactions affect pharmacological activity
- study the important inorganic compounds that are useful in Pharmacy
- study the periodic system of elements in relation to their chemical, biologic and toxicological properties
- study the bioinorganic active compounds
- understand the pharmaceutical chemistry of vitamins

Learning Outcomes:

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

- understand aspects of the synthesis and reactivity of organic molecules of pharmaceutical interest

- identify the general properties of drug molecules. In particular, the role of various chemical bonds and groups in the action of drugs and the selectivity
- Recognize the phenomenon of metabolism and its effects on the activity and toxicity of drugs
- understand the function, importance and use of vitamins
- understand the concept of inorganic drug and recognize the chemical properties and biological role as well as the composition, purity control identification, mechanism of action at the molecular level, drug use and adverse events

Course Content:

Chemical bonding, properties of drug molecules and drug action: covalent, covalent bond, hydrogen bond, van der Waals forces, lipophilic interactions. Selectivity principles based on differences in morphology, biochemistry and distribution

Introduction to Functional Groups in Medicinal Chemistry: physicochemical properties, reactivity, stability in vitro and in vivo conditions, metabolism, isosterism

Introduction to the chemistry of vitamins. Classification and study of the aliphatic vitamins (ascorbic acid, pantothenic acid), alicyclic vitamins (inositol, retinol, vitamin D), aromatic vitamins (vitamins K, dicumarol, p-aminobenzoic acid), heterocyclic vitamins (vitamin E, lipoic acid, nicotinic acid, nicotinamide, pyridoxine hydrochloride, thiamine, folic acid, biotin, riboflavin, cyanocobalamin). Studying the composition, their general characteristics, how to identify and quantify them, and their importance in health, uses, hypervitaminosis, hypovitaminosis, avitaminosis and their antagonists

Pharmacological and toxicological activity, metal – metalloid, non-metals, inorganic compounds of pharmaceutical interest: composition / origin/ synthesis, authentication - purity - content, properties, mechanism of action, uses, adverse chemical reactions and interpretation thereof

Bioinorganic Medicinal Chemistry: Coordination compounds with pharmaceutical use

Laboratory Exercises

Laboratory 1: Detection of organic functional groups

Laboratory 2: Detection of S, N, Cl in organic compounds

Laboratory 3: Determination of ascorbic acid

Laboratory 4: Determination of free iodine and sodium iodide in iodine tincture

Laboratory 5: Synthesis of boric acid

Laboratory 6: Determination of boric acid

Laboratory 7: Determination of iron sulfate (II)

Laboratory 8: Determination of zinc

Laboratory 9: Reactions of penicillamine with bivalent copper

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
Οργανική Φαρμακευτική Χημεία Βιταμίνες	Αθηνά Γερονικάκη	Εκδόσεις Σύγχρονη Παιδεία	2012	978-960-357- 013-3
Review of Organic Functional Groups: Introduction to Medicinal Organic Chemistry	Thomas L. Lemke	Lippincott Williams & Wilkins Press	2012	978-1-60831- 016-6

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Ανόργανη Φαρμακευτική Χημεία	Αθηνά Γερονικάκη	Εκδόσεις Σύγχρονη Παιδεία	2008	960-357-014-1
Κεφάλαια Βιοανόργανου Φαρμακοχημεία	Ε. Χιωτέλης, Δ. Παπαγιαννοπούλου	Εκδόσεις Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης	2015	E-Book

The organic Chemistry of Drug Design and Drug Action, 2nd edition	Richard B. Silverman	Elsevier Academic Press	2004	E-Book 978-0126437324
Medicinal Chemistry: An Introduction, 2 nd Edition	Gareth Thomas	Wiley	2008	E-Book 978-0-470-02598-7
Organic Chemistry Concepts and Applications for Medicinal Chemistry	Joseph E. Rice	Academic Press	2014	E-Book 9780128008324
Essentials of Pharmaceutical Chemistry, 4th Revised edition edition	Donald Cairns	Pharmaceutical Press	2012	978-0853699798
Basic Concepts in Medicinal Chemistry	Marc Harrold, Robin Zavod	American Society of Health System Pharmacists	2013	978-1585282661
An Introduction to Medicinal Chemistry	Graham Patrick	Oxford University Press	2013	978-0-19-969739-7
Fundamentals of Medicinal Chemistry	Gareth Thomas	John Wiley & Sons Editions	2003	0-470 84307 1
Pharmaceutical Chemistry 1: Inorganic	G.R. Chatwal; M. Arora	Himalaya Publishers	2010	978-81-84884-63-0

Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry	J.M. Beale; J.H. Block	Lippincott Williams & Wilkins Press	2011	978-0-7817- 7929-6
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