



UNIVERSITY OF
PATRAS
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ

DEPARTMENT OF PHARMACY

SCHOOL OF HEALTH SCIENCES

UNIVERSITY OF PATRAS
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF PHARMACY
POSTGRADUATE PROGRAM: **NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)**

COURSE TITLE: INTRODUCTION IN PHARMACEUTICAL SCIENCES
CODE:HG4_NM0

NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)
COURSE OUTLINE

1. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	DEPARTMENT OF PHARMACY		
PARTICIPATING INSTITUTIONS	-		
TITLE of POSTGRADUATE PROGRAM	NANOMEDICINES FOR DRUG DELIVERY- NANOMED (EMJMD)		
LEVEL	POSTGRADUATE		
COURSE CODE	HG4_NM0	SEMESTER	A'
COURSE TITLE	INTRODUCTION IN PHARMACEUTICAL SCIENCES		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
Courses	2	3	
COURSE TYPE	General Background knowledge (Basic Biology and Basic Chemistry)		
PREREQUISITE COURSES	None		
LANGUAGE of INSTRUCTION and EXAMINATIONS	ENGLISH		
COURSE OFFERED to ERASMUS STUDENTS	THIS IS ALREADY AN EMJMD PROGRAM COURSE		
COURSSE (URL)	https://www.pharmacy.upatras.gr/images/DS/Nano-Med/HG4_NM00.pdf		

2. LEARNING OUTCOMES

Learning Outcomes
<p>Upon successful course completion, students will acquire knowledge, skills and abilities related to level 7 of the European Qualifications Framework for Lifelong Learning. This course is a basic course for harmonization of the selected students according to their undergraduate degree background. Since the Nanomed program is open for students of different backgrounds, such as Pharmacy, Chemistry, Biochemistry, Engineering, Biology, Nontechnology etc. Students select the appropriate course that is required to complement their background and make it easier for them to understand and successfully follow the following courses. Basic Chemistry course are organized by the Université Paris Cité , and Basic Biology/Biopharmaceutics are organized by the University of Patras.</p> <p>In particular, students will:</p> <ol style="list-style-type: none"> 1. understand the basic concepts of Biology in order to understand interactions between nanoparticles and biological media, as well as interactions between NP's and cells.

2. understand basic concepts of drug absorption, bioavailability and pharmacokinetic, in order for students from other disciplines to be able to follow the next courses
3. acquire basic chemistry background, and in particular basic Organic chemistry (chemical reactions), basic Physical chemistry (theory of dispersion systems, stability etc), and Analytical chemistry (methods for drug detection in formulations and biological media).

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team Work
- Decision-making
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking
- Adapting to new situations

3. SYLLABUS

Basic Chemistry Course

1. Introduction- Scope of Course and Learning outcomes
2. Organic chemistry (reactions, structure of organic compounds etc.)
 - a. Thiol-ene Micheal addition reaction
 - b. Click chemistry
 - c. Cycloaddition
3. Physical chemistry (basic concepts, Flux, Kinetics)
 - a. liquid forms,
 - b. Multi-component solid forms,
 - c. Physical chemistry of pharmaceutical compounds,
 - d. Single-component solid forms
4. Analytical chemistry (basic methods for drug detection, UV-VIS, Fluorescence, etc. Elisa methods etc.)
 - a. Separative methods,
 - b. Liquid chromatography
 - c. Gas chromatography

Basic Biology/Biopharmaceutics

1. Cells
 - a. Types of Cells,
 - b. Characteristics, C
 - c. Components,
 - d. Intracellular organelles structure and function
2. Cellular and biological membranes:
 - a. Components
 - b. Structure and functions

3. Interaction of drugs and Nanos with cells
 - a. uptake, binding, endocytosis, transcytosis
 - b. Mechanisms, and requirements
4. Biopharmaceutics
 - a. ADME of drugs
 - b. Basic Biopharmaceutical concepts
 - c. Drug classification
5. Introduction to Bioavailability
 - a. Per os administration - physiological factor considerations effect;
 - b. Effect of formulation type
 - c. Other routes of administration - physiological factor considerations /types of formulations
6. Basic Pharmacokinetics
 - a. Non compartmental analysis
 - b. Bioavailability and Bioequivalence

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face										
USE of INFORMATION and COMMUNICATIONS TECHNOLOGY	<ul style="list-style-type: none"> • Use of ICT - e-class platform • Communication with students 										
TEACHING METHODS	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><i>Activity</i></th> <th style="text-align: right;"><i>Semester Workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: right;">30</td> </tr> <tr> <td>Directed self study</td> <td style="text-align: right;">15</td> </tr> <tr> <td>non-directed Self Study</td> <td style="text-align: right;">30</td> </tr> <tr> <td>Course Total (25 hours of work-load per ECTS credit)</td> <td style="text-align: right;">75</td> </tr> </tbody> </table>	<i>Activity</i>	<i>Semester Workload</i>	Lectures	30	Directed self study	15	non-directed Self Study	30	Course Total (25 hours of work-load per ECTS credit)	75
<i>Activity</i>	<i>Semester Workload</i>										
Lectures	30										
Directed self study	15										
non-directed Self Study	30										
Course Total (25 hours of work-load per ECTS credit)	75										
STUDENT PERFORMANCE EVALUATION	<p>Language of Evaluation: English</p> <p>Written exams</p> <ul style="list-style-type: none"> • Multiple choice questionnaires, Short answer questions, Open ended questions (100% of final grade) 										

5. RECOMMENDED BIBLIOGRAPHY

Suggested Bibliography:

1. Clayden, Jonathan, Nick Greeves, and Stuart Warren. 2012. Organic Chemistry. 2nd ed. London, England: Oxford University Press.
2. Graham L. Patrick, "An Introduction to Medicinal Chemistry", 5th Edition, Oxford University Press, 2013.
3. Atkins, P., Paula, J. d. (2010). Atkins' Physical Chemistry. United Kingdom: OUP Oxford.
4. Kuhn, H., Försterling, H., Waldeck, D. H. (2009). Principles of physical chemistry. United Kingdom: Wiley.
5. Soffiantini, V. A. (2021). Analytical Chemistry: Principles and Practice. Germany: De Gruyter.
6. Robinson, J. W., Skelly Frame, E. M., Frame II, G. M. (2021). Instrumental Analytical Chemistry: An Introduction. United States: CRC Press.
7. Wanjie, A. (2013). The Basics of Cell Biology. United States: Rosen Publishing Group.
8. Pollard, T. D., Earnshaw, W. C., Lippincott-Schwartz, J., Johnson, G. T. (2017). Cell Biology. Netherlands: Elsevier.
9. Kar, A. (2010). Essentials of Biopharmaceutics and Pharmacokinetics - E-Book. India: Elsevier Health Sciences.
10. Biopharmaceutics and Clinical Pharmacokinetics: An Introduction, Fourth Edition,. (2017). United States: CRC Press.

Related Academic Journals:

Journal of Medicinal Chemistry
European Journal of Medicinal Chemistry
Journal of Analytical Chemistry
J. Colloid and Interphase Sciences
Colloids and Surfaces A and B
Pharmaceutical Sciences
European Journal of Pharmaceutical Sciences