



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
PHAR-451E	Αρχ. Φαρμ. Βιοτεχνολογίας & Φαρμακογυνιδίων/ Introduction to Pharmaceutical Biotechnology and Pharmacogenomics	5
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
BIOL-123E	Life and Health Sciences	Fall/Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Compulsory	Pharmacy	Greek/English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Galatou Eleftheria	4
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-Face	N/A	N/A

### Course Objectives:

The main objectives of the course are to:

- Give students an understanding of the principles of human genetics and genomics as they apply to improving the problems in drug therapy optimization and patient care, thus providing basic understanding of discipline of pharmacogenomics.
- Give students an understanding of the genetic basis of variability in drug response can contribute to drug efficacy and toxicity, adverse drug reactions and drug-drug interaction. As such, pharmacists need a thorough understanding of the genetic component of patient variability to deliver effective individualized pharmaceutical care.
- Enable pharmacy students to better understand and manage the new genomics based diagnostic tools as they become available as well as make best treatment choices.

### Learning Outcomes:

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

- Explain the basic principles of human genetics and heredity as they apply to inter-individual variation in treatment response
- Apply the principles of molecular and cellular biology to explain the genetic basis of variability in drug response.
- Outline how genetic variability in genes encoding drug metabolizing enzymes, drug transporting proteins, and drug receptors (targets) can contribute to variability in drug

disposition and action, leading to changes in pharmacokinetics, pharmacodynamics, and clinical outcome

- Understand the impact of Pharmacogenomics in different therapeutic areas. Discuss case studies reporting the clinical consequences of pharmacogenomics on therapeutic efficacy or toxicity.
- Apply pharmacogenomic concepts to a particular drug therapy to solve relevant problems in pharmaceutical care
- Recognize the societal and ethical implications of genetic testing and the resultant individualization of drug therapy.
- Summarize the current and future literature in the area of pharmacogenomics
- Identify key sources and reliable databases with pharmacogenomics knowledge base

### Course Content:

- Introduction to pharmaceutical biotechnology and pharmacogenomics
- Pharmacological and pharmacogenomics approaches to improve drug delivery clinical outcomes
- Genetic polymorphism of CYP isoenzymes and drug transporters
- Advancements in molecular pharmacology, informatics, nanotechnology and genomics for the new drug development era
- New pharmacological classes of drugs (antibodies, antisense RNAs, siRNAs, aptamers)
- Personalized medicine and drug prescription
- Pharmacology and pharmacogenomics of cardiovascular system
- Clinical pharmacogenomics and drug interactions; Practical utility of various pharmacogenomics resources in the clinical setting
- Protein drugs and the development of biotherapeutics
- Pharmaceutical biotechnology of monoclonal antibodies (mAbs); Pharmacodynamics and pharmacokinetics of mAbs; Pharmacogenomics of mAbs
- Development of new innovative molecularly-targeted cancer therapeutics; Cancer pharmacogenomics and biotherapeutics
- *Examples of drugs related to the pharmacogenomics application in clinical practice:* a) Pharmacodynamics- and pharmacogenomics-guided warfarin dosing in individual patients; b) Pharmacological assessment of tamoxifen-paroxetine interaction and pharmacogenomics of tamoxifen in oncology; c) Thiopurine drugs and pharmacogenomics of TPMT enzyme in guiding dosage schemes; d) Pharmacogenomics of antidepressant and psychotropic drugs; e) Pharmacogenomics of Cetuximab and Panituximab. Recombinant Coagulation Factors and Thrombolytic Agents, Recombinant Human Deoxyribonuclease I, Hematopoietic Growth Factors: Focus on Erythropoiesis-Stimulating Agents, Interferons and Interleukins, Vaccines, Gene Therapy, Stem Cell Technology.

### Learning Activities and Teaching Methods:

Lecture presentations; Computer-assisted learning through application of specific drug-related databases; Tutorials; and Discussion of specific drug-related pharmaceutical biotechnology/pharmacogenomics cases of clinical relevance.

**Assessment Methods:**

Final exam, Midterm exam, course work
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**Required Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Pharmaceutical Biotechnology: Concepts and Applications.	Gary Walsh	John Wiley & Sons: West Sussex.	2007	978-0470012451
Pharmaceutical Biotechnology: Fundamentals and Applications.	Daan J. A. Crommelin, Robert D. Sindelar, Bernd Meibohm	Informa Healthcare: New York.	2008	9781420044386
Pharmacogenomics: The Search for Individualized Therapies.	J. Licinio and M.-L. Wong	Wiley-Blackwell	2009	978-3-527-61630-5