UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Course Code	Course Title	Credits (ECTS)
PHAR451	Introduction to Pharmaceutical Biotechnology and Pharmacogenomics/ Αρχές Φαρμακευτικής Βιοτεχνολογίας και Φαρμακογωνιδιωματικής	5
Department	**Semester**	**Prerequisites**
Life & Health Sciences	Fall	BIOL-123, PHAR-215
Type of Course	**Field**	**Language of Instruction**
Required	Pharmacy	Greek/English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	4th year	
Mode of Delivery	**Work Placement**	**Co-requisites**
face-to-face	N/A	None

Objectives of the Course:

It is most likely that in coming years personalized medicine will revolutionize the practice of medical disciplines by offering efficacious pharmacotherapy guided by the genetic variants in individual patient. The goal of the course is 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. 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. Understanding of the basics of pharmacogenomics will 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. We understand that today pharmacogenomics has a modest impact on day to day practice at this time. However, the principals covered in this course will soon become part of clinical care such that a well trained pharmacist will need to know how to critically evaluate, interpret and apply this information on a daily basis.

Pharmaceutical Biotechnology course delivers up-to-date subject matter on multiple protein expression systems, (bacteria, baker's yeast, insect, mammalian and plant cells) for production of diverse biopharmaceuticals, encompassing a range of platform technologies.

Learning Outcomes:

After completion of the course students are expected 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.
- Discuss 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
- Discuss 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.
- Critically evaluate the current and future literature in the area of pharmacogenomics
- Identify key sources and reliable databases with pharmacogenomics knowledge base

Course Contents:

Definition of the terms 'traditional pharmaceutical product', 'biologic' and 'biotechnological product. Advantages of producing biotechnological products by recombinant means (e.g. availability and scale of production, prevention of accidental transmission of disease, development of altered product forms via protein engineering); overview of biotechnological products now approved for use.
Overview of the drug development process; preclinical studies and clinical trials; Developing a recombinant therapeutic protein; Identification of potential biotechnological products, generation of suitable recombinant expression systems, characterization of the expressed protein, recombinant production in bacterial/animal cells.Plants and transgenic animals as potential sources of recombinant biotechnological products.
Bioinformatics, personalized medicine, how genetic variants affect PK,PD.
Introduction to the Pharmacology aspect of Pharmacogenomics,
Importance of Personalized Therapy
Choosing Phenotypes for Pharmacogenomic Studies
What are phenotypes and pharmacology 101 – PK (ADME) and PD; drug-drug interaction
Examples of Pharmacogenetics/Genomics – Candidate Gene and Genome-Wide Association Studies ,Tamoxifen, 6-MP- TPMT, Warfarin, Statin, Flucloxacillin
Application of Classical Genetic Techniques to Pharmacogenomics –
Cell Based Model for Cytotoxic Anti-Cancer Agents
Pharmacogenomics in Facilitating Drug Discovery
The Role of Ethnicity in Pharmacogenomics
Economic/Ethical Issues of Pharmacogenomics
Role of Pharmacogenomics in Clinical Practice

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, practicals

Assessment Methods:

Final Examination, course work

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
	Φαρμακευτική βιοτεχνολογία Βασικές αρχές και πρακτικές εφαρμογές .	ΠΑΡΙΣΙΑΝΟΥ Α.Ε		
Γεώργιος Π. Πατρινός, Σωτηρία Μπουκουβάλα ΠΑΡΙΣΙΑΝΟΥ Α.Ε.	Φαρμακογονιδιωματική και Πρωτεϊνωματικη: Τα εργαλεία της εξατομικευμένης ιατρικής	ΠΑΡΙΣΙΑΝΟΥ Α.Ε		

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN