



Course Code BIOL-123	Course Title Molecular Biology and Genetics/ Μοριακή Βιολογία και Γενετική	Credits (ECTS) 6
Department Life & Health Sciences	Semester Spring	Prerequisites BIOL-122
Type of Course Required	Field Pharmacy	Language of Instruction Greek/English
Level of Course 1 st Cycle	Year of Study 1 st year	Lecturer Lefteris Zacharia/Maria Christofidou/Maria Mastorikou
Mode of Delivery face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The objective of the course is to give students an understanding of the basic principles of molecular biology and genetics and pose fundamental questions that will stimulate their interest in molecular biology and genetics and their importance in health sciences. Students will learn the basics of human genetics, as well as the central dogma of molecular biology (from DNA to proteins), DNA structure, replication, transcription, translation and gene regulation. In addition, they will get the chance to learn the different techniques used in molecular biology and biotechnology and get exposed to current topics relevant to pharmacy. Students will also be exposed to literature search by assigning and studying a genetic disease or disorder and present their findings.

Learning Outcomes:

With the completion of the course students are expected to:

1. Know the basic principles of mitosis, meiosis and reproduction.
2. Be able to describe Mendelian genetics, and the chromosomal basis of inheritance.
3. Know the structure and function of DNA and be able to describe the basic steps involved in transcription and translation of genes and well as the mechanisms of gene regulation and repair.
4. Compare and contrast the mechanisms of bacterial and eukaryotic DNA replication, DNA repair, transcription, and translation

5. Be able to describe the different biotechnology methods and recognize their use and importance in pharmacy.
6. Be able to know the basic principles of the molecular basis and genetics of cancer.
7. Learn the basic principles of gene and stem cell therapy, and get exposed to the field of pharmacogenomics

Course Contents:

1. Cellular division – mitosis and meiosis.
2. Genetics: Mendelian Genetics, chromosomal basis of inheritance, and molecular basis of inheritance.
3. DNA and chromosomes: structure and function of DNA, structure of eukaryotic chromosomes.
4. DNA replication and repair
5. From DNA to proteins: how cells read the genome. From DNA to RNA and proteins (transcription, translation)
6. Chromosomes and gene expression regulation- molecular switches
7. Biotechnology: Techniques for DNA analysis, methods for isolating and studying nucleic acids. Methods used for DNA and RNA. Gel electrophoresis, Southern and Northern blotting, Restriction enzymes and ligations, cloning of DNA). Polymerase chain reaction (PCR). Their application in the field of pharmacology
8. Cancer, Stem cells and gene therapy
9. Pharmacogenomics.

Major Assignment:

1. Study/ explore and present to class a genetic disease (inheritance, prevalence etc)

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments

Assessment Methods:

Final exam, coursework

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Campbell-Reece et al	Biology	Pearson, Benjamin, Cummings	2008	

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN

AlbertsB.,Bray D.,HopkinK.,JohnsonA.,LewisJ.,RaffM.,Robert sK.,Walter P	ΒασικέςΑρχέςΚυττα ρικής Βιολογίας	BROKEN HILL PUBLISHE RS LTD		
ΒΑΣΙΛΗΣ ΜΑΡΜΑΡΑΣ & ΜΑΡΙΑ ΛΑΜΠΡΟΠΟΥΛΟΥ-ΜΑΡΑΜΑΡΑ	Βιολογία Κυτάρου	ΤΥΠΟΡΑΜ Α - Αγοργιανί της Σπ. Μον. ΕΠΕ		
S.H.Y. WONG, M.W. LINDER, R. VALDES	Φαρμακογονιδιωμα τική και Πρωτεϊνοματική/ PHARMACOGENO MICS AND PROTEOMICS: ENABLING THE PRACTICE OF PERSONALIZED MEDICINE			