



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
BIOL-123E	Μοριακή Βιολογία και Γενετική/Molecular Biology and Genetics	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
None	Life and Health Science	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 Christou Charita	1
<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:

- Explain to students 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.
- Give to students the understanding of 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.
- Give to students the chance to learn the different techniques used in molecular biology and biotechnology and get exposed to current topics relevant to pharmacy.
- Expose students to literature search by assigning and studying a genetic disease or disorder and present their findings

### Learning Outcomes:

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

1. Understand the basic principles of mitosis, meiosis and reproduction.
2. Describe Mendelian genetics, and the chromosomal basis of inheritance.
3. Recognize 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. Describe the different biotechnology methods and recognize their use and importance in pharmacy.  
6. Define the basic principles of the molecular basis and genetics of cancer.  
7. Outline the basic principles of gene and stem cell therapy, and get exposed to the field of pharmacogenomics

**Course Content:**

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:  
10. 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, Midterm exam, assignment

**Required Textbooks / Readings:**

Title	Author(s)	Publisher	Year	ISBN
Biology	Campbell- Reece et al	Pearson, Benjamin, Cummings	2008	97808053 68444
Βασικές Αρχές Κυτταρικής Βιολογίας	Alberts B.,Bray D.,Hopkin K.,Johnson A.,Lewis J.,Raff M.,Roberts K.,Walter P	BROKEN HILL PUBLISHERS	2015	9789963258277
Βιολογία Κυτάρου	ΒΑΣΙΛΗΣ ΜΑΡΜΑΡΑΣ & ΜΑΡΙΑ ΛΑΜΠΡΟΠΟ ΥΛΟΥ- ΜΑΡΜΑΡΑ	ΤΥΠΟΡΑΜΑ Αγοργιανίτης Σπ. Μον. ΕΠΕ	2005	9789607620132
Φαρμακογονιδιωματική και Πρωτεϊνοματική/PHAR MACOGENOMICS AND PROTEOMICS: ENABLING THE PRACTICE OF PERSONALIZED MEDICINE	S.H.Y. WONG, M.W. LINDER, R. VALDES	AACC Press; 1st edition	2006	9781594250460