University of Nicosia

Course Code	**Course Title**	**ECTS Credits**
BIOL-311	Molecular Biology	8
Department	**Semester**	**Prerequisites**
Life and Health Sciences	Fall	BIOL 201 – Cell Biology; BIOL-232 Human Molecular Genetics
Type of Course	**Field**	**Language of Instruction**
Required	Molecular Biology	English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	3rd	Dr. Evi Farazi
Mode of Delivery	**Work Placement**	**Co-requisites**
face-to-face	N/A	None

Objectives of the Course:

The aim of the course is to provide students with in depth understanding of the molecular processes involved in gene function and regulation in prokaryotes and eukaryotes that would form the basis for continuation to graduate studies.
The main objectives of the course are to:

- Present the prokaryotic and eukaryotic DNA gene and chromosomal structure.
- Provide students with the principles of prokaryotic and eukaryotic DNA Replication, Homologous Recombination, Transposition and DNA repair
- Provide students with deep knowledge on the molecules and mechanisms involved in gene transcription and translation and in the regulation of gene expression and protein post-translational modifications.
- Make students aware of the latest technological and scientific discoveries in the study of molecular biology.
- Provide students with the opportunity to have hands on experience with the design and execution of experiments related to molecular biology.

Learning Outcomes:

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

1. Describe and compare the molecular basis of genes/chromosome structure in prokaryotic and eukaryotic cells.
2. Identify, define and compare the molecular mechanisms and associate proteins involved in gene transcription and translation and access their relationship to

biotechnology applications.
3. Define and discuss chromosomal function, and demonstrate how DNA replication, homologous recombination, transposition and DNA repair occur.
4. Discuss and compare the molecular processes involved in gene activation, deactivation in prokaryotes and eukaryotes.
5. Apply molecular biology laboratory techniques to study genes and gene activity.
6. Record, analyze and report experimental results and use biological databases.
7. Demonstrate team working and problem solving skills and use critical thinking to discuss and report scientific literature.

Course Contents:

1. A Brief History; The Molecular Nature of Genes
2. Molecular Cloning Methods and Tools for Studying Genes and Gene Activity
3. The Transcription Apparatus of Prokaryotes
4. Major Shifts in Prokaryotic Transcription; DNA-Protein Interactions
5. Eukaryotic RNA Polymerases and their Promoters
6. General Transcription Factors in Eukaryotes; Transcription Activators
7. Chromatin Structure and Its Effects on Transcription
8. Posttranscriptional Events
9. Translation
10. Ribosomes and Transfer RNA
11. DNA Replication I: Basic Mechanism
12. DNA Replication II: Detailed Mechanism and control
13. Homologous Recombination; Site-Specific Recombination and Transposition
14. Transgenic animals and cloning

Learning Activities and Teaching Methods:

Lectures; Laboratory Practical sessions. Reading assignments and group discussions. Writing assignments, Problem Sets.

Assessment Methods:

Midterms, Lab Reports and assignments, Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Watson, Baker, Bell, Gann, Levine, Losick	Molecular Biology of the Gene	Pearson Benjamin Cummings	6th ed. 2007	978-0805395921
Williams, Slatko, McCarrey	Laboratory Investigations in	Jones and Bartlett	4th ed. 2006	0763733296

	Molecular Biology			

Recommended Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
Robert Weaver	Molecular Biology	McGraw Hill	4th Ed. 2007	978-007-127548-4