University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
BISC-532	Molecular Genetics	8
Department	**Semester**	**Prerequisites**
Life and Health Sciences	Spring	None
Type of Course	**Field**	**Language of Instruction**
Required	Biomedical Sciences	English
Level of Course	**Year of Study**	**Lecturer**
2st Cycle	1st	Dr. Fellekis Kyriakos
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

This course will promote students understanding of advanced molecular biology by focusing on new breakthrough knowledge and technology advancements.
The aims of the course are to:

- Present the new concepts and technologies used in molecular biology
- Explain the use of new molecular biology experiments to address important biological questions.
- Relate the basic principles of molecular biology to cloning, stem cell research and gene therapy
- Review scientific papers based on molecular biology advancements
- Discuss bioethics issues associated with scientific research and discovery

Learning Outcomes:

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

- Explain basic and advanced molecular biology concepts in contemporary molecular and genetics research.
- Critically assess and discuss scientific publications regarding experimental design and validity of results
- Formulate research questions and propose experimental approaches using molecular biology concepts and technologies.
- Demonstrate appreciation and knowledge of how to deal with ethical issues relating to science.
- Apply critical thinking, problem solving and demonstrate reference research skill in molecular biology
- Communicate molecular biology facts and research findings in a scientific manner

Course Contents:

1. Chromatic structure and remodeling
2. Mechanisms of DNA synthesis, replication and repair
3. Bacterial and Eukaryotic transcription; transcriptional activation
4. RNA structure, catalysis and processing; Regulation of Translation;
5. Functional Genomics, Proeomics
6. Epigenetics; Imprinting and Dosage Compensation
7. Posttranscriptional Gene Silencing
8. RNAi/Talen Technology
9. MicroRNA in Biology and disease
10. CRISPR Technology for gene editing
11. New approaches of treating diseases; gene therapy
12. Genetic testing in populations; cancer genetics
13. Immunogenetics
14. Genetic manipulations of cells and animals
15. Bioinformatics: function and structure from sequence

Learning Activities and Teaching Methods:

Lectures; presentations and discussions of molecular biology based scientific literature. Cooperative learning.

Assessment Methods:

Assignments/Exercises; Oral presentations and written esseays; Mid-term and Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine Richard Losick	Molecular Biology of the Gene	Benjamin Cummings	7 edition (2013)	**ISBN-10:** 0321762436 **ISBN-13:** 978-0321762436
Bruce R. Korf, Mira B. Irons	Human Genetics and Genomics, Includes Wiley E-Text	Wiley-Blackwell;	4 edition (2013)	**ISBN-10:** 0470654473 **ISBN-13:** 978-0470654477

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Tom Strachan, Andrew Read	Human Molecular Genetics, Fourth Edition [Paperback]	Garland Science;	4 edition (2010)	**ISBN-10:** 0815341490 **ISBN-13:** 978-0815341499

Gerald Karp	Cell and Molecular Biology: Concepts and Experiments	Wiley;	7 edition (2013)	**ISBN-10:** 1118206738 **ISBN-13:** 978-1118206737