

## **Introduction in research Methodology**

The major task of this course is to introduce graduate students in the principles of Molecular Medicine, as a first step towards a better understanding of specific topics focusing on heritability, basic genetics, cytogenetics, medical genetics and human disorders. Moreover, graduate students will be introduced in subjects dealing with Bioinformatics, stem cells technology, in situ techniques as well as visualization methods. Altogether, these topics will offer knowledge that is necessary for a multidisciplinary approach of biological and clinical issues. Additionally, students will be trained on basic laboratory techniques and methodologies in the fields of molecular biology and genetics and, therefore, graduate students of the program are expected to acquire skills that are necessary in order to perform successfully any experiments in a research laboratory. In particular, these skills refer to:

- understanding the basic concepts of molecular medicine
- understanding the basic principles of basic research methodologies
- presenting original and review articles to an audience
- writing a research article

Based on this knowledge and experiences, they will be able to read comprehensively research articles in the framework of their Masters Thesis and become familiar with the laboratory equipment and instruments.

**Course coordinator:** George Goulielmos, Associate Professor of Human Molecular Genetics, Dept. of Internal Medicine, Medical School of Crete.

### **Instructors:**

Elias Drakos (Assistant Professor of Morphology, Medical School of Crete)  
Ioannis Iliopoulos (Assistant Professor of Molecular Biology-Bioinformatics, Medical School of Crete)

Emmanuel Prokopakis (Assistant Professor of Otorhinolaryngology, Medical School of Crete)

Ioannis Charalampopoulos (Assistant Professor of Pharmacology, Medical School of Crete)

Maria Zervou (Laboratory Teaching Staff, Dept. of Internal Medicine, Medical School of Crete)

**Teaching hours:** Lectures and laboratory courses 41, Students presentations 5, presentations' preparation 10 hours (per student)

**Exams:** Writing exams and oral presentation of a research article

### **Theoretical section:**

1. Basic principles of Molecular Biology and Genetics

2. Principles of Medical Genetics and Molecular Diagnostics with application in eye diseases
3. Modern techniques of gene mapping (highthroughput technologies)
4. Personalized Medicine
5. Writing a research article
6. Presenting a scientific article
7. Applications of stems cells in Ophthalmology
8. Using in situ techniques to approach biological problems
9. Methodology of searching in biological and medical data bases
10. Multispectrum visualization

**Laboratory section:**

1. Extraction of genomic DNA
2. Polymerase Chain Reaction (PCR): Principles of the technique and diagnostic applications
3. Digestion of PCR products – Electrophoresis techniques
4. Genotyping method for human diseases