Co-funded by the
Erasmus+ Programme
of the European Union

EUROPEAN UNIVERSITY FOR CUSTOMISED EDUCATION

STUDY GUIDE

HUMAN GENETICS, MOLECUALR MEDICINE DIAGNOSIS AND CLINICAL-OMICS

Organised by

University of the Peloponnese

1. IDENTIFYING DATA.	
· **Course Name.**	*Human genetics, Molecular medicine Diagnosis and Clinical-omics*
· **Coordinating University.**	*University of the Peloponnese*
· **Partner Universities Involved.**	-
· **Course Field(s).**	*Molecular biology, Molecular Medicine, Genetics*
· **Related Study Programme.**	-
· **ISCED Code.**	*05, 09*
· **SDG.**	*SDG 3: Good Health and Well being. Ensure healthy lives and promote well-being for all at all ages* *SDG 4: Quality Education. Education is the key that will allow many other Sustainable Development Goals (SDGs) to be achieved. When people are able to get quality education they can break from the cycle of poverty.*
· **Study Level.**	*This course is part of a Bachelor degree but could be offered to Master or Doctorate degrees*

· **Number of ECTS credits allocated.**	*5 ECTS*
· **Mode of Delivery.**	*Online live*
· **Language of Instruction.**	*English* *Spanish can be used for communication and assignments*
· **Course Dates.**	*07/10/24- 20/12/24 and 6/1/25 -27/1/25*
· **Schedule of the course.**	*2 hours per week every Monday at 15 pm*
· **Key Words.**	*Genetics, Molecular biology, Molecular Medicine, Molecular Nursing, Omics, Molecular based diagnosis, Molecular based therapy, Genetic counselling*
· **Catchy Phrase.**	*Powerful new next generation technologies in Genetics and Molecular Medicine have been driving forward immense and exciting changes in clinical practice*

· **Prerequisites and co-requisites.**	*Student must have successfully completed a Biology course*
· **Number of EUNICE students that can attend the Course.**	*30 students in total, 3 per partner university*
· **Course inscription procedure(s).**	*The standard EUNICE registration process will be applied for the course*

Co-funded by the
Erasmus+ Programme
of the European Union

2. CONTACT DETAILS.

· **Department.**	*Nursing Department, School of Health Sciences*
· **Name of Lecturer.**	*Andrea Paola Rojas Gil*
· **E-mail.**	arojas@go.uop.gr
· **Other Lecturers.**	-

3. COURSE CONTENT.

Genetics and Molecular Medicine sets out to demonstrate the recent advances in the field of human genetics. The course will describe how mutations in the genome arise, how they are detected and how knowledge of mutations informs on disease mechanisms. The course will also cover the clinical applications of human genetics including, molecular phenotyping and genetic approaches to treat disease. The course covers novelty areas of research and implementation concerning diagnosis by conventional strategies to next-generation platforms and new therapeutic strategies.

4. LEARNING OUTCOMES.

On completion of this course, the student will be able to:

- *Understand the base of inheritance,*
- *Demonstrate a critical understanding of the current theories of how mutations in the genome arise, and how technology has evolved to identify causative mutations in human disease.*
- *Understand how genome-wide association studies have led to the identification of genetic variants that contribute to complex human traits including disease*
- *Understand the new therapeutic strategies their advantages and dangers*
- *Gain knowledge about the interaction of environment, nutrition, medicaments and gene expression*
- *Understand new molecular technological challenges in clinical practice*
- *Demonstrate the ability to critically evaluate and consolidate information on human genetics from multiple sources (text books, lectures, research papers), and communicate knowledge in multiple format*

5. OBJECTIVES.

The objective of this course is for professionals from different areas of health to become familiar with the advances in molecular genetics, methods of diagnosis, study and gene-based therapy. In the same way that they understand the importance of personalization of health, taking into account the relationship of the environment, nutrition, pharmaceutical agents and gene expression.

6. COURSE ORGANISATION.	
UNITS	
1.	*Principles of Mendelian genetics and basic concepts in Molecular Biology*
2.	*Epigenetics in Health and disease.*
3.	*Genetic counselling*
4.	*Molecular diagnostic Techniques*
5.	*New challenges in genetic based therapy. Gene editing techniques and their applications in gene therapies and regenerative medicine*
6.	*Pharmacogenomics and personalized medicine*
7.	*Genome-wide association studies and its role in the identification of genetic variants in human diseases*
8.	*Interaction of genes with diet*
9.	*The role of in silico analysis, databases and multi-omics of single-cell which will help in designing better clinical management strategies.*
10	*Biochemical Genetics and metabolomics*
11-13.	*Case report studies*
LEARNING RESOURCES AND TOOLS.	
Molecular Databases, global index-based bibliography, Scientific biographies, scientific documentaries	
PLANNED LEARNING ACTIVITIES AND TEACHING METHODS.	
Lectures, Supervised Practical/Workshop/Studio , Feedback/Feedforward, , Formative Assessment, Programme Level Learning and Teaching, Directed Learning and Independent Learning	

7. ASSESSMENT METHODS, CRITERIA AND PERIOD.
Presentation of case report analysis, oral presentation of the final project
OBSERVATIONS.

8. BIBLIOGRAPHY AND TEACHING MATERIALS.

Genomes 4; Brown T.A., 2018, Lewin's Genes XII; Krebs J., et al. 2018
https://www.genome.gov/About-Genomics/Introduction-to-Genomics
https://www.ncbi.nlm.nih.gov/books/NBK115552/
https://pubmed.ncbi.nlm.nih.gov/32445090/
https://link.springer.com/chapter/10.1007/978-3-030-73227-1_2
https://www.sciencedirect.com/topics/medicine-and-dentistry/gene-therapy
https://www.sciencedirect.com/topics/medicine-and-dentistry/pharmacogenetics
https://www.nature.com/articles/s43586-021-00056-9
https://pubmed.ncbi.nlm.nih.gov/31952575/
https://www.sciencedirect.com/science/article/pii/S2095177923001235