



University of Nicosia, Cyprus

Course Code BIOL-323	Course Title Molecular Basis to Health and Disease	ECTS Credits 8
Department Life and Health Sciences	Semester Spring	Prerequisites BIOL-241 Immunology BIOL-322 Biochemistry II, BIOL-311 Molecular Biology
Type of Course Required	Field Biochemistry, Medicine	Language of Instruction English
Level of Course Undergraduate	Year of Study 3 rd or 4 th	Lecturer Dr. Demoliou Catherine, Dr. Nicolaou Stella
Mode of Delivery Face to Face	Work Placement N/A	Co-requisites None

Objectives of the Course:

This course aims to help students integrate the biochemical, physiological and molecular knowledge on human health and disease and built the scientific background required for successful progression in the basic biosciences and medical sciences.

The main objectives of this course are to:

- Guide students to acquire, integrate and apply the basic science principles that underlie the biochemical, molecular biology and physiology theory and practice.
- Provide students with knowledge, skills and opportunities to identify, analyze and predict the molecular basis for the cause, effect of diseases.
- Develop students' awareness of the advances in –omics research and the contributions of such research to study cell and tissue functions, and to treat diseases.
- Encourage individual and interactive life-long learning skills.

Learning Outcomes:

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

1. Discuss and compare the mechanisms of DNA damage and repair in relation to cell death and the development of neoplasia.
2. Discuss the molecular basis for the pathogenesis in inflammatory diseases.
3. Demonstrate using specific examples the molecular and biochemical bases of gene and protein function in major human genetic disorders.
4. Identify the experimental approaches in –omics research and systems biology used in the conceptual understanding of molecular mechanisms and cell physiology and discuss the

- implications of the human genome project in understanding human diseases.
5. Compare the molecular and biochemical bases of gene and protein function and report on the risk factors involved in the development of major human degenerative diseases.
 6. Appraise how controlling gene and protein expression as well as signal transduction pathways aid in the design of therapeutic strategies.

Course Contents:

- Mechanisms of Diseases
1. Molecular mechanisms of cell death
 2. Acute and chronic inflammation.
 3. Infection and host response.
 4. Neoplasia
- Implications of Molecular Biology and Genetics for the Understanding of Human Diseases
5. Molecular Genetics: The Human Genome Project
 6. The Human Transcriptome
 7. The Human Epigenome
 8. The Human Proteome
 9. Integration of Systems Biology
- Molecular Pathogenesis
10. The Biological basis of human diseases
 11. Integration of molecular and cellular pathogenesis
 12. Molecular basis of cardiovascular diseases.
 13. Molecular basis of hemostatic and thrombolytic diseases
 14. Molecular basis of diseases of immunity
 15. Pharmacogenomics: Personalized medicine in the treatment of human diseases.

Learning Activities and Teaching Methods:

Lectures; discussions sessions, presentations of medical research papers, independent study and review sessions

Assessment Methods:

Assignments, Tests and Mid-term Exam; Final Exam

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
William B. Coleman Gregory J. Tsongalis	Molecular Pathology: The Molecular Basis of Human Disease	Academic Press	(2009)	ISBN-10: 0123744199 ISBN-13: 978-0123744197

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
RH Garrett, CM Grisham	Principles of Biochemistry with a Human Focus	Brooks Cole	2001	ISBN - 0030973716
Richard J. Epstein	Human Molecular Biology : An Introduction to the Molecular Basis of Health and Disease	Cambridge University Press	2002,1 st ed.	ISBN: 052164481X
J.K. Pasternak	An Introduction to Human Molecular Genetics: Mechanisms of Inherited Diseases	Wiley-Liss	1999	ISBN: 1891786032