DEPARTMENT OF
MOLECULAR
BIOLOGY&
GENETICS
DUTH

UNDERGRADUATE PROSPECTUS 2013 - 2014

Alexandroupolis 2013

ADDRESS

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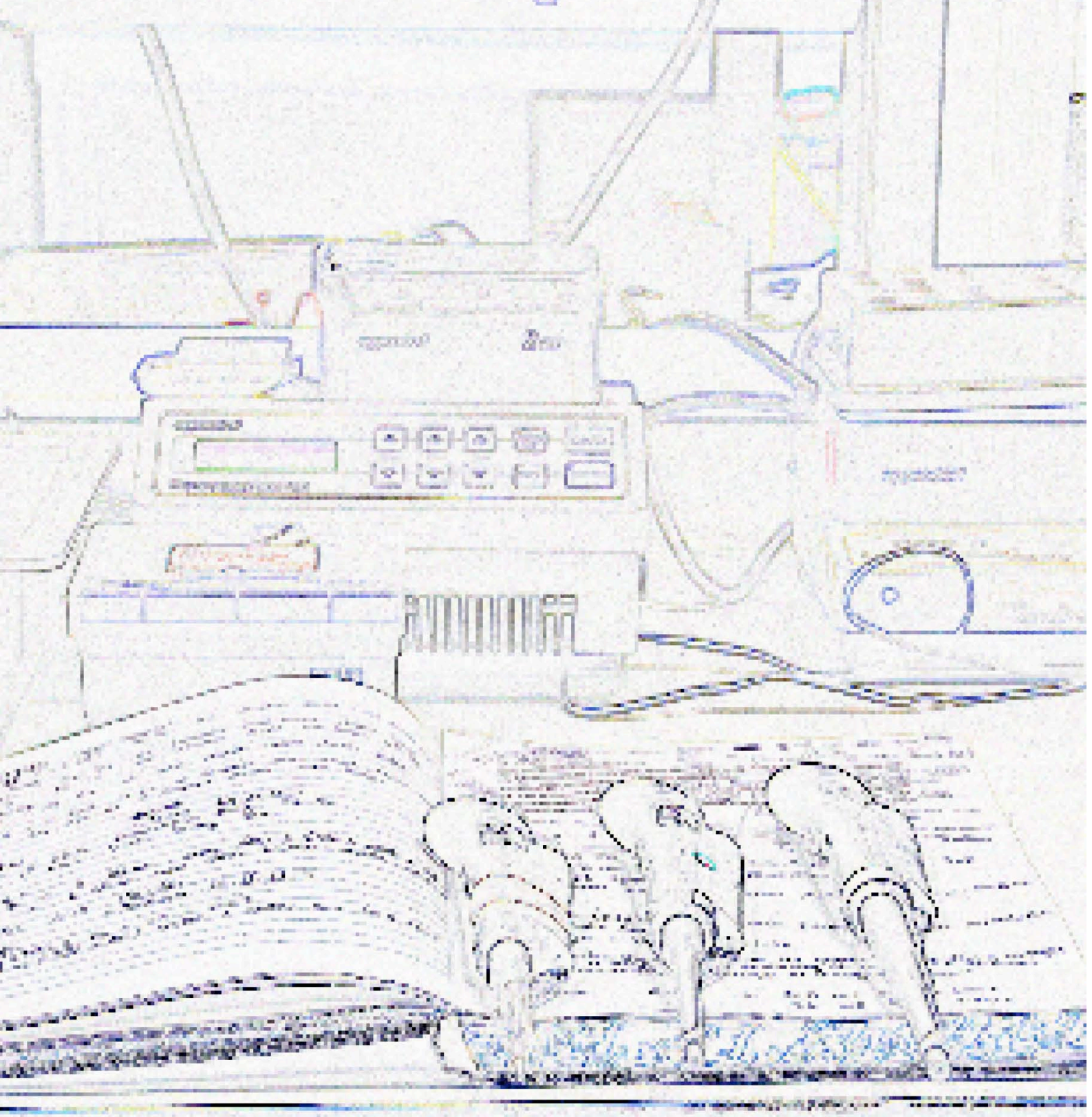

The undergraduate prospectus was organised by Associate Professor M. E. Grigoriou

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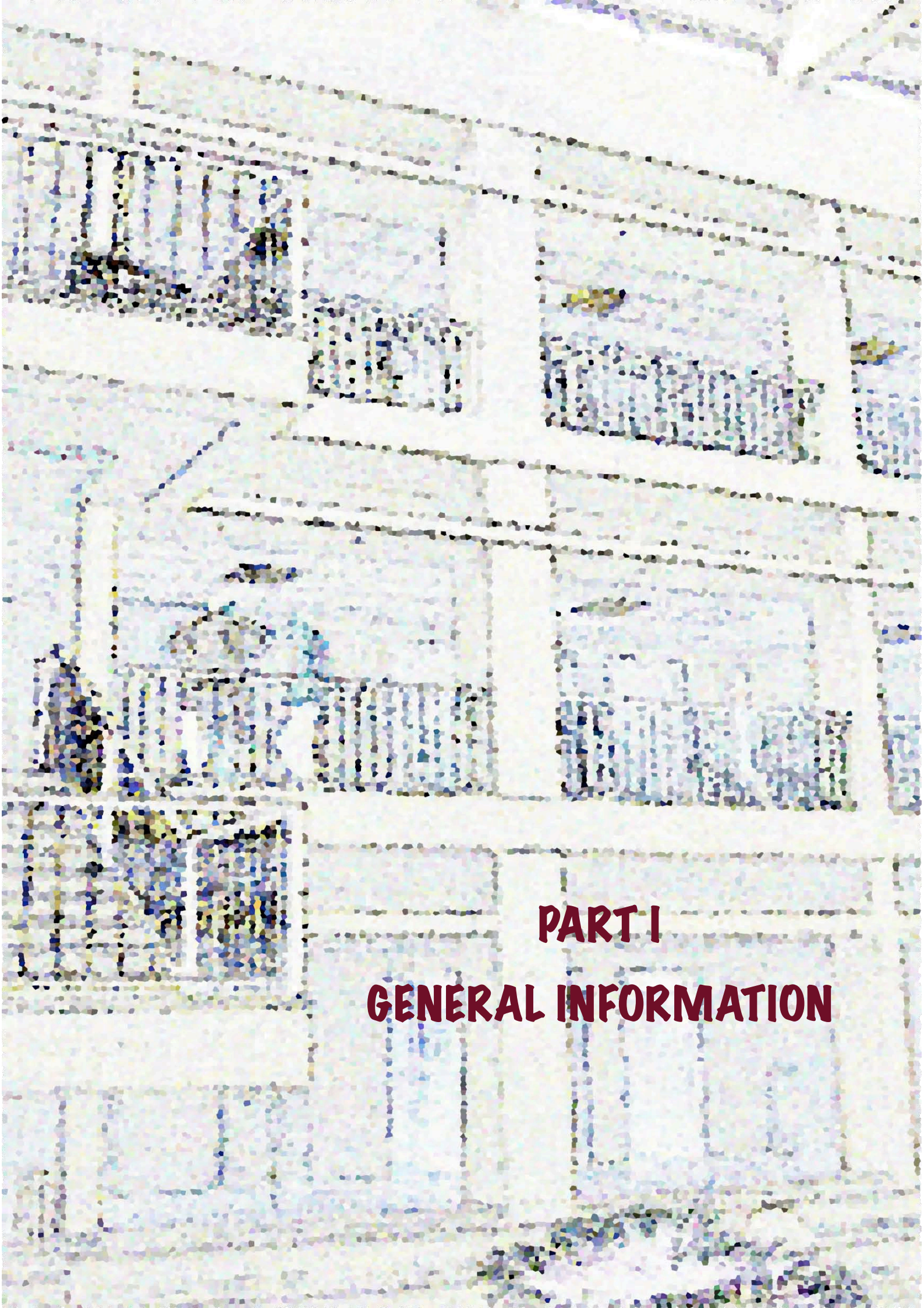

PART I
GENERAL INFORMATION

DEMOCRITUS UNIVERSITY OF THRACE (D.U.TH)

1. The University

Democritus University of Thrace (DUTH) was established in July 1973. It was named after the ancient Greek philosopher Democritus who was born in Avdira, Thrace, an administrative district of Greece.

The University is organized in two Faculties and eighteen Departments. The Departments are located in four major cities of Thrace: seven in Komotini, five in Xanthi, four in Alexandroupolis and two in Orestiada. A total of 12.466 undergraduate students are enrolled in DUTH. The administration of the University is located in Komotini, which is the seat of the administrative district of East Macedonia and Thrace.

Through the quality of teaching and the level of research, DUTH plays an important role in the economy and the culture of the region and is one of the leading Universities in Greece. As an Institution of Higher Education, Democritus University of Thrace is a Public Institution with full administrative autonomy. It is subject to state supervision via the Greek Ministry of Education, Lifelong Learning and Religious Affairs, which also provides its funding.

Departments of DUTH

1. Department of Law, established in 1974 in Komotini.
2. Department of Civil Engineering, established in 1974 in Xanthi.
3. Department of Electrical and Computer Engineering, established in 1975 in Xanthi.
4. Department of Physical Education and Sport Science, established in 1984 in Komotini.
5. Department of Medicine, established in 1985 in Alexandroupolis.
6. Department of Primary Level Education, established in 1986 in Alexandroupolis.
7. Department of Educational Sciences in Pre-school Age, established in 1987 in Alexandroupolis.
8. Department of History and Ethnology, established in 1991 in Komotini.
9. Department of Environmental Engineering, established in 1995 in Xanthi.
10. Department of Greek Literature, established in 1995 in Komotini.
11. Department of Social Administration, established in 1996 in Komotini.
12. Department of Architectural Engineering, established in 1999 in Xanthi.
13. Department of International Economic Relations and Development, established in 1999 in Komotini.
14. Department of Agricultural Development, established in 1999 in Orestiada.
15. Department of Forestry and Management of the Environment and Natural Resources, established in 1999 in Orestiada.
16. Department of Production and Management Engineering, established in 2000 in Xanthi.

17. Department of Languages, Literature and Culture of the Black Sea Countries, established in 2000 in Komotini.

18. Department of Molecular Biology and Genetics, established in 2000 in Alexandroupolis.

19. Department of Business Administration established in 2009 in Komotini.

20. Department of Political Sciences in 2009 in Komotini.

2. Administration

Under the Act N. 1268/82, Greek Universities are organized into Schools, Faculties and Departments. The basic Academic unit is the Department which has the authority to award to the students Degrees - upon successful completion of their studies.

The administration of University is exercised by the Senate, the Rector's Council and the Rector. The administration of the Faculty is exercised by the General Assembly of the Faculty and the Dean. The administration of the Department is exercised by the General Assembly of the Department and the President of the Department.

The human resources of the University consist of the Academic Faculty, the technical staff and the administrative staff. The academic Faculty comprises Lecturers, Assistant Professors, Associate Professors and Professors as well as specialized-Teaching Faculty members.

The Department of Molecular Biology and Genetics (M.B.G)

1. The Department

The Department of Molecular Biology and Genetics (MBG) was established in 1999 and it is the only Department of Biosciences in Greece that is specialized in Molecular Biology and Genetics. The Department is situated at the city of Alexandroupolis in north-eastern Greece and is part of the Democritus University of Thrace.

Research and teaching in MBG includes fundamental, as well as medically oriented problems in molecular biology, genetics, developmental biology, genomics, cell biology, biochemistry, and macromolecular structure. MBG graduates develop careers in basic research in University and Research Institutes, in the biotechnological and biomedicinal sector or in teaching Biosciences.

2. Administration and Teaching Staff

Vice President :

Prof. V. Vargemezis
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Head of Secretariat

Dimitrios Asimakopoulos
Tel. (+30)25510-30610, Fax: (+30)25510-30613, e-mail secr@mbg.duth.gr

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Roi Litsikaki Tel. (+30)25510-30614
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2. Academic Faculty Members

Name	Title	Telephone (0030-25510)	email
Maroulakou Ioanna	Professor of Genetics	30666	imaroula@mbg.duth.gr
Mavromara Penelope	Professor of Biochemistry	30618	
Grigoriou Maria	Associate Professor of Molecular-Developmental Biology	30657	mgrigor@mbg.duth.gr
Sandaltzopoulos Raphael	Associate Professor of Molecular Biology	30622	rmsandal@mbg.duth.gr
Fylaktakidou Konstantina	Associate Professor of Chemistry of Organic Compounds	30663	kfylakta@mbg.duth.gr
Agianian Bogos	Assistant Professor of Molecular – Structural Biology	30668	magiania@mbg.duth.gr
Boukouvala Sotiria	Assistant Professor of Molecular Genetics	30632	sboukouv@mbg.duth.gr
Chlichlia Aikaterini	Assistant Professor of Molecular Immunology	30630	achliclia@mbg.duth.gr
Galanis Alexis	Assistant Professor of Molecular Biology	30634	agalanis@mbg.duth.gr
Glykos Nikolaos	Assistant Professor of Computational and Structural Biology	30620	glykos@mbg.duth.gr
Kourkoutas Ioannis	Assistant Professor of Applied Biotechnology	30633	ikourkou@mbg.duth.gr
Koffa Maria	Assistant Professor of Cell Biology	30661, 30675	mkoffa@mbg.duth.gr
Pappa Aglaia	Assistant Professor of Physiology and Molecular Pharmacology .	30625	apappa@mbg.duth.gr
Paschou Peristera	Assistant Professor of Population Genetics	30658	ppaschou@mbg.duth.gr
Skavdis Georgios	Assistant Professor of Molecular Biology	30626	gskavdis@mbg.duth.gr
Fakis Giannoulis	Assistant Professor of Human Genetics and Cytogenetics	30628	gfakis@mbg.duth.gr
Chatzaki Maria	Lecturer of Biology	30636	mchatzak@mbg.duth.gr
Katsani Aikaterini	Lecturer of Protein Chemistry	30635	kkatsani@mbg.duth.gr

Teaching Assistant

Name		Telephone (00302551)	email
Dr Staneloudi Chysovalanto	B.Sc, PhD Biology	30385	cstanelo@mbg.duth.gr

Research Assistants

Name		Telephone (00302551)	email
Metallinou Chrysoula	B.Sc, Biology	30641	cmetalli@mbg.duth.gr
Dr Malatos Sotirios	B.Sc, PhD Biology	30384	smalatos@mbg.duth.gr

3. Divisions

The Department has been, unofficially, divided into the following Divisions

1. Division of Basic Sciences, Biochemistry and Biotechnology

Members	Position	Research Interests
Mavromara Penelope	Professor	Biochemistry
Fylaktakidou Konstantina	Associate Professor	Chemistry of Organic Compounds
Ioannis Kourkoutas	Assistant Professor	Applied Biotechnology
Katerina R. Katsani	Lecturer	Protein Chemistry

Division's Laboratories

- Lab 1: **Laboratory of Organic and Biological chemistry and Natural Products (founded in 2003)**

2. Division of Molecular and Computational Biology

Members	Position	Research Interests
Raphael M. Sandaltzopoulos	Associate Professor	Molecular Biology
Katerina Chlichlia	Assistant Professor	Molecular Immunology
Alexis Galanis	Assistant Professor	Molecular Biology
Nikolaos Glykos	Assistant Professor	Computational and Structural Biology
Aglaia Pappa	Assistant Professor	Physiology and Molecular Pharmacology

Division's Laboratories

- Lab 1: **Laboratory of Gene Expression, Molecular Diagnostics and Modern Therapeutics (founded in 2002)**

3. Division of Molecular, Cellular, Developmental Biology and Biomolecular Applications

Members	Position	Research Interests
Maria Grigoriou	Associate Professor	Developmental Biology
Bogos (Pavlos) Agianian	Assistant Professor	Molecular and Structural Biology
Maria D. Koffa	Assistant Professor	Cell Biology
George Skavdis	Assistant Professor	Molecular Biology

Division's Laboratories

- Lab 1: **Laboratory of Molecular Neurobiology and Molecular Biology of Development (founded in 2006)**
- Lab 2: **Laboratory of Molecular Cell Biology, Cell cycle and Proteomics (founded in 2006)**

4. Division of Genetics, Genomics and Systematics

Members	Position	Research Interests
Ioanna Maroulakou	Professor	Genetics
Sotiria Boukouvala	Assistant Professor	Molecular Biology
Giannoulis Fakis	Assistant Professor	Human Genetics and Cytogenetics
Peristera Paschou	Assistant Professor	Population Genetics
Maria Chatzaki	Lecturer	Biology

Division's Laboratories

- Lab 1: **Laboratory of Population Genetics and Evolution (founded in 2002)**

4. Admission

Students are admitted through successful completion of the national examinations organized by the Ministry of National Education and Religious Affairs. In case they hold a University Degree, admission is achieved through special examinations organized by the University. Admission to studies in Higher Education in Greece is free and the language of instruction is Greek.

PART II
STUDYING AT MBG

DEPARTMENT OF MOLECULAR BIOLOGY AND GENETICS

COURSE TIMETABLE

MODULES	LECTURES	PRACTICALS/SEMINARS	TEACING HOURS PER WEEK	TEACHING UNITS	ECTS
1st SEMESTER					
Physics for Biological Sciences	**3**	**1**	**4**	**4**	**6**
Inorganic Chemistry	**3**	**3**	**6**	**4**	**6**
Introduction to Biology	**3**	**3**	**6**	**4**	**6**
Biostatistics	**2**	**0**	**2**	**2**	**4**
Introduction to Computational Biology	**3**	**3**	**6**	**4**	**6**
English I	**2**		**2**	**2**	**2**
Total	**16**	**10**	**26**	**20**	**30**

MODULES	LECTURES	PRACTICALS /SEMINARS	TEACING HOURS PER WEEK	TEACHING UNITS	ECTS
2nd SEMESTER					
English II	**2**		**2**	**2**	**2**
Introduction to Organismal Biology	**3**	**3**	**6**	**4**	**6**
Organic Chemistry	**3**	**3**	**6**	**4**	**6**
Physical Chemistry and Elements of Biophysics I	**3**	**2**	**5**	**4**	**4**
Biochemistry I	**3**	**3**	**6**	**4**	**6**
Genetics I	**3**	**3**	**6**	**4**	**6**
TOTAL	**17**	**14**	**31**	**22**	**30**
3rd Semester					
Cell Biology	**4**	**3**	**7**	**5**	**8**
Molecular Biology I	**4**	**1**	**5**	**5**	**8**
Molecular Microbiology	**3**	**3**	**6**	**4**	**8**
Introduction to Molecular Biology Techniques	**3**	**0**	**3**	**3**	**6**
TOTAL	**17**	**13**	**30**	**22**	**30**

MODULES	LECTURES	PRACTICALS /SEMINARS	TEACHING HOURS PER WEEK	TEACHING UNITS	ECTS
4th SEMESTER					
Genetics II	**3**	**3**	**6**	**4**	**7**
Physiology	**4**	**3**	**6**	**5**	**7**
Molecular Biology II	**3**	**0**	**3**	**3**	**4**
Gene Expression and SignalingI	**4**	**0**	**6**	**4**	**5**
Biochemistry II	**4**	**3**	**6**	**5**	**7**
TOTAL	**17**	**9**	**27**	**21**	**30**
5th SEMESTER					
Methods in Molecular Biology	**1**	**9**	**10**	**4**	**6**
Molecular Immunology	**4**	**3**	**7**	**5**	**7**
Bioinformatics	**4**	**3**	**7**	**5**	**6**
Developmental Biology	**4**	**0**	**4**	**4**	**6**
Population and Evolutionary Genetics	**3**	**3**	**6**	**4**	**5**
TOTAL	**16**	**18**	**34**	**22**	**30**

MODULES	LECTURES	PRACTICALS / SEMINARS	TEACHING HOURS PER WEEK	TEACHING UNITS	ECTS
6th SEMESTER					
Applied Biotechnology	**3**	**2**	**5**	**4**	**4**
Regulation of Cell function	**3**	**1**	**5**	**3**	**4**
Genomics	**3**	**3**	**6**	**4**	**5**
Introduction to Molecular Structure	**3**	**3**	**6**	**4**	**5**
Pedagogics	**1**	**0**	**1**	**1**	**2**
Career Development of Bioscientists	**1**	**0**	**1**	**1**	**2**
4 Optional Modules	**8**	**0**	**8**	**8**	**8**
TOTAL	**21**	**10**	**31**	**25**	**30**

7th SEMESTER					
MODULES	**LECTURES**	**PRACTICALS / SEMINARS**	**TEACHING HOURS PER WEEK**	**TEACHING UNITS**	**ECTS**
Human Genetics	**4**	**3**	**7**	**5**	**5**
Applications of Molecular Biology in Medical Sciences	**3**	**2**	**5**	**4**	**5**
Molecular Neurobiology	**3**	**0**	**3**	**3**	**4**
Proteomics	**3**	**1**	**4**	**4**	**4**
Technology of Molecular Biology	**3**	**0**	**3**	**3**	**4**
4 Optional Modules	**8**	**-**	**8**	**8**	**8**
TOTAL	**24**	**6**	**32**	**27**	**30**
8th SEMESTER					
MBG411: Degree Dissertation			**20**	**20**	**30**
TOTAL			**20**	**20**	**30**

CURRICULUM TOTAL	**Teaching units 197** **ECTS 240**

OPTIONAL MODULES

MODULES	LECTURES	PRACTICALS/SEMINARS	TEACHING HOURS PER WEEK	TEACHING UNITS	ECTS
AUTUMN SEMESTER					
Molecular Ecology	**2**		**2**	**2**	**3**
Virology	**2**		**2**	**2**	**3**
Radiobiology	**2**		**2**	**2**	**3**
Teaching Biosciences	**2**		**2**	**2**	**3**
Chemicals in our Daily Life	**2**		**2**	**2**	**3**
Computer Programming: C++	**2**		**2**	**2**	**3**
Molecular Plant Biology	**2**		**2**	**2**	**3**
Mechanisms of Oncogenesis	**2**		**2**	**2**	**3**
Principles of laboratory animal management	**2**		**2**	**2**	**3**
Medicinal and Natural Product Chemistry	**2**		**2**	**2**	**3**
Molecular Biotechnology and Nutrition	**2**		**2**	**2**	**3**
Acquired Genetic Diseases and Translational Medicine	**2**		**2**	**2**	**3**

MODULES	LECTURES	PRACTICALS/SEMINARS	TEACHING HOURS PER WEEK	TEACHING UNITS	ECTS
SPRING SEMESTER					
Histology	**2**		**2**	**2**	**3**
Pharmacology	**2**		**2**	**2**	**3**
Advanced Themes of Bioinformatics	**2**		**2**	**2**	**3**
Advanced techniques and applications in cell biology	**2**		**2**	**2**	**3**
Stem Cell and Regenerative Biology	**2**		**2**	**2**	**3**
Behavioral Biology	**2**		**2**	**2**	**3**
Bioethics	**2**		**2**	**2**	**3**
Practical Training	**2**		**2**	**2**	**3**
Genetics in Forensic Science	**2**		**2**	**2**	**3**
Introduction to Bioscience Enterprise	**2**		**2**	**2**	**3**

1. Rules and regulations of exams and evaluation

Studies in MBG last four academic years (8 semesters). The academic year starts on September 1st and ends on August 31st of the following year. Each academic year is organized chronologically in two semesters, the winter semester and the spring semester. Each semester consists of at least 13 weeks of classes and is followed by two exam periods, each of which lasts four weeks. In semesters 1-5 students attend compulsory modules, that are considered essential for their Degree. During the 6th and 7th semester, students have to choose 8 optional modules (4 in each semester).

There are 3 examination periods: February 1st -28th, June 1st -30th and September 1st – 30th . In the exam periods of February and June students are examined in modules taught only in the relevant semesters. During September's exam period, students are examined in modules taught in both semesters (Resits). The detailed program of final exams is drawn up by the administrative secretariat (in consultation with a representative of Student Union) and it is announced in due time.

The marking of student progress is determined on the basis of a 0 to 10 scale. Testing is considered to be successful if students get at least 5/10.

Teaching units (credits) and ECTS units are allocated to all courses. These units reflect the quantity of work each course unit requires in relation to the total quantity of work necessary to complete a full year of academic study at the institution (that is, lectures, practical work, seminars, tutorials, fieldwork, private study- in the library or at home- and examinations or other assessment activities).The semester workload of a student is the sum of the credits of the courses in which s(he) has enrolled during that semester.

2. Requirements for graduation

Students become graduates when they have:

a. Successfully attended all compulsory modules
b. Successfully attended 8 optional modules
c. Had their degree dissertation approved and marked
d. Accumulated 240 ECTS credits

The graduates of the Department are awarded the Degree of Molecular Biology and Genetics.

3. Degree Dissertation

The aim of the degree dissertation is to familiarize students with the techniques frequently used in a Molecular Biology and Genetics lab. Moreover, students acquire essential knowledge on searching related papers in literature and skills on writing up a scientific project/ paper.

- The dissertation is compulsory
- The dissertation project lasts 6 months and starts during the 8th semester.
- It equals with 20 teaching units (30 ECTS units)
- Language of dissertation is Greek but in some cases it can be accepted in English.

For further information visit the following website (Regulations for Degree Dissertation) http://www.mbg.duth.gr/files/File/Kan_dipl.pdf

Advisory Committee for Degree Dissertation

Maria Grigoriou, Associate Professor, mgrigor@mbg.duth.gr

Aglaia Pappa, Assistant Professor, apappa@mbg.duth.gr

Giannoulis Fakis, Assistant Professor , gfakis@mbg.duth.gr

Chryssoula Metallinou, Research Associate, cmetalli@mbg.duth.gr, (+3025510-30641)

Two representatives of the Student Union

DESCRIPTION OF COMPULSORY MODULES

PHYSICS FOR BIOLOGICAL SCIENCES

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	3	1	4	6

Course Objectives

The objectives of the course are:

a) Provide a concise introduction and overview of the principal physical concepts that are necessary for the understanding of phenomena and mechanisms encountered in Chemistry, Biochemistry and Molecular Biology and Genetics.

b) Present the physical foundations of technological tools and techniques commonly used for studying and interacting with biological systems.

c) Outline the basic philosophical concepts that bridge physics with life (thermodynamics of evolution, complex systems, self-organization, etc.)

d) Trigger further discussion, inquiry and study in the area of physics application in molecular biology and genetics.

e) Present the scientific methodology, as well as concepts and best practices of scientific knowledge management.

Course Contents

Lectures

- Introduction: Physics and Molecular Biology and Genetics. Physics in the study of biological systems. Scientific methodology. Experimental procedure, measurement and errors. Scientific knowledge management, scientific literature management, scientific knowledge presentation.

- Evolution of Physics I: Basics of classical mechanics. Principal law of motion. Universal laws of energy, momentum, and angular momentum conservation. Gravity. An example of classical mechanics: hydrodynamics of macromolecules, hydrodynamics as an analytical tool, centrifugation.

- Evolution of Physics II: Theory of electromagnetism. Electric charge, electric force. Moving electric charge, magnetic force. The field concept. Electromagnetic waves and Maxwell theory. Electromagnetic spectrum, interaction of electromagnetic waves with matter and applications in biological sciences.

- Evolution of Physics III: Modern physics. Problems in classical physics (black body radiation, photoelectric effect, atomic absorption spectra, atomic stability). Planck-Einstein energy quantization, Bohr's atomic model. Particle-wave duality of matter and light. Principles of quantum mechanics. Uncertainty principle. Spin and exclusion principle. Quantum theory of matter.
- Light in Modern Physics: Nature and characteristics. Analysis of light spectrum. Light as quantum wave-particle. Production of light. Light as a geometrical ray, geometrical optics, reflection, refraction, physics of vision, microscopy. Light as a wave, polarization, crystallography. Material waves: ultrasound imaging and microscopy.

- Matter in Modern Physics. Atoms and Molecules. Atoms and molecules in modern physics. Atomic and molecular energy levels. Interaction of light and matter. Atomic and molecular spectroscopy. Luminescence and bioluminescence. LASER and applications in biological sciences. X rays and applications in biological sciences (imaging and therapy).

- Matter in Modern Physics. Atomic Nucleus. Nuclear structure. Nuclear forces and energy. Isotope chart, stable and radioactive isotopes. Radioactivity (a, b and γ disintegration). Radiation detection and dosimetry. Biological effects of radiation. Radioctive tracing, imaging and molecular imaging (scintillation, SPECT, PET). Nuclear magnetic spectroscopy, imaging and microscopy.

- Macroscopic Systems. Macroscopic physical variables. Temperature and thermodynamics. Entropy and life. Complex systems. Thermodynamics and self-organization of matter.

Practicals

Practicals involve small group (1-2 persons) assignments on the study and presentation of specific topics in physics as applied to molecular biology and genetics. Each assignment involves search and study of scientific literature, a 20 min presentation and follow-up discussion based on audience questions. Students can choose their assignment out of more than 70 available topics.

Instructor

E. Kaldoudi, Assistant Associate Professor of Physics of Medical Imaging – Telemedicine .

Recommended Reading

Title:	Physics Today
Author(s):	Economou E.N.
Publishing Company:	Cretan University Press
Place & Year of Publishing:	Heraklion 2004
ISBN:	960-7309-08-1

EUDOXUS code: 274

Title:	Physics Chapters
Author(s):	Anagnostopoulos A., Doni E., Karakostas Th., Komninou F.
Publishing Company:	Ziti
Place & Year of Publishing:	Thessaloniki 1998
ISBN:	960-431-249-9
EUDOXUS code:	11065

Course Notes

The following course notes are also available from the course website [in greek]

Title:	Concept Evolution in Physics
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	Principles of Sedimentation & Centrifugation]
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	Physics of Light
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	Radioactivity: Detection, Biological Effects and Imaging
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	Nuclear Magnetic Resonance Spectroscopy & Imaging Author(s): E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	X-rays
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011
Title:	Ultrasound
Author(s):	E. Kaldoudi
Place & Year of Publishing:	Alexandroupoli 2011

Practical Notes

The assignments involve specialized scientific literature proposed for each individual topic, which mainly involves scientific articles.

Teaching Methods

Theatre lectures on the basic theoretical concepts. More special topics are analyzed as students' assignments, presented by students and thoroughly discussed in the classroom. On occasion, invited speakers present specialized topics, while students engage in web based assignments and self-

evaluation exercises. The course is fully supported on the web, where discussion forums are also provided.

Language of instruction

Greek. Suggested further reading includes a number of publications in English.

Assessment Methods

Written exams, based on multiple choise questions. Assessment of students' presentations based on well defined criteria.

INORGANIC CHEMISTRY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	3	3	4	6

INTRODUCTION TO BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	3	3	4	6

Course Objectives

The objectives of the course are:

a) introduction to the basic knowledge of structural and functional biology from unicellular to multicellular organisms

b) introduction to biodiversity (flora and fauna)

c) introduction to the main aspects of evolutionary process

d) study of structure and function of higher plants

e) acqaintance with basic biology lab equipment and techniques

f) practice in quick and critical thinking and linking of academic to previous knowledge in biology

Course Contents

Lectures

- Origin and properties of life
- Macromolecules and their characteristics

- Structure and function of prokaryotic cells
- Structure and function of eukaryotic cells
- Viruses-viroids-prions
- Principles of taxonomy and evolution of organisms
- Protists and yeasts
- Animal diversity
- Plant diversity
- Higher plants structure and function

Practicals

1. Microscopy (3 hours)
2. Prokaryotic cells (3 hours)
3. Eukaryotic cells – dying techniques (3 hours)
4. Principles of invertebrate taxonomy (6 hours)
5. Fauna of Greece (3 hours)

Instructor

M. Alexiou Chatzaki, Lecturer of General Biology

Recommended Reading

Title: Biology
Author(s): A. Zisι, Z. Mamouris, K. Moutou
Publishing Company: University of Thessalia
Place & Year of Publishing: Larissa 2008
ISBN: 978-960-8029-66-8
EUDOXUS code: 6006

Practical Notes

Title:. Introduction to biology - Practical notes for 1st year students
Author(s): M. Alexiou Chatzaki
Place & Year of Publishing: Alexandroupolis 2008

Teaching Methods

Lectures, practical excercises, documentaries.

Assessment Methods

Written examination at the end of the semester.

CELL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
c'	c	4	3	5	7

Course contents

Comprehension of the cell structure and function is important for understanding of all biological sciences. Comparison of similarities and differences between cell types is important. Topics covered will include single cell organisms and viruses, as well as multi cell systems.

This course will allow students to develop a comprehension of the basic concepts of behavior, physiology and interaction of cells with their environment, at the microscopical and molecular level, the molecular mechanisms involved in cell function, as well as to achieve a closer review of the literature.

Lectures

- Cell structure and function-Methodology
  - Light Microscopy - Fluorescence Microscopy techniques
  - Electron Microscopy -
  - Immunocytochemistry
  - Cell fractionation, Chromatography
  - Gel electrophoresis
  - Cell culture
- Procaryotic cell, eukaryotic cell, viruses, intracellular compartments and cell organelles (nucleus, mitochondria, ER, Golgi, chloroplasts, peroxisomes, lysosomes)
- Nuclear pores, nuclear lamina
- Protein structure and function
- Intracellular compartments and protein sorting: nuclear-cytoplasmic transport, intracellular vesicular traffic
- Cell membrane structure: the lipid bilayer, membrane proteins
- Membrane transport: principles, carrier proteins, ion channels, electrical properties of membranes
- Cytoskeleton: actin filaments, intermediate filaments, microtubules, molecular motors, cell behavior
- Mechanisms of cell division, cell cycle, senescence and cell death
- Cell communication, cell junction, cell adhesion and the extracellular matrix
- Stem cells and gene therapy, cancer, the lives and deaths of cells in tissues

Practicals

1. Mitosis (3hrs)
2. Osmosis – animal and plant cells (2hrs)
3. Cell fractionation, organelle separation, protein extraction (3hrs)
4. SDS PAGE electrophoresis, Coomassie blue staining (4 hrs)
5. Electroblotting (3hrs)

6. Western blotting analysis (6hrs)

Instructor

Maria koffa, Associate Professor of Cell Biology

Recommended Reading

Title: Essential Cell Biology, second edition,
Author(s): Alberts et al.,
Publishing Company: Garland Science
Place & Year of Publishing: 2006
ISBN: 978-960-489-276-1
EUDOXUS code: **13256944**

Title: Cell Biology
Author(s): Marmaras and Labropoulou-Marmara
Publishing Company:
Place & Year of Publishing: 2005
ISBN: 960-7620-13-5
EUDOXUS code: 6

Title: Cell Biology
Author(s): Margaritis Loukas et al.
Publishing Company: K. & N. LITSAS O.E.
Place & Year of Publishing: 4th edit./2004
ISBN: 960-372-077-1
EUDOXUS code: 25249

Title: Regulatory mechanisms of cell function
Author(s): Thomopoulos Georgios
Publishing Company: University Studio Press A.E.
Place & Year of Publishing: 1st edit./2006
ISBN: 978-960-12-1549-5
EUDOXUS code: 17508

The power point presentations of the lectures are provided (in a pdf format) at the e-class of the course

Title: Practical exercises in Cell Biology
Author(s): Maria Koffa
Place & Year of Publishing: Alexandroupolis, 2013

Teaching Methods

Lecture course: powerpoint presentations and videos. These, together with recommended books are up-loaded in the e-class of the course.

Laboratory course: practical exercises based on the practical notes and the presentations given before each

practical exercise.

Web sites related to the course, for further study

Scientific papers given to the students for further study, and for presentation of a subject related to the course (voluntarily)

Language

Mainly greek, the scientific papers are in English

Assessment Methods

Written exam at the end of the semester, mainly based on multiple-choice questions (80%). Written exams at the end of each practical exercise (20%). Voluntarily presentation of a subject related to the course (rewarded an additional 10% of the final mark)

BIOSTATISTICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	2	0	2	4

Course contents

- Epidemiological Study design – descriptive, analytical and experimental
- Basic experimental designs – clinical trials
- Epidemiological Measures – rate, incidence and prevalence, relative risk, odds ratio
- Reliability and validity of screening and diagnostic tests, ROC analysis
- Sampling – random and non-random sampling methods
- Data summarization – measures of averages and dispersion
- Data Presentation techniques – graphical and tabular
- Normal distribution – properties and applications
- Estimation – standard error, confidence intervals – definition, computation, interpretation and applications
- Basic principles of testing of hypothesis
- Test of significance – t-test, one way anova, repeated measures anova, chi square and non-parametric methods – sample size
- Correlation and regression
- Logistic regression
- Survival analysis
- Software packages – SPSS.

Instructor

G. Trypsianis, Associate Professor

Teaching Methods

Lectures, documentaries

Assessment Methods

Written examination at the end of the semester

Language of instruction

Greek

INTRODUCTION TO COMPUTATIONAL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	3	3	4	6

Course Objectives

Introduction to scientific computing, Unix, C.

Course Contents

Lectures

UNIX: history, characteristics, versions, login-logout, filesystem, directories, users and groups, commands cd, ls, chmod, substitution characters, standard input-output and redirection, find, cat, tail, tee, ln, mv, cp, rm, umask, chown, chgrp, mkdir, rmdir, gzip, gunzip, tar, more, who, finger, date, cal, Networks: architecture, TCP/IP, protocols and examples, ssh, ftp, telnet, talk, unix mail, http, introcuction to html. C: variables and types, for, if-else, while, functions: print() and scanf(), characters, encodings, applications.

Practicals

1st PRACTICAL EXERCISE, 3 hours

- login, logout
- The unix shell
- The filesystem
- cd, pwd, ls, mkdir, rmdir
- Editors: vi, joe, nedit, xedit
- cat, more, cp, mv, rm

2nd PRACTICAL EXERCISE, 3 hours

- cd, pwd, ls, mkdir, rmdir, cp, mv, rm, cat, more
- Special substitution characters: ~, *, ?
- chmod

3rd PRACTICAL EXERCISE, 3 hours

- tar
- grep, find, tail, head, wc
- w, who, finger

4th PRACTICAL EXERCISE, 3 hours

• Unix: the full monty

5th PRACTICAL EXERCISE, 3 hours

• C: introduction24

• The compiler

• printf()

• for

• if and if-else

• Types: int, float

• One-dimensional arrays

6th PRACTICAL EXERCISE, 3 hours

• First application: the least-squares program

7th PRACTICAL EXERCISE, 3 hours

• Characters, strings

• Application: calculation of the molecular weight of a protein from its sequence

• Application: calculation of a hydropathy plot of a protein from its sequence, application to bacteriorhodopsin

8th PRACTICAL EXERCISE, 3 hours

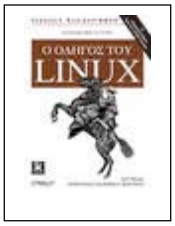
• C, the full monty: program writing exercise

Instructor

Nicholas M. Glykos, Assistant Professor (**Structural and Computational Biology**).

Recommended Reading.

Title:	Teach Yourself C in 21 Days
Authors:	Aitken, Jones
Edition:	2006
ISBN:	978-960-512-491-5
EUDOXUS code:	12373



Title:	Running Linux
Authors:	WELSH, DALHEIMER & KAUFMAN
Edition:	2002
ISBN:	960-209-408-7
EUDOXUS code:	13813

Title:	The UNIX programming environment
Authors:	BRIAN W. KERNIGHAN, ROB PIKE
Edition:	2011
ISBN:	978-960-332-208-5
EUDOXUS code:	12530814

Teaching Methods

Lectures, eight practical exercises.

Assessment Methods

Practical exercises 30%, Exams (multiple choice), 70%

ENGLISH I

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
A'	C	2	0	2	3

Ojectives

- To familiarize students with scientific vocabulary found in authentic texts relevant to their subject of study and improve their reading skills. This will enable them to cope more efficiently with bibliography and research requirements in their future studies and subsequent career.
- To improve their competence in the written language
- To equip them with the necessary knowledge of grammatical structures and syntactical phenomena which will facilitate a better understanding of language functions
- To encourage critical thinking and discussion of the hot issues in genetics today, thus building students' confidence in speaking.
-

Course Contents

A wide range of authentic material is used. In the first semester the students are introduced to scientific vocabulary of related fields such as Medicine (Human Anatomy, Common Diseases and Ailments), Anthropology (Theories of Evolution),, Chemistry (Chemical Elements and Compounds) e.t.c.

Instructor

Nalbanti Eleni, Teaching Assistant

Teaching methods:

- Systematic development of the four language skills through realistic challenging tasks which encourage the learner's personal engagement
- clear presentation of the target language through a variety of interesting authentic texts, such as recent articles from scientific journals, accompanied by lexical exercises practising the essential vocabulary thoroughly. The texts are also followed by exercises specifically designed to develop the required techniques through which students acquire the necessary text information quickly and effectively.
- a wide range of speaking activities
- a variety of listening and writing tasks

In all above mentioned areas students work individually, in pairs or groups depending on the type of task. Particular emphasis is given to group work as it gives students ample opportunity to participate in real life communicative activities.

Assessment methods

The course is assessed by an end- of –term written examination.

ENGLISH II

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	2	0	2	3

Ojectives

- To familiarize students with scientific vocabulary found in authentic texts relevant to their subject of study and improve their reading skills. This will enable them to cope more efficiently with bibliography and research requirements in their future studies and subsequent career.
- To improve their competence in the written language
- To equip them with the necessary knowledge of grammatical structures and syntactical phenomena which will facilitate a better understanding of language functions
- To encourage critical thinking and discussion of the hot issues in genetics today, thus building students' confidence in speaking

Course Contents

A wide range of authentic material is used. In the second semester the reading texts and exercises focus on topics related to Biology (The Cell, The Biological Clock), Molecular Biology and Genetics (Alterations in the Genetic Material, DNA Repair, The Genetic Content of the Human Genome).

Instructor

Nalbanti Eleni, Teaching Assistant

Teaching methods:

- Systematic development of the four language skills through realistic challenging tasks which encourage the learner's personal engagement
- clear presentation of the target language through a variety of interesting authentic texts, such as recent articles from scientific journals, accompanied by lexical exercises practising the essential vocabulary thoroughly. The texts are also followed by exercises specifically designed to develop the required techniques through which students acquire the necessary text information quickly and effectively.
- a wide range of speaking activities
- a variety of listening and writing tasks

In all above mentioned areas students work individually, in pairs or groups depending on the type of task. Particular emphasis is given to group work as it gives students ample opportunity to participate in real life communicative activities.

Assessment methods

The course is assessed by an end- of –term written examination.

INTRODUCTION TO ORGANISMAL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	3	3	4	6

Course Objectives

The objectives of the course are:

a) introduction to organismal biology emphasizing the diversity of systems and physiology of animals through the comparison from unicellular organisms to humans
b) introduction to the principles of ecology and conservation
c) acquaintance with the anatomy of model orgnanisms
d) acquaintance with natural environment and the local biodiversity

Course Contents

Lectures

- Animal tissues
- Homeostasis - Thermoregulation
- Nervous system and Senses
- Dermal – Skeletal – Muscle system
- Circulatory – Respiratory system
- Digestive – Excretory system
- Reproductive system and development
- Ecosystems ecology
- Energy flow – Trophic relationships – Biogeochemical cycles
- Population ecology
- Community ecology

Practicals

1. Fish anatomy (3 hours)
2. Frog anatomy (3 hours)
3. Mouse anatomy (3 hours)
4. Field excursion and data analysis (9 hours)

Instructor (s)

M. Alexiou Chatzaki, Lecturer of General Biology

Recommended Reading

Title:	Biology
Author(s):	A. Zish, Z. Mamouris, K. Moutou
Publishing Company:	University of Thessalia
Place & Year of Publishing:	Larissa 2008
ISBN:	978-960-8029-66-8
EUDOXUS code:	6006

Practical Notes

Title:.	Introduction to organismal biology – Practical notes for 1st year students
Author(s):	M. Alexiou Chatzaki
Place & Year of Publishing:	Alexandroupolis 2008

Teaching Methods

Lectures, practical excercises, documentaries, field excursion.

Assessment Methods

Written examination at the end of the semester.

PHYSIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
D'	C	4	3	5	7

Course Objectives

The objectives of the course are:

a) To comprehend the fundamental principles of systems physiology and their underlined mechanisms. Particular emphasis is given on how molecular mechanisms and cellular functions through sequential and reasonable associations integrate together for the coordination of systemic function and organism's homeostasis.

b) To provide an understanding of the basic molecular machinery and signaling cascades responsible for cell communication at the cellular and multi-cellular level.

c) To study and compare differentiated cell types of the body and link them with systemic physiology and specialized function.

d) To understand the basic principles underlining the functions of mammalian nervous, muscular, cardiovascular, respiratory, renal, digestive and reproductive systems.

e) To comprehend the endocrine regulation of metabolism and development.

f) To discuss modern molecular biology research methods employed to resolve outstanding questions concerning mammalian physiology through discussion and analysis of scientific articles of current literature.

Course Contents

Lectures

1. Introduction - Fundamental principals in Physiology - Movement of molecules through membranes
2. Systems of homeostatic control - Feedback systems and local homeostatic responses
3. Nervous tissue and membrane potentials - Synapses and transmission of action potentials
4. Skeletal muscle cells - Molecular mechanisms of muscle contraction - Energetics of skeletal muscle
5. Smooth muscle cells - Molecular mechanisms of muscle contraction - Control of body movement
6. Cardiac muscle cells - cardiac pulse - cardiac output

7. Blood flow and control of blood reassure - Vascular and lemphatic systems
8. Organization of respiratory system - Mechanics of breathing - Gas exchange and transport - Saturation of hemoglobin
9. Acid-base balance - Regulation of ventilation
10. Kidney functions : Filtration - Reabsorption -Secretion - Excretion
11. Fluid and electrolyte balance
12. Calcium homeostasis and hormonal regulation
13. Regulation and functions of the organs of digestive system (food digestion and absorption)
14. Endocrine control of growth and metabolism
15. Control of growth and development - Growth hormonal effects
16. Reproductive physiology - Sex hormones
17. Integration of organ functions - Neuroendocrine control - Principals of function of hormonal control systems
18. The role of hypothalamus and pituitary on hormonal control systems
19. Organization of the central nervous system
20. General and special senses

Practicals

1. Cell transport mechanisms and permeability (3 hours).
2. Neurophysiology of nerve impulses (3 hours)
3. Skeletal muscle physiology (3 hours)
4. Energetics of muscle contraction (3 hours)
5. Blood physiology : Functions of white/red blood cells - Counting of white/red blood cells - Overview of the blood lineages - General characteristics of granulocytes - Determination of the hematocrit value (3 hours)
6. Cardiac function – Frog cardiac system (3 hours)
7. Respiratory function (3 hours)
8. Renal function (3 hours)
9. Hormonal regulation of glucose (3 hours)
10. Determination of peptic enzymes of mammalian digestive system (3 hours)
11. Study and analysis of relevant scientific articles from current bibliography

Instructor (s)

A. **Pappa, Assistant Professor of Molecular Physiology-Pharmacology**

Recommended Reading

Title: Physiology: The Mechanisms of Body Function
Author(s): Vander A., Sherman J., Luciano D.
Publishing Company: Broken Hill Publishers Ltd
Place & Year of Publishing: Athens, 1st edition/2011
ISBN: 9789604892259
EUDOXUS code: 13257031

Title: Physiology
Author(s): Linda S. Costanzo
Publishing Company: Lagos D.
Place & Year of Publishing: Athens, 4th edition/2012
ISBN: 9789607875754
EUDOXUS code: 22698807

Practical Notes

Title: Physiology – Laboratory manual
Author(s): A. Pappa
Place & Year of Publishing: Alexandroupolis 2010

Course lecture notes are available at https://eclass.duth.gr

Teaching Methods

Lecture course, laboratory course, e-class, guided literature research assignments

Assessment Methods

Students' evaluation is based on their performance on practical reports, written and oral assignments (10%), mid-term exams (20%) and final exams (70%).

ORGANIC CHEMISTRY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	3	3	4	6

Course Objectives

The objectives of the course are:

a) The knowledge of structure, stereochemistry, electronic phenomena and spectroscopic characteristics of organic compounds, given that almost all biological interesting compounds are categorized as organic compounds

b) The knowledge of the structural and electronic characteristics of heterocyclic compounds, amino acids and sugars which consist the main components of biological molecules.

Course Contents

Lectures

- Nomenclature
- Isomerism
- Electronic phenomena
- Stereochemistry
- Spectroscopy
- Mechanisms of organic reactions
- Aromaticity
- Aromatic and heterocyclic compounds
- Lipids
- Aminoacids
- Carbohydrates

Practicals

1. Recrystallization (3 hours).
2. Extraction (3 hours).
3. Distillation (3 hours).
4. Chromatography methods (layer, column, and ιon exchange chromatography), (3 hours).
5. Detections of structural features (double bonds, carbonyls, sugars, amino acids), (3 hours).

Instructor (s)

K. C. Fylaktakidou, Assoc. Prof. of Chemistry of Organic Compounds.

Recommended Reading

Title: Οργανική Χημεία Επίτομο: Μέρος Πρώτο και Δεύτερο
Author(s): Νικολαΐδης Δημήτριος
Publishing Company: Ζήτη Πελαγία &Σια Ο.Ε.
Place & Year of Publishing: 1η έκδοση 1996
ISBN: 978-960-456-291-6
EUDOXUS code: 13004940

Title: Επίτομη Οργανική Χημεία
Author(s): Βάρβογλης Αναστάσιος Γ.
Publishing Company: Ζήτη Πελαγία &Σια Ο.Ε.
Place & Year of Publishing: 1η έκδοση 2005
ISBN: 960-431-948-5
EUDOXUS code: 10998

Practical Notes

Title: Safety, Theory and Practice of Laboratory Techniques
Author(s): K. C. Fylaktakidou
Place & Year of Publishing: Ed. DUTH, 2007

Teaching Methods

Electronic presentations of the courses are provided during the lectures, which are accessible to the students via e-class program. Molecular models for the understanding of the 3-dimentional space of the compounds, seminars and practical lab exercises.

Language of instruction

Greek

Assessment Methods

End of term written examinations, Laboratory examination sheets.

MBG114 PHYSICAL CHEMISTRY AND ELEMENTS OF BIOPHYSICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	3	2	5	4

BIOCHEMISTRY I

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	3	3	4	6

Course Objectives

The objectives of the course are :

a) Introduction to basic concepts of Biochemistry

b) Introduction to the structure - chemical properties and function of biomolecules (the building blocks of life) with special emphasis to amino acids and proteins.

c) Introduction to Enzymology

Course Contents

Lectures

- Review of basic chemical concepts {forces that hold atoms and biomolecules together (chemical bonds); forces that drive reactions (thermodynamics)}
- Characteristics of water molecule and Aqueous solutions
- Structure of aminoacids
- Structure and function of proteins
- Principles of protein purification
- Enzymes (function-kinetics-types of catalysis-inhibitors-control)
- Sugars: structure and properties
- Lipids: structure and properties
- Nucleic acids : structure-properties- biosynthesis

- Introduction in Protein synthesis, modification, trafficking and degradation

Practicals

- preparation of aqueous Solutions - the Dilution Law (3 hrs)
- Protein Quantification (Bradford) (2-3 hrs)
- Phosphatase Assay (3 hrs).

Instructors

P. MAYROMARA, Professor.

K.R. KATSANI, Lecturer

Recommended Reading

Title: BIOCHEMISTRY
Author(s): BERG J.M., TYMOCZKO J.L., STRYER L.
Publishing Company: Crete University Press
Place & Year of Publishing: : 2009
ISBN: 978-960-524-190-2
EUDOXUS code: 350

Title: Biochemistry: Basic Concepts
Author(s): Lehninger S./ Nelson D.
Publishing Company: Paschalidis Medical Publications
Place & Year of Publishing: Athens, 2011
ISBN: 9789604892204
EUDOXUS code: 12602324

Course Notes

e-class

Practical Notes

copies during the practicals

Teaching Methods

- Power point lectures
- homework
- Literature updates
- e-class

Assessment Methods

Semester final exams and reports and performance in the in practical courses.

GENETICS I

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
B'	C	3	3	4	6

Course Objectives

The objective of the course is the introduction to the basic principles of Genetics, through the presentation and understanding of:

- the nature of the genetic material and the genome
- gene structure
- extranuclear inheritance
- the chromosomal theory and sex determination in various organisms
- the cell cycle and the influence of the genetic cycle on heredity.
- Mendelian principles and their applications
- the principles of non-Mendelian inheritance
- the principles of the influence of environmental factors on the development of the phenotype
- the mechanisms that may lead to inherited or de-novo abnormalities on a gene or chromosomal level, and their phenotypic impact
- the most important historical advances in the field of Genetics

Course Contents

Lectures

- Introduction to Genetics
- DNA and gene structure
- Gene mutations
- Extranuclear inheritance
- Mitosis-Meiosis
- Mendelian inheritance
- Chromosomal theory of inheritance, sex determination
- Extensions of Mendelian inheritance
    - Sex linked inheritance
    - Multiple alleles
    - Epistasis

- Lethal alleles
- Chromosomal abnormalities
- Introduction to Genomics
- Genotype-Environment interaction – Introduction to Epigenetics

Practicals

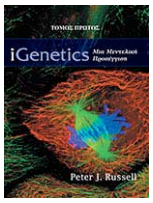
1. Blood groups (3 hours)
2. Barr body (3 hours)
3. Study section (3 hours)

Names of Lecturers

Ioanna Maroulakou, Professor of Genetics

Peristera Paschou, Assistant Professor of Population Genetics

Recommended Reading



Title:	iGenetics - A Mendelian Approach
Author:	Peter J. Russell
Publishing Company:	Academic Publications J. Basdra & Co.
Place & Year of Publishing:	Alexandroupoli, 2009
ISBN¨	978-960-88412-8-4
EUDOXUS code:	13003328

Title:	Introduction to Genetics
Author:	Michael G. Loukas
Publishing Company:	Stamoulis Publications
Place & Year of Publishing:	Athens, 2010
ISBN¨	978-960-351-814-3
EUDOXUS code:	23093

Course Notes

Course notes are available on-line through the electronic platform e-class.

Practical Notes

Practical notes are available on-line through the electronic platform e-class.

Teaching Methods

Lectures, Practicals, and Study Sections.

Language of instruction

Greek.

Assessment Methods

Final exam.

BIOCHEMISTRY II

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
C'	C	4	3	5	6

Course Objectives

I) Life cannot exist without taking energy from the surrounding environment and transforming it to useful purposes. The course covers basic concepts of metabolic processes (interlinked chemical reactions of biomolecules) and bioenergetics.. It focuses on central metabolic pathways -shared by all forms of life- and their implication in life processes and disease. Emphasis is given to the degradative phase of metabolism (catabolism) in which organic nutrient molecules (carbohydrates, fats, and proteins) are converted into smaller molecules releasing energy, some of which is conserved in the formation of ATP and reduced electron carriers (NADH, NADPH, and FADH2). The characteristics of key energy carrier molecules (such as ATP) will be discussed.
II) A special focus is given on the control of metabolism, signal biomolecs (such as hormones), and tissue metabolic profiles.

Course Contents

➢ Lectures

- Basic concepts on metabolism
- Glucose metabolism
- The Citric Acid Cycle
- Bioenergetics and Oxidative Phosphorylation
- Metabolic pathways in plants - Photosynthesis.
- Fatty Acid metabolism (biosynthesis and β-oxidation)
- Metabolic pathways in plants - Photosynthesis
- Amino Acids metabolism (oxidation and the production of urea)
- Integration and regulation of human metabolism

Practicals

1) practical on glucose metabolism or biochemical calculations (2 hrs)
2) protein purification techniques : gel filtration (3 hrs)
3) redox enzymes in metabolism (3 hrs)

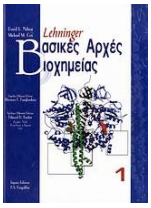
Instructors

P. MAYROMARA, Professsor

K.R. KATSANI, Lecturer

Recommended Reading

Title:	BIOCHEMISTRY
Author(s):	BERG J.M., TYMOCZKO J.L., STRYER L.
Publishing Company:	Crete University Press
Place & Year of Publishing: :	2009
ISBN:	978-960-524-190-2
EUDOXUS code:	350



Title:	Biochemistry: Basic Concepts
Author(s):	Lehninger S./ Nelson D.
Publishing Company:	Paschalidis Medical Publications
Place & Year of Publishing:	Athens, 2011
ISBN:	978960489220
EUDOXUS code:	12602324

Course Notes

e-class

Practical Notes

copies during the practicals

Teaching Methods

- Power point lectures
- homework
- Literature updates
- e-class

Assessment Methods

Semester final exams and reports evaluation and performance in the practicals

MBG 203 CELL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
C'	C	3	3	5	6

Course Objectives

Comprehension of the cell structure and function is important for understanding of all biological sciences. Comparison of similarities and differences between cell types is important. Topics covered will include single cell organisms and viruses, as well as multi cell systems.

This course will allow students to develop a comprehension of the basic concepts of behavior, physiology and interaction of cells with their environment, at the microscopical and molecular level.

Course Contents

Lectures

- Cell structure and function-Methodology
    - Light Microscopy - basics
    - Electron Microscopy - basics
    - Immunocytochemistry
    - Cell fractionation
    - Chromatography
    - Gel electrophoresis
    - Cell culture
- Procaryotic cell, eukaryotic cell, viruses, intracellular compartments and cell organelles (nucleus, mitochondria, ER, Golgi, chloroplasts, peroxisomes, lysosomes)
- Protein structure and function
- Chromatin organization (briefly), nuclear pores, nuclear lamina
- Cell membrane structure: the lipid bilayer, membrane proteins
- Membrane transport: principles, carrier proteins, ion channels, electrical properties of membranes
- Cytoskeleton

Practicals

7. Mitosis (3hrs)
8. Osmosis – animal and plant cells (2hrs)
9. Cell fractionation, organelle separation, protein extraction (3hrs)
10. SDS PAGE electrophoresis, Coomassie blue staining (4 hrs)

Instructor

Maria Koffa, Assistant Professor of Cell Biology

Recommended Reading

Title: Essential Cell Biology, second edition,
Author(s): Alberts et al.,
Publishing Company: Garland Science
Place & Year of Publishing: 2006
ISBN: 978-960-489-276-1
EUDOXUS code: **13256944**

Title: Cell Biology
Author(s): Marmaras and Labropoulou-Marmara
Publishing Company:
Place & Year of Publishing: 2005
ISBN: 960-7620-13-5
EUDOXUS code: 6

Course Notes

The power point presentations of the lectures are provided (in a pdf format) at the e-class of the course

Practical Notes

Title: Practical exercises in Cell Biology
Author(s): Maria Koffa
Place & Year of Publishing: Alexandroupolis, 2011

Teaching Methods

Lecture course: powerpoint presentations and videos. These, together with recommended books are up-loaded in the e-class of the course.

Laboratory course: practical exercises based on the practical notes and the presentations given before each practical exercise.

Web sites related to the course, for further study

Scientific papers given to the students for further study, and for presentation of a subject related to the course (voluntarily)

Language of instruction

Mainly greek, the scientific papers are in English

Assessment Methods

Written exam at the end of the semester, mainly based on multiple-choice questions (80%). Written exams at the end of each practical exercise (20%). Voluntarily presentation of a subject related to the course (rewarded an additional 10% of the final mark)

INTRODUCTION TO MOLECULAR BIOLOGY TECHNIQUES

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
C'	C	3	0	4	6

Course Objectives

A course of basic molecular biology methods. The concept and aplications of several techniques, is described using a case study approach. Emphasis is given on the applications in Health and Agriculture.

Course contents:

Module I: Enzymes in Molecular Biology.

1. Introduction to Restriction enzymes.
2. Restriction enzymes.
3. DNA polymerases and their use in DNA labeling (nick translation, random priming)
4. RNA polymerases.
5. DNA ligases.
6. Nucleases.
7. DNA kinases and phosphatases and their use in DNA labeling.
8. Recombination enzymes (cre, FLP recombinases).
9. Proteinase K.

Module II: Prokaryotic cloning systems.

1. Elements of E. coli biology.
2. Cloning vectors (plasmid vectors, viral vectors, phagemids, YACs and BACs).

Module III: Purification and analysis of nucleic acids.

1. DNA purification (plasmid, viral, genomic).
2. RNA purification (total RNA / poly A-RNA).
3. DNA and RNA analysis.
4. Electrophoresis of nucleic acids (agarose and polyacrylamide gels).
5. Southern / Northern blotting.
6. RNAse protection, primer extention.

Module IV: PCR.

1. Introduction to PCR.
2. Primer selection.
3. Degenerate primers.
4. Cloning PCR products.
5. Touch-down PCR.
6. Hot start PCR.
7. Nested PCR.
8. Inverse PCR.

9. Reverse Transcription PCR / RT-PCR.

10. Differential Display PCR.

11. SELEX (Systematic Evolution of Ligands by Exponential Enrichment).

12. In vivo footprinting.

13. Analysis of polymorphisms using PCR.

14. Real time PCR.

Module V: Sequencing

1. Maxam – Gilbert method.

2. Sanger method (+ automated PCR sequencing).

3. Pyrosequencing.

Module VI: Libraries

1. Genomic Libraries.

2. cDNA libraries (construction of cDNA libraries, full length cDNA cloning, expression libraries, forced cloning).

Instructor

Georgios Skavdis, Assistant Professor of Molecular Biology

Recommended Reading

Tile: Recombinant DNA
Authors: Watson D.A. κα
Publishing Company: Academic Publications
Place & Year of Publishing: 1st 2010
ISBN: 978-960-88412-5-3
EUDOXUS code: 2625.

Title: Basic Laboratory Calculations
Authors: Lisa Seidman
Publishing Company: Academic Publications
Place & Year of Publishing: 1st 2010
ISBN: 978-960-88412-9-1
EUDOXUS code: 5319

Course Notes

Title: Introduction to Molecular Biology Techniques
Authors: Georgios Skavdis
Place & Year of Publishing: Alexandroupolis, 2011

Language of instruction

Greek

Teaching methods

Lectures, Practicals.

Participatory method of teaching.

Assessment methods

Comprehensive final exam.

MOLECULAR BIOLOGY I

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
C'	C	4	1	5	5

Course Objectives:

- To understand the fundamental principles of information flow and the nature of genetic material in Molecular Biology terms.

- To develop a combination of analytical skills and synthesis.

- To realize that the priority is to understand mechanisms and regulatory circuits rather than memorizing details.

- To learn about the basic principles of transcription and the related regulatory mechanisms in prokaryotes and to contrast the structure of their genetic material to that of the genetic material of eukaryotes.

- To invoke a sense of admiration by realizing the complexity, the beauty and the efficiency of the molecular mechanisms under study.

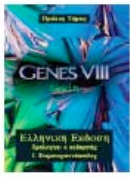
Course contents

1. Introductory concepts. The flow of genetic information. The nature of the gene. The structure of the genetic material. Genetic material in change (mutations). The genetic code. *cis*-Acting elements and *trans*-acting factors.
2. The interrupted gene. Introns and Exons.
3. Transcription in prokaryotes.
4. The operon.
5. Regulatory circuits in bacteria.
6. Phage strategies. The lytic cycle and lysogeny.
7. The structure of the genetic material in eukaryotes. The chromosomes.
8. The nucleosomes.

Instructor

Raphael Sandaltzopoulos, Associate Professor

Recommended reading:



Tile:	Genes VIII
Authors:	Lewin
Publishing Company:	Academic Publications
Place & Year of Publishing:	2004
ISBN:	960-88412-2-6
EUDOXUS code:	13003327.

Teaching methods

The Units of the Syllabus are presented and thoroughly analyzed in the amphitheater employing powerpoint presentations and/or videos. Emphasis is given upon formulating questions which the students attempt to answer. This procedure triggers discussions and offers an opportunity to use the principles that are being elaborated in each session. At the end of every unit, a list of the main points is put together and the conclusions are summarized. During reinforcing sessions, the main points are revisited through a different perspective, mainly through the analysis of experimental approaches, applications or suitable patient study cases referring to the particular molecular mechanism. The assessment method of pre-examination (based on multiple choice questions) during the semester is also utilized as a teaching tool since it sensitizes the students to use analysis and synthesis. During the semester, the students are invited to raise questions, share opinions and argue about certain cellular mechanisms that are scrutinized at the molecular level. In every opportunity, students are encouraged to participate in the discussion in order to elicit certain conclusions.

Assessment methods:

The assessment method comprises a non-compulsory pre-examination based on multiple choice questions (counts for up to 20% of the total remark) and written exams during the exam period. Bonus points may be gathered by students that volunteer to perform certain tasks (e.g. prepare and deliver presentations of current literature). Questions that have been discussed in detail during the courses are used as the framework for the exams.

Language of instruction

Greek. Study of original scientific literature (in English) may be required in certain voluntary tasks (review and presentation of advanced topics of molecular biology.

GENETICS II

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
D’	C	3	3	4	6

MBG 214 MOLECULAR BIOLOGY II

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
D'	C	3	-	3	5

Course Objectives

The objectives of the course are:

This core module provides knowledge essential for all Molecular Biology & Genetics students. The molecular mechanisms of living systems are described in detail during lectures.

Course Contents

Lectures

1. Messenger RNA
2. The tRNA
3. The ribosomal RNA
4. Protein synthesis
5. The Genetic code
6. Nuclear transport
7. Protein localization
8. Ubiquitination – protein degradation
9. The replicon
10. DNA replication

Name of Lecturer

Dr. Alex Galanis, Assistant Professor of Molecular Biology

Recommended Reading

Title:	Genes VIII
Author(s):	Lewin
Publishing Company:	Academic Publications
Place & Year of Publishing:	Alexandroupolis 2004
ISBN:	960-88412-2-6
EUDOXUS code:	13003327

Teaching Methods

Lectures, use of e-class, tutorials and seminar classes

Language of instruction

Greek

Assessment Methods

End of term written examination, mid-term written examination

MOLECULAR MICROBIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
D'	C	3	3	4	5

Course Objectives

The objectives of the course are:

a) The consolidation of the basic principles of microbiology. Microbiology is the science which studies the microbial world and is considered as one of the major pillars of modern biology.

b) The comprehension of the molecular mechanisms of microbial structure and action, as well as their integration into the environment. In the frame of the course, important applications in medicine, industry, agriculture and biotechnology are also presented. Finally, many astonishing recent findings are discussed, such as the understanding of microbial life on molecular level, the clarification of microbial genetics, the principles of modern virology, etc.

Course Contents

Lectures

- Microorganisms and microbiology.
- Survey of microbial life.
- Microbial polymers.
- Cell structure and function: Cell morphology, cell wall of prokaryotes, mechanisms of microbial movement, cell structure, spores.
- Microbial cultures and microbial metabolism.
- Microbial growth.
- Effect of environmental conditions on microbial growth.
- Microbial evolution: The RNA world.
- Microbial systematics.
- New methods of taxonomy.
- The species.
- Principles of microbial taxonomy.
- Taxonomy of bacteria.
- Proteobacteria: *Chromatium*, *Ectothiorhodospira*, *Rhodobacter*, *Rhodospirillum*, *Nitrosomonas* and *Nitrobacter*, *Thiobacillus*, *Ralstonia*, *Methylomonas*, *Methylobacter, Pseudomonas*, Acetic acid bacteria, *Azotobacter, Azomonas,* Enteric bacteria, *Rickettsia*, *Spirillum*, *Bdellovibrio*,

Campylobacter, *Sphaerotilus*, *Leptothrix*, *Hyphomicrobium*, *Caulobacter*, *Myxococcus*, *Stigmatella*, *Desulfovibrio*, *Desulfobacter*, *Deulfuromonas*.

- Gram (+) bacteria: *Staphylococcus*, Lactic acid bacteria, *Listeria*, *Bacillus*, *Clostridium*.
- *Mycoplasma*, Corynobacteria, Propionic acid bacteria, *Mycobacterium*, *Streptomyces*.
- *Cyanobacteria*, *Chlamydia*, *Verrucomicrobium*, *Bacteroides*, *Flavobacterium*, *Cytophaga*, *Chlorobium*, *Prosthecochloris*, *Chlorochromatium*, *Spirochaeta*, *Deinococcus*, *Chloroflexus*, *Thermomicrobium*, *Thermotoga*, *Thermodesulfobacterium*, *Aquifex*, *Thermocrinus*.
- Taxonomy of Archea: *Halobacterium*, Methane production by methane producing archea: *Methanobacterium*, *Methanocaldococcus*, *Methanosarcina.*
- Taxonomy of eukaryotic microorganisms: Genetics of eukaryotic microorganisms, Protozoa, Mycetes, Algae.
- Control of microbial growth: Antimicrobial agents.
- Microbial pathogenesis-Toxins.
- Biotechnological applications of microorganisms.
- Virology: General principles of viruses, viral structure-virions, quantitative determination of viruses, growth of viruses–attachment and penetration, bacteriophages, animal viruses, retroviruses, viroids and prion proteins.

Practicals

1. Aseptic methods. Preparation of culture media. Sterilization (2h).
2. Microbial solid and liquid cultures (2h).
3. Quantitative determination of bacteria by serial dilutions. Isolation of lactic acid bacteria from dairy products (2h).
4. Resistance of microbes to antibiotics. Antimicrobial effect of essential oils (2h).
5. Gram staining. Use of microscope. Microbial examination of human teeth and mouth (2h).

Instructors

- **I. Kourkoutas**, Lecturer of Applied Biotechnology.
- **K. Chlichlia,** Assistant Professor of Molecular Immunobiology.
-

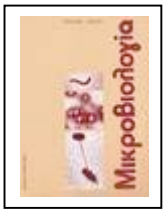
Recommended Reading

Title: Brock, The biology of microorganisms, Volume I
Author(s): M. T. Madigan, J. M. Marinko, J. Parker
Publishing Company: Crete University Press
Place & Year of Publishing: Crete, 2005
ISBN: 960-524-199-4
EUDOXUS code: 366

Title: Brock, The biology of microorganisms, Volume II
Author(s): M. T. Madigan, J. M. Marinko, J. Parker

Publishing Company: Crete University Press
Place & Year of Publishing: Crete, 2007
ISBN: 960-524-199-5
EUDOXUS code: 367

Title: Microbiology and Microbial Technology
Author(s): G. Aggelis
Publishing Company: Stamoulis Press
Place & Year of Publishing: Athens, 2007
ISBN: 978-960-351-717-7
EUDOXUS code: 22904



Title: Microbiology
Author(s): S. Koliais
Publishing Company: University Studio Press, S.A.
Place & Year of Publishing: Athens, 2001
ISBN: 978-960-12-0308-9
EUDOXUS code: 17401

Course Notes

Title: Notes of Molecular Microbiology
Author(s): I. Kourkoutas
Place & Year of Publishing: Department of Molecular Biology & Genetics, Democritus University of Thrace, 2010.

Practical Notes

Title: Laboratory exercises of Molecular Microbiology
Author(s): I. Kourkoutas
Place & Year of Publishing: Department of Molecular Biology & Genetics, Democritus

University of Thrace, 2010.

Teaching Methods

1. Lectures.
2. E-class.
3. Laboratory exercises.
4. Tutorials.
5. Lectures by invited speakers (invited scientists, invited speakers from the industrial sector, etc).

Assessment Methods

- Mid-term written exams.
- Laboratory assessments.
- Final written exams.

GENE EXPRESSION AND SIGNALING I

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
D'	C	3	0	4	5

Course Objectives:

- To understand the fundamental principles of gene expression in eukaryotes and comprehend the multilevel complex regulatory mechanisms.
- To develop a combination of analytical skills and synthesis.
- To realize that the priority is to understand mechanisms and regulatory circuits rather than memorizing details.
- To learn about the basic principles of gene expression regulation of eukaryotic organisms in the context of the dynamic organisation of the structure of the genetic material.
- To invoke a sense of admiration by realizing the complexity, the beauty and the efficiency of the molecular mechanisms under study.

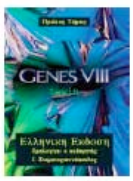
Course contents:

1. Organization and function of eukaryotic gene promoters.
2. Organization and function of enhancers and silencers.
3. The activation of transcription in eukaryotes.
4. Families and regulation of transcription factors.
5. The regulation of chromatin structure.
6. The molecular base of epigenetic phenomena.
7. The mechanism of RNA splicing.
8. The alternative splicing.

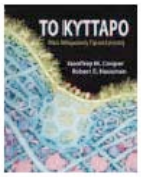
Instructor

Raphael Sandaltzopoulos, Associate Professor

Recommended reading:



Tile: Genes VIII
Authors: Lewin
Publishing Company: Academic Publications
Place & Year of Publishing: Alexandroupolis ,2004
ISBN: 960-88412-2-6
EUDOXUS code: 13003327.



Tile: The Cell: A molecular approsch
Authors: Geoffrey M. Cooper & Robert E. Hausman
Publishing Company: Academic Publications
Place & Year of Publishing: Alexandroupolis, 2011
ISBN: 978-960-99895-3-4
EUDOXUS code: 13003329.

Teaching methods

The Units of the Syllabus are presented and thoroughly analyzed in the amphitheater employing powerpoint presentations and/or videos. Emphasis is given upon formulating questions which the students attempt to answer. This procedure triggers discussions and offers an opportunity to use the principles that are being elaborated in each session. At the end of every unit, a list of the main points is put together and the conclusions are summarized. The students are invited to raise questions, share opinions and argue about certain cellular mechanisms that are scrutinized at the molecular level. In every opportunity, students are encouraged to participate in the discussion in order to elicit certain conclusions.

Assessment methods:

The assessment method comprises a non-compulsory pre-examination based on multiple choice questions (counts for up to 20% of the total remark) and written exams during the exam period. Bonus points may be gathered by students that volunteer to perform certain tasks (e.g. prepare and deliver presentations of current literature). Questions that have been discussed in detail during the courses are used as the framework for the exams. A question related to the practical course is also included in the written exam (counts for 15% of the general remark).

Language of instruction

Greek. Study of original scientific literature (in English) may be required in certain voluntary tasks (review and presentation of advanced topics of molecular biology).

MOLECULAR STRUCTURE AND FUNCTION II

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E’	C	3	3	4	5

MOLECULAR IMMUNOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E'	C	3	3	4	5

Course Objectives

The objectives of the course are:

a) to gain knowledge on the structure and organization of the immune system

b) to understand the basic principles of the immune system's function

c) to study and get insight into the complex mechanisms underlying the immunological responses

Course Contents

Lectures

- Overview of the immune system
- Cells and organs of the immune system
- Antigens
- Immunoglobulins: structure and function
- Organization and Expression of immunoglobulin genes
- Antigen-Antibody reactions
- Major Histocompatibility Complex
- Antigen Processing and Presentation
- T Cell Receptor
- T cell development, activation and differentiation
- B cell development, activation and differentiation
- Cytokines
- The complement system
- Cell-mediated effector responses

Practicals

1. Examination and identification of blood cells - blood smear - stains (3 hours).

2. Lymphocyte separation/isolation - differential centrifugation of peripheral blood mononuclear cells in ficoll - cell counting (live/dead) - culture of lymphocytes and calculation of cell viability (3 hours)

3. Hemagglutination assay (3 hours)

4. Immunoassay: ELISA (Enzyme-linked immunosorbent assay) (6 hours)

5. Immunoassay: Immunofluorescence for the identification of specific antibodies (5 hours)

6. Flow cytometry and Immunophenotyping of lymphocytes with fluorescence activated cell

scanner (FACS) (2 hours)

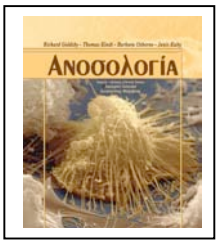
7. Immunization. Determination and identification of peptide epitopes for selected antigens - data bases (3 hours)

8. Analysis of results - modern trends in immunological assays (3 hours)

Instructor (s)

Katerina Chlichlia, Assistant Professor of Molecular Immunobiology.

Recommended Reading



Title:	IMMUNOLOGY
Authors:	Goldsby R, Kindt T, Osborne B,
company:	Ιατρικές Εκδόσεις Π.Χ. Πασχαλίδη
Place and Year of Publishing:	2007
ISBN:	978-960-399-530-2
EUDOXUS code:	13256416

Title:	Clinical immunobiology: the immune system in health and disease
Authors:	Janeway - Travers
Publishing company:	Ιατρικές Εκδόσεις Π.Χ. Πασχαλίδη
Place and Publishing year:	2002
ISBN:	960-399-101-5
EUDOXUS code:	13256319

Course Notes

Title:	Course notes on Molecular Immunobiology I
Author:	Ass. Prof. Katerina Chlichlia
Place & Year of Publishing:	Alexandroupolis, 2012

Practical Notes

Title:	Molecular Immunobiology – Practical Notes
Author(s):	Ass. Prof. Katerina Chlichlia
Place & Year of Publishing:	Alexandroupolis, 2010

Teaching Methods

Powerpoint presentations, video, participation of students in discussions, presentations on special issues from invited speakers, e-learning platform (e-class), practical training in the laboratory.

Language of instruction

Greek

Assessment Methods

Student's performance is evaluated with tests accompanying the practicals and the final written exams.

ADVANCED MOLECULAR BIOLOGY TECHNIQUES

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	C	3	-	4	5

Course Objectives

An advanced course of molecular biology methods. The concept and aplications of several techniques is described using a case study approach. Emphasis is given on the applications in Health and Agriculture.

Course contents

Module I: Library screening.

1. Screening of libraries with DNA/ RNA probes.
2. Screening of libraries using PCR.
3. Expression screening.

Module II: In vitro mutagenesis.

1. Site specific mutagenesis.
2. *Random in vitro* mutagenesis.

Module III: Expression of proteins in E. coli.

1. pBAD.
2. pET.
3. pLEX.
4. Purification of proteins expressed in *E. coli*.

Module IV: Cell lines: culture, transfection and protein expression in eukaryotic cells.

1. Cell lines.
2. Transfection of animal cells.
3. Infection of eukaryotic cells using retroviral vectors.
4. Selection markers.

Module V: Genetically modified animals.

1. Transgenic animals
2. Gene targeting.

Module VI: Genetically modified plants

1. Generation of genetically modified plants using Ti.
2. Generation of genetically modified plants using viruses.
3. Generation of genetically modified plants by physical methods.
4. Control of gene expression in plants.
5. Marketing genetically modified plants.

Module VII Microarrays και RNAi.

1. Microarrays

2. RNA interference (RNAi).

Module VIII: Biomedical Applications of Molecular Biology Methods.

1. Nucleic Acid sequences as diagnostic tools.
2. Recombinat proteins as drugs.
3. Animal models of disease.
4. Gene Therapy.
5. Therapeutical cloning.
6. Vaccines.
7. Forensics.

Instructor (s)

Georgios Skavdis, Assistant Professor of Molecular Biology.

Maria Grigoriou, Associate Professor of Molecular Biology

Recommended Reading

Tile:	Recombinant DNA
Authors:	Watson D.A. κα
Publishing Company:	Academic Publications
Place & Year of Publishing:	1st 2010
ISBN:	978-960-88412-5-3
EUDOXUS code:	2625.

Title:	Basic Laboratory Calculations
Authors:	Lisa Seidman
Publishing Company:	Academic Publications
Place & Year of Publishing:	1st 2010
ISBN:	978-960-88412-9-1
EUDOXUS code:	5319

Course Notes

Title:	Introduction to Molecular Biology Techniques
Authors:	Georgios Skavdis
Place & Year of Publishing:	Alexandroupolis, 2011

Language of instruction

Greek

Teaching methods

Lectures, Practicals.

Participatory method of teaching.

Assessment methods

Comprehensive final exam.

BIOINFORMATICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E'	C	4	3	5	5

Course Objectives

Bioinformatics: data bases, algorithms and and tools.

Course Contents

Lectures

Applications of computing machines to biology, definitions - Bioinformatics as a tool and as a research field - Algorithms, programs, the importance of the network (the client-server computing model) - Data bases: structure and function, some very well known data bases - Pairwise sequence alignment, rigorous methods: Needleman & Wunsch, Smith & Waterman – Substitution matrices (PAM, BLOSUM) - Hereustic algorithms: BLAST, FASTA - Multiple sequence alignment: problems, algorithms, applications, the program CLUSTAL - Phylogenetic trees: definitions, problems, algorithms, programs, the UPGMA and Neighbor
Joining algorithms Protein motifs, fingerprints, profiles, their data bases, and their tools - Expressed Sequence Tags: data bases, methods, problems, applications - Functional genomics: microarrays (twochannel), data reduction and analysis - Applications to structural biology: secondary structure prediction, prediction of transmembrane regions, homology modeling, threading, abinitio structure prediction (empirical force fields, molecular dynamics simulations).

Practicals

1st ASSIGNMENT, 5 hours
"Data bases: identification and characterisation of a protein based on incomplete data"

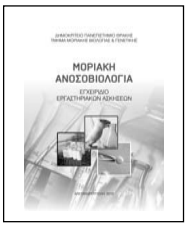
2nd ASSIGNMENT, 5 hours
"Using sequence alignments, motifs and phylogenetic reletionships to identify conserved regions and amino acids in a protein sequence"

3rd ASSIGNMENT, 5 hours
"Applications to structural biology: sequence-structure-function relationships"

Instructor

Nicholas M. Glykos, Assistant Professor (**Structural and Computational Biology**).

Recommended Reading.



Title: Bioinformatics
Authors: BAXEVANIS & OVELLETTE
Edition: 2004
ISBN: 978-960-394-222-1
EUDOXUS code: 41233

Title: An introduction to Bioinformatics Algorithms
Authors: NEIL C. JONES, PAVEL A. PEVZNER
Edition: 2010
ISBN: 978-960-461-388-5
EUDOXUS code: 21522

Title: Bioinformatics
Authors: KOSSIDA, S.
Edition: 2009
ISBN: 978-960-9309-60-8
EUDOXUS code: 5110

Teaching Methods

Lectures, three assignments.

Assessment Methods

Assignments 30%, Exams (multiple choice), 70%

DEVELOPMENTAL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E'	C	4	0	5	5

Course Objectives

The primary objective of this course is to introduce the students to modern developmental biology. The course covers general principles of animal development with emphasis on the connection between mechanisms of normal development and disease etiology. Invertebrate and vertebrate model systems are covered, including *C. elegans*, *Drosophila melanogaster*, chick, *Xenopus*, zebrafish, mouse and human. The intimate connection between developmental biology and evolution, is an important theme throughout the course.

Course contents

Courses

- Principles of Development.
- Techniques to study animal Development.
- Model organisms.
- Gametogenesis-Fertilization.
- Basic Embryology of *C. elegans*
- Pattern formation I: *C. elegans*.
- Basic Embryology of *D. melanogaster*
- Pattern formation II: *D. melanogaster*
- Basic Embryology of *Xenopus*
- Pattern formation III: *Xenopus*.
- Basic Embryology of chick
- Basic Embryology of mammals
- Pattern formation IV: mouse
- Organogenesis
- The somites and their derivatives.
- Limb development.
- Development of the heart, the kidney and the gonads.

Lecturer (s)

M. Grigoriou, Associate Professor.

G. Skavdis, Assistant Professor.

Recommended reading:

Title:	Essential Developmental Biology
Author:	JMW Slack
Publisher	Blackwell Publishing
Place & Year of Publishing:	2006
ISBN:	960-88412-3-2

Additional material

Title:	Early development of *D. melanogaster*
Author:	G. Skavdis and M. Grigoriou
Place & Year of Publishing:	Alexandroupolis 2005

Title:	Early development of *C. elegans*
Author:	G. Skavdis and M. Grigoriou
Place & Year of Publishing:	Alexandroupolis 2006

Course Notes

Title:	Developmental Biology Lectures
Author:	M. Grigoriou and G. Skavdis
Place & Year of Publishing:	Alexandroupolis 2006

Teaching methods

Courses, participatory teaching methods

Language of instruction

Greek study of literature in English

Assessment methods

End of semester written examination (80% of final grade).

End of semester written examination on practicals (10% of final grade)

POPULATION AND EVOLUTIONARY GENETICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E'	C	3	3	4	5

Course Objectives

The course objectives are the following:

- Introduction to the basic concepts of Population Genetics
- Familiarization of students with the basic principles of techniques that are used to determine genetic variation.
- Understanding o basic methodology for the quantification and analysis of genetic variation.
- Understanding the forces that shape evolution both on a molecular and population level.
- Understanding the forces that drive speciation.
- Familiarization with basic methodology used for the analysis of species evolution and population relationships.

Course Contents

Lectures

- The history of evolutionary thinking.
- Variation (Hardy-Weinberg principle, quantitative and qualitative traits, genotype and phenotype variation).
- Population structure (inbreeding, genetic drift, effective population size, mutation, gene flow, theories of evolution).
- Natural selection.
- Speciation (allopatric, sympatric, parapatric speciation, founder effects).
- Adaptation (recognizing adaptation, models of selection).
- Evolution (systematics, classification, inferring phylogenies, molecular clock).
- Biogeography (patterns of distribution).
- Molecular Evolution (rates of evolution, duplications, transposable elements, gene families, genome size, gene and protein evolution, horizontal gene transfer)

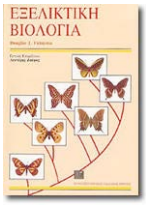
Practicals

1. The genome and genetic databases (3 hours)
2. Introduction to SNP data analysis software - linkage disequilibrium estimation (3 hours)
3. Study section (3 hours)

Instructor

Peristera Paschou, Assistant Professor of Population Genetics

Recommended Reading



Title: Evolutionaly Biology
Author: Douglas J. Futyuma
Publishing Company: ΙΤΕ - ΠΑΝΕΠΙΣΤΗΜΙΑΚΕΣ ΕΚΔΟΣΕΙΣ ΚΡΗΤΗΣ.
Place & Year of Publishing: Ηράκλειο, 1995
ISBN: 960-7309-20-0
EUDOXUS code: 345

Title: Evolution
Authors: Barton N, Briggs D, Eisen J, Goldstein D, Patel N
Publishing Company: ΥΤΟΡΙΑ ΕΚΔΟΣΕΙΣ ΕΠΕ
Place & Year of Publishing: Αθήνα, 2011
ISBN: 978-960-99280-4-5
EUDOXUS code: 12465721

Course Notes

Course notes are available on-line through the electronic platform e-class.

Practical Notes

Practical notes are available on-line through the electronic platform e-class.

Teaching Methods

Lectures, Practicals, and Study Sections.

Language of instruction

Greek.

Assessment Methods

Final exam.

APPLIED BIOTECHNOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	C	3	2	4	4

Course Objectives

The aim of the course is the consolidation of the basic principles of biotechnology. Nowadays, biotechnology is considered as cutting-edge technology and is involved in almost all processes aiming at improvement of human life, such as improvement of food products, production of novel medicines, protection of environment, improvement of agriculture, etc. In an effort to cover the students' needs for up-to-date education, the course is designed to combine traditional and modern knowledge on enzyme and microbial technology, offering a wide range of information.

Course Contents

Lectures

- Introduction to enzyme and microbial biotechnology.
- Enzyme purification: Down Stream Processing, Chromatography (Gel filtration chromatography, Ion-exchange chromatography, Affinity chromatography), Scale-up, Product standardization.
- Enzyme kinetics: Enzyme kinetics, Inhibition kinetics, Effect of temperature and pH on the enzymatic reactions.
- Immobilized biocatalysts: Enzyme and cell immobilization techniques, Advantages of immobilization, Prerequisites of immobilization supports, Effect of immobilization on molecular and kinetic characteristics, Effect of immobilization on cell viability and metabolic activity.
- Bioreactors: Types of Bioreactors (Stirred tank bioreactor, Contiunous stirred tank bioreactor, Tower bioreaactor, Fluidized bed bioreactor), Bioreactors kinetics, Aerobic fermentation systems, The problem of foaming, Sterilization methods.
- Biotechnological applications in food industry: In Wine-making, brewing, baking, cheese-making, edible oils, production of fruit products.
- Bioremediation of agro-industrial wastes for production of added value: Production of potable alcohol using agro-industrial wastes as raw material, Biotechnological applications in starch hydrolysis, Biotechnological applications in hydrolysis of cellulosic materials, Exploitation of cheese whey, Production of animal feed.
- Applications of biotechnology in the production of protein enriched products: Single cell protein production, Production of aminoacids.
- Biological treatment: Aerobic and anaerobic treatment. Biotechnological applications in papermill, and tannage.
- Production of sugars and sugar polymers.
- Analytical applications: Biosensors, Homogenic and heterogenic ELISA.
- Cure treatments: Genetic abnormalities, Cancer therapy, Heart-related problems.

- Pharmaceutical applications: Production of antibiotics, Production of insulin.
- Introduction to application of HAACP in the industrial sector.

Practicals

1. Single cell protein production: Aerobic fermentation of molasses (2h).
2. Yeast immobilization on natural supports (2h).
3. Fermentation technology with immobilized yeast (2h).
4. Visits to industrial units (3h).

INSTRUCTOR

I. Kourkoutas, Assistant Professor of Applied Biotechnology.

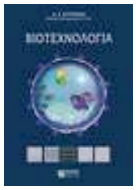
Recommended Reading

Title: Biotechnology of enzymes
Author(s): I. Klonis
Publishing Company: Crete University Press
Place & Year of Publishing: Crete, 1997
ISBN: 978-960-524-304-3
EUDOXUS code: 356

Title: Food Biotechnology
Author(s): T. Roukas
Publishing Company: S. Giachoudis & SIA O.E.
Place & Year of Publishing: Thessoliniki, 2009
ISBN: 978-960-6700-30-9
EUDOXUS code: 8921

Title: Biotechnology with biochemical engineering elements
Author(s): M. Liakopoulou-Kyriakidou
Publishing Company: Ziti Pelagia &SIA O.E.
Place & Year of Publishing: Thessaloniki, 2004
ISBN: 960-431-900-0
EUDOXUS code: 11134

Title: Microbiology and Microbial Technology
Author(s): G. Aggelis
Publishing Company: Stamoulis Press
Place & Year of Publishing: Athens, 2007
ISBN: 978-960-351-717-7
EUDOXUS code: 22904



Title:	Biotechnology
Author(s):	D.A. Kyriakidis
Publishing Company:	Ziti Pelagia &SIA O.E.
Place & Year of Publishing:	Thessaloniki, 2000
ISBN:	960-431-595-1
EUDOXUS code:	11133

Course Notes

Title:	Notes of Applied Biotechnology
Author(s):	I. Kourkoutas
Place & Year of Publishing: Genetics,	Department of Molecular Biology & Democritus University of Thrace, 2010.

Practical Notes

Title: Biotechnology	Laboratory exercises of Applied
Author(s):	I. Kourkoutas
Place & Year of Publishing: Genetics,	Department of Molecular Biology & Democritus University of Thrace, 2010.

Teaching Methods

1. Lectures.
2. E-class.
3. Laboratory exercises.
4. Tutorials.
5. Lectures by invited speakers (invited scientists, invited scientists by the industrial sector, etc).
6. Visits to industrial units.

Assessment Methods

1. Mid-term written exams.
2. Laboratory assessments.
3. Final written exams.

METHODS IN MOLECULAR BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
E'	C	0	4	2	5

Course Objectives

This course is designed to introduce the students to the process of molecular biology research.
More specifically the objectives of the course are:

- To learn to formulate a hypothesis and design appropriate experiments to test it
- To master fundamental techniques a used in molecular biology studies
- To learn to record and interpret scientific data

Course contents

Students work in groups of 2-3 and participate in a research project in which they use various approaches to study a gene product.

- Transformation of plasmid DNA in *E.coli*.
- Isolation of plasmid DNA - DNA quantitation
- Restriction enzymes/ restriction digests
- DNA electrophoresis
- Expression of recombinant proteins in *E.coli*
- Purification of recombinant proteins from *E. coli*
- Protein quantitation and electrophoresis
- PCR, Real time PCR and primer design
- *In vitro* transcription
- *In situ* hybridization
- Mouse embryo anatomy
- Basic principles of cell culture

Instructors

A. Galanis, Assistant Professor
M. Grigoriou, Associate Professor
C. Metallinou, Teaching Assistant
E. Paleologou, Assistant Professor
R. Sandaltzopoulos, Professor
G. Skavdis, Associate Professor
C. Stanelloudi, Teaching Assistant

Recommended reading:

Title:	Basic Laboratory Methods for Biotechnology
Author:	Lisa Seidman (translated to Greek)
Publisher	Academic Publications
Place & Year of Publishing:	2009
ISBN:	978-960-88412-9-1

Additional material

Title: Methods in Molecular Biology-A Laboratory manual (A)
Author: Galanis A., Paleologou K & R. Sandaltzopoulos
Place & Year of Publishing: Alexandroupolis 2015

Title: Methods in Molecular Biology-A Laboratory manual (B)
Author: Fysekis I., Chytoudis C., Stylianopoulou E, G. Skavdis and M. Grigoriou
Place & Year of Publishing: Alexandroupolis 2015

Teaching methods

Practicals, small group work, guided

Language of instruction

Greek

Assessment methods

End of semester written examination, Assessement of the laboratory notebook.

GENE EXPRESSION AND SIGNALING

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	C	3	0	4	4

Course Objectives

The objectives of the course are: To enhance knowledge and understanding of the molecular mechanisms of signal transduction, the regulation of cell cycle and the basic aspects of carcinogenesis.

Course Contents

Lectures

1. G-proteins and protein kinases in signal transduction
2. MAP kinase signaling pathways
3. Specificity of MAP kinase signaling pathways
4. cAMP, JAK-STAT, SMAD signalling pathways
5. Cell Cycle
6. Regulation of Cell Cycle
7. Apoptosis
8. Cellular Oncogenes
9. Tumor Suppressor Genes
10. Cell Immortalization and Senescence

Tutorials

Scientific paper presentations. Attendance of class tutorials and seminars is obligatory. Tutorials and seminars are taught to groups of 4 students. The duration of each presentation is approximately 30 minutes.

Name(s) of Lecturer(s)

Dr. Alex Galanis, Assistant Professor of Molecular Biology

Recommended Reading

Title: Genes VII
Author(s): Lewin
Publishing Company: Mpasdra O.E
Place & Year of Publishing: 2004 Alexandroupolis Greece
ISBN: 960-88412-2-4
EUDOXUS code: 13003327

Teaching Methods

Lectures, use of e-class, tutorials and seminar classes

Language of instruction

Greek

Assessment Methods

End of term written examination, mid-term written examination

GENOMICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	C	3	3	4	5

Course Objectives

The course introduces students to a cutting-edge discipline with major impact on human health, biotechnology, ecology and environmental management, evolutionary biology etc. Students learn how to access and use genomic databases, and discuss the ethical, legal and social implications of genomics.

Course contents

Lectures

1) The history of genomics - Major advancements and applications
(S. Boukouvala)
2) Genetic and physical mapping of genomes
(S. Boukouvala)
3) Genomic data mining from electronic databases
(S. Boukouvala)
4) Genome sequencing technologies
(S. Boukouvala)
5) Genotyping technologies for genome-wide analysis
(S. Boukouvala)
6) Transcriptomics and other "omics" (proteomics, metabolomics etc.)
(S. Boukouvala)
7) The Human Genome Project and related advancements in human genomics (dbSNP, dbVar, dbGaP, HapMap, 1000 Genome project, ENCODE etc.)
(S. Boukouvala)
8) Oncogenomics and the Cancer Genome Project
(I. Maroulakou)
9) Functional genomics and Epigenomics
(I. Maroulakou)
10) Pharmacogenomics, Toxicogenomics and Nutrigenomics
(S. Boukouvala)
11) Microbial genomics - Pathogenomics and Ecogenomics
(S. Boukouvala)
12) Comparative genomics
(S. Boukouvala)
13) The impact of genomics - Ethical, legal and social implications
(I. Maroulakou)

Practicals

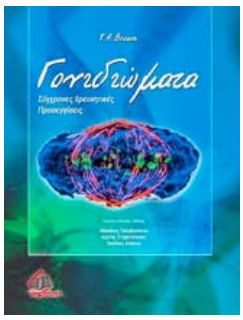
Computational, laboratory and/or seminar classes to groups of 20-25 students. Emphasis on database mining techniques and applications of genomics. Students work independently and in groups, under the guidance of the instructor. At the end of each practical, they are assigned homework in the form of written essay or report.

Lecturers

Boukouvala Sotiria, Assistant Professor in Molecular Genetics

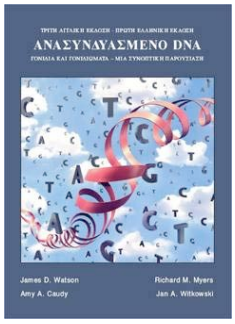
Maroulakou Ioanna, Professor in Genetics

Recommended Reading



Title: Genomes
EUDOXUS code: 13256614
Edition: 1st ed./2010
Authors: Brown T. A.
ISBN: 9603998563
Publisher: BROKEN HILL PUBLISHERS LTD

Title: Pharmacogenomics and Proteomics: Enabling the Practice of Personalized Medicine
EUDOXUS code: 89223
Edition: 1st ed./2010
Authors: S.H.Y. WONG, M.W. LINDER, R. VALDES
ISBN: 978-960-394-721-9
Publisher: PARISIANOS



Title: Recombinant DNA: Genes and Genomes
EUDOXUS code: 2625
Edition: 3rd ed./2007
Authors: James D. Watson et al.
ISBN: 978-960-88412-5-3
Publisher: ACADEMIC PUBLICATIONS I. BASDRA & Co.

Course notes

No cover

Title: Genomics (Lecture handouts)
Author(s): Lecturers
Place & Year of Publishing: Alexandroupolis 2014

Practical notes

No cover

Title: Genomics (Practical notes and protocols)
Author(s): Lecturers
Place & Year of Publishing: Alexandroupolis 2014

Teaching Methods

Lectures, study of scientific literature, database searches.

Language

Greek, English.

Assessement methods

Attendance of lectures, practical assignments, end of semester written examinations.

HUMAN GENETICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	C	4	3	5	6

Pedagogics

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	C	1	0	1	2

Course Objectives

This course attempts an approach of the core terms, conditions and roles linked to Pedagogy.

Course Contents

The content of the course is the definition of the field of knowledge, basic terminology and concepts involved, research methods of Pedagogy, effective teaching and learning, issues of educational policy, the educational system and its goals, the functions of the school institution, the factors involved in the educational process, the role and the personality of the educator, the institutional framework and interpersonal relationships within the school unit.
Students are also expected to acquire basic knowledge and, especially, skills of writing a scientific essay, its requirements, structure, style of writing and its presentation in front of an audience.

Name of Lecturer

Katerina Kedraka, Lecturer.

Recommended Reading

Title: Introduction to Pedagogy
Author: Dimitrios Hatzidimou
Publishing Company: Kyrakidis Brs
Place & Year of Publishing: Thessaloniki, 2013
ISBN: 978-960-343-902-8
EUDOXUS code: 33155553

Course Notes

Title: NOTES for the needs of the course: Pedagogy
Author: Katerina Kedraka
Place & Year of Publishing: Alexandroupolis, 2013 (Unbublished, only in CD ROM)

Teaching Methods

In the course active learning is used, so students are encouraged to participate during the lessons, through teaching techniques like role playing, working in groups, simulations, discussions etc. Presentations and lectures are used additionally to ensure that all main aspects are discussed.

Language of instruction

Greek

Assessment Methods

Assessment is based on written exams at the end of the semester and during examination periods. Since the course is based on active learning, students' participation and interaction, attendance is considered of core importance and for this reason it is included in the final evaluation. Alternatively, essays and research topics could be assigned to students.

Career Development of Bioscientists

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	C	1	0	1	2

Course Objectives

During the course subjects as the career development and the job profile of the Bioscientists in modern working environments are discussed, and in order to facilitate their job entry, students are taught how to make plans for their future studies and/or career, including acquiring skills on CV writing or interviews.

Course Contents

A. Issues of career development and management in the current working environment
B. Personal career planning – Personality traits (Personal Characteristics) – Decision making skills – Setting an Action plan for managing career development on a realistic basis
C. Practical skills for job searching (Conducting a CV /Getting prepared for a Job Interview).

Name of Lecturer

Katerina Kedraka, Lecturer.

Recommended Reading

Title: Organizational Psychology and Behavior
Authors: Maria Vakola & Ioannis Nikolaou
Publishing Company: Rosili
Place & Year of Publishing: Athens, 2012
ISBN: 978-960-89407-4-1
EUDOXUS code: 12257495

Course Notes

Title: NOTES for the needs of the course: Career Development of Bioscientists
Author: Katerina Kedraka
Place & Year of Publishing: Alexandroupolis, 2013 (Unbublished, only in CD ROM)

Teaching Methods

In the course active learning is used, so students are encouraged to participate during the lessons, through teaching techniques like role playing, working in groups, simulations, discussions etc. Presentations and lectures are used additionally to ensure that all main aspects are discussed.

Language of instruction

Greek

Assessment Methods

Assessment is based on written exams at the end of the semester and during examination periods. Since the course is based on active learning, students' participation and interaction, attendance is considered of core importance and for this reason it is included in the final evaluation. Alternatively, essays and research topics could be assigned to students.

APPLICATIONS OF MOLECULAR BIOLOGY IN MEDICAL SCIENCES

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	C	4	3	5	6

Course objectives

The objectives of the course are:

a) To introduce students to the principles and methodologies of applied research in biotechnological fields associated with human health.

b) To describe the link between basic research, industrial R&D and clinical application.

c) To introduce concepts like innovation, intellectual property, total quality and resource management in applied research.

d) To present the current regulatory framework encompassing drug and IVDD development.

e) To describe major technological breakthroughs and current career prospects in the field.

Course Contents

Lectures

Part I: *From basic to applied research*

- The history and progress of applied biomedical research (3 hours).
- Innovation and intellectual property (3 hours).
- Funding and managing of start-up businesses in biotechnology (3 hours).

Part II: *Applications of modern biosciences in molecular diagnostics*

- The regulatory framework for *in vitro* diagnostic devices in the EU and the USA (3 hours).
- Quality management in the industrial and clinical setting – Laboratory safety principles (3 hours).
- Modern technologies for nucleic acid detection with applications in diagnosis: Applications in clinical microbiology, preventive and predictive population genetic screening, preimplantation and prenatal genetic diagnosis and forensics (9 hours).

Part III: *Applications of modern biosciences in therapeutics*

- The regulatory framework for drug development in the USA and the EU (3 hours).
- From drug discovery to drug development – Clinical trials (3 hours).
- The contribution of modern biosciences to the development and clinical evaluation of new therapies: Target identification and validation, lead discovery and optimization, pre-clinical and clinical development; pharmacogenetics and pharmacogenomics; targeted cancer therapies; recombinant proteins and monoclonal antibodies as therapeutic agents; therapeutic applications of antisense nucleic acids, ribozymes and RNA interference; recombinant vaccines and DNA vaccines; gene therapy; targeted drug delivery (9-12 hours).

Practicals

1. ***Patents*** (3 hours, 3-4 groups): The students read and present patents describing important biomedical innovations.
2. ***Organizations involved in applied biomedical research*** (3 hours, 3-4 groups): The students search the internet for information regarding biotechnology and pharmaceutical companies, science parks, biotechnology research institutes, regulatory organizations, patent offices, etc. They present their results orally during the practical.
3. ***Quality management systems*** (3 hours, 3-4 groups): The students assume that they are members of an industrial R&D project team, undertaking the development of an innovative technology for molecular diagnosis. The instructor guides them through the steps leading from user need evaluation and design input, to new product verification and validation, in compliance with the requirements of a standard quality management system. The students then write an essay, describing their hypothetical work and results.
4. ***Computer-based practical*** (3 hours, 3-4 groups): The students assume that they are members of an industrial R&D project team undertaking the validation of novel therapeutic targets with the purpose of developing novel cancer therapies. They access electronic databases to retrieve essential information concerning both the disease and the pharmaceutical target of interest, but also to assess IP issues and current competition in the field. They present their results and conclusions in a written report.
5. ***Laboratory-based practical*** (3 hours, 3-4 groups): The students assume that they work in a clinical laboratory performing routine genetic diagnosis. They familiarize with an innovative technology and learn about the principles and ethics of modern diagnostics. They subsequently describe their methodology, results and conclusions in a written report.

Instructor

Sotiria Boukouvala, Assistant Professor in Molecular Genetics

Recommended Reading

Title:	Pharmacogenomics and Proteomics
Author(s):	S.H.Y. WONG, M.W. LINDER, R. VALDES
Publishing Company:	PARISIANOS
Place & Year of Publishing:	1st ed./2010
ISBN:	978-960-394-721-9
EUDOXUS code:	89223

Title:	Molecular Diagnostics
Author(s):	Patrinos G.P., Ansorge Wilhelm
Publishing Company:	PARISIANOS
Place & Year of Publishing:	1st ed./2008
ISBN:	978-960-394-534-5
EUDOXUS code:	41544

Title:	Applications of Molecular Diagnostics
Author(s):	Plageras P., Gerovassili A., Papaioannou A.
Publishing Company:	BROKEN HILL PUBLISHERS LTD
Place & Year of Publishing:	1st ed../2011
ISBN:	9789604891887
EUDOXUS code:	13256969

Title:	Economics and Law in Biology: Focus on Biotechnology
Author(s):	Triantafyllidis Konstantinos
Publishing Company:	KYRIAKIDIS
Place & Year of Publishing:	1st ed./2006
ISBN:	978-960-343-884-7
EUDOXUS code:	6429

Course Notes

Title: Applications of Molecular Biology in Medical Sciences
Author(s): Sotiria Boukouvala
Place & Year of Publishing: Alexandroupolis, March 2004 (extensive yearly updates since then)

Practical Notes

Title: Instructions for implementation of practical assignments
Author(s): Sotiria Boukouvala
Place & Year of Publishing: Alexandroupolis, March 2004 (extensive yearly updates since then)

Teaching Methods

Lectures; Virtual, computing and laboratory exercises; Study of patents and articles; Internet search (incl. databases); Reports, essays, oral presentations.

Language of instruction

Greek, study of literature in English.

Assessment Methods

End of semester written examination (80% of final grade). Essays, laboratory reports and presentations

(20% of final grade).

MOLECULAR NEUROBIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	C	3	0	4	6

Course Oblectives

The primary objective of this course is to provide a basic but thorough understanding of modern Neurobiology. The course covers experimental work on a wide range of invertebrate and vertebrate model systems. More specifically the goals of the course are:

1) to impart fundamental knowledge of contemporary Molecular Neurobiology

2) to convey an understanding of the molecular basis of various diseases of the Nervous System.

Course contents:

- The Molecular and Cellular Biology of the Neuron.
- Molecular and cellular mechanisms regulating synaptic transmission.
- Induction of the nervous system.
- Birth and survival of neuronal cells.
- Axon formation and guidance.
- Synapse formation - Network formation.
- The molecular Biology of olfaction (Mammals/*Drosophila*).
- Genes and behavior.
- Language and the aphasias.
- Molecular mechanisms of learning and memory
- Ageing of the nervous system –Alzheimer's disease.

Instructor

Maria Grigoriou, Associate Professor

Recommended reading

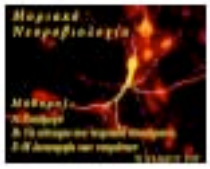
Title: *Principles of Neural Science*
Author(s): Kandel, Schwartz and Jessell
Publishing Company: Paschalidis Ed
Place & Year of Publishing: 1st ed./200 4
ISBN: 9603992135

EUDOXUS code: 45097

Title: *Essentials of Neural Science and Behavior*
Author(s): Kandel, Schwartz and Jessell
Publishing Company: Crete University Press
Place & Year of Publishing: 1st ed./2009
ISBN: 978-960-524-075-2

EUDOXUS code: 467

Course Notes



Title: Molecular Neurobiology Course Notes
Author(s): Maria Grigoriou
Place & Year of Publishing: Alexandroupolis, March 2011

Teaching methods

Courses / Group discussions, Participatory methods

Assessment methods

Comprehensive final exam, reports, and oral presentations.

Language of instruction

Greek.

DESCRIPTION OF OPTIONAL MODULES

MOLECULAR ECOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The scope of this course is the introduction to the principles of molecular ecology, namely the development of molecular markers to the study of ecological and evolutionary topics and scientific puzzles. In this respect molecular ecology unifies two distinct disciplines, molecular biology and ecology.

Course Contents

Lectures

- Modern ecology and its relation to other disciplines of biology
- Evolutionary theory –schools of genetic diversity– adaptation– speciation
- Ecological definition of evolution
- Molecular ecology - molecular markers
- Molecular systematics and phylogeny
- Population genetics
- Phylogeography
- Molecular evolution and adaptation
- Molecular basis of behaviour
- Conservation biology
- Gentically modified organisms

Instructor

M. Alexiou Chatzaki, Lecturer of General Biology

Recommended Reading

- **An Introduction to Molecular Ecology**. Travor J.C. Beebee & Graham Rowe. *Oxford University Press, 2004*
- **Οικολογία.** Δημήτρης Βερεσόγλου.*Περιφ. Εκδόσεις «έλλα», 2004*
- **Εξελικτική Βιολογία**. D.J. Futuyama, *Παν. Εκδ. Κρήτης, 1991*
- **Molecular Markers, Natural History, and Evolution**. John C. Avise, *2nd edition, Sinauer Associates, 2004*
- **Advances in Molecular Ecology**. Gary R. Carvalho, *IOS Press, 1998*
- **Εξελικτική οικολογία**. Eric R. Pianka, *Παν. Εκδ. Κρήτης, 2006*

Teaching Methods

Lectures, experts seminars.

Assessment Methods

Oral presentations/seminars and/or written examination at the end of the semester.

VIROLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The objectives of the course are:
a) to gain general knowledge about viruses and to study selected viral families,
b) to understand that viruses represent powerful research tools in the field of translational medicine,
c) to study the significance of recombinant viruses as vehicles for gene transfer.

Course Contents

Structure and Organization of viruses. Virus classification systems. Viral genomes and methods of replication. Study of selected viral families. Virus - host interactions. Clinical manifestations of viral infections, viral detection and diagnosis. Prophylaxis and Therapy of viral infections. The significance of viruses as gene transfer vehicles.

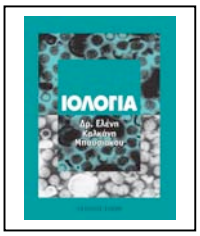
Lectures

- General virology: structure of viruses, Baltimore classification, viral replication
- Bacteriophages
- Picornaviridae, Reoviridae, Rhabdoviridae, Coronaviridae
- Myxoviridae, Paramyxoviridae
- Retroviridae (HTLV-1, HIV-1),
- Papillomaviridae, human papillomavirus (HPV)
- Parvoviridae, Adenoviridae, Poxviridae
- Herpesviridae
- Oncogenic viruses, Hepatitis viruses, prions
- Recombinant viruses for gene therapy and immunotherapy

Instructors

Penelope Mavromara, Professor of Biochemistry.
Katerina Chlichlia, Assistant Professor of Molecular Immunobiology

Recommended Reading



Title:	VIROLOGY
Author:	Dr. Eleni Kalkani-Bousiakou
Publishing Company:	ELLIN
Place & Year of Publishing:	Greece, 2008
ISBN:	960-286-977-1
EUDOXUS code:	16445

Title:	MEDICAL MICROBIOLOGY & VIROLOGY
Authors:	I.K. Papapanagiotou & B. Kyrazopoulou-Dalaina
Publishing Company:	University Studio Press
Place & Year of Publishing:	Thessaloniki, 2004
ISBN:	960-12-1007-5
EUDOXUS code:	17328

Course Notes

Title:	Course notes on Virology
Author:	Ass. Prof. K. Chlichlia, Prof. P. Mavromara
Place & Year of Publishing:	Alexandroupolis, 2012

Teaching Methods

Powerpoint presentations, video, participation of students in discussions, e-learning platform (e-class), assignments based on the study of related contemporary scientific literature.

Language of instruction

Greek

Assessment Methods

Performance is evaluated by a) assignments on contemporary literature and b) final written exams.

MBG 503– RADIOBIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

TEACHING BIOSCIENCES

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The objectives of the course are:

a) The course introduces students to the contemporary educational principles and practices, both for youngsters and adults and equips them with basic knowledge, skills and attitudes of teaching methodology, in case they decide to follow a teaching career.

b) During this course, also, subjects as the career development and the job profile of the Bioscientists in modern working environments are discussed, and in order to facilitate their job entry, students are taught how to make plans for their future studies and/or career, including acquiring skills on CV writing or interviews.

Course Contents

Lectures

- Educational Approaches/ Teaching Methodology
  - **A.** Contemporary trends in teaching and learning
  - **B.** Basic principles for teaching and planning a course - Psychopedagogical approaches - models of teaching.
  - **C.** Adult Education
- Career Development
  - **A.** Career issues in modern labor market
  - **B.** Individual Planning: Personal characteristics - Decision-making - Personal strategy for the career management
  - **C.** Practical skills on job search (CV / Job Interview)

Instructor

Katerina Kedraka, PhD, Lecturer 407/80 .

Recommended Reading

Title: Adult Educatiors in Greece

Author(s): Aikaterini D. Kedraka
Publishing Company: Kyrakidis Brs
Place & Year of Publishing: Thessaloniki, 2009

ISBN: 978-960-467-075-8
EUDOXUS code: 5822

Course Notes

Title: NOTES for the needs of the course: Teaching Methodology for Bioscientsts

Author(s): Katerina Kedraka

Place & Year of Publishing: Alexandroupolis, 2011

(Unbublished, only in CD ROM)

Teaching Methods

In the course active learning is used, so students are encouraged to participate during the lessons, through teaching techniques like role playing, working in groups, simulations, discussions etc. Presentations and lectures are used additionally to ensure that all main aspects are discussed.

Language of instruction

Greek

Assessment Methods

Assessment is based on written exams at the end of the semester and during examination periods. Since the course is based on active learning, students' participation and interaction, attendance is considered of core importance and for this reason it is included in the final evaluation.

CHEMICALS IN OUR DAILY LIFE

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The objectives of the course are:

a) To familiarize students with chemical compounds used in everyday life, with emphasis to their interrelationship with biological organisms

b) To familiarize students with chemical compounds found in new materials, mainly nano-materials which are used nowadays in everyday life and in biomedical applications

c) To be able to submit a written assignment using the scientific nomenclature, give an oral presentation on the specific topic, and answer the questions of the audience.

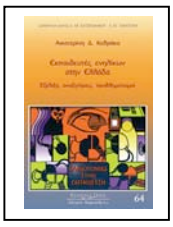
Course Contents

- Polymers
- Detergents
- Food
- Medicines
- Metals
- Coloring substances-colors
- Environmental polutants
- Fuels
- Nanomaterials applied in health problems
- Nanomaterials applied in everyday life
- Nanomaterials and toxicology
- Nanomaterials and environment

Instructor

K. C. Fylaktakidou, Assoc. Prof. of Chemistry of Organic Compounds.

Recommended Reading



Title:	Χημεία και Καθημερινή Ζωή
Author(s):	Βάρβογλης Αναστάσιος
Publishing Company:	Αλ. Μαμάλης &Σια
Place & Year of Publishing:	1η Έκδοση 2006
ISBN:	960-7778-91-X
EUDOXUS code:	15999

Title:	Τα ετεροκυκλικά στη ζωή και την κοινωνία
Author(s):	Pozharskii Alexander F.
Publishing Company:	Εκδοτικός Οίκος Α. Τζιόλα &Υιοί Α.Ε.
Place & Year of Publishing:	1η Έκδοση 2004

ISBN: 960-418-038-X
EUDOXUS code: 18548935

Teaching Methods

Lectures and seminars.

Language of instruction

Greek

Assessment Methods

Assignment and oral presentation.

COMPUTER PROGRAMMING C++

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

PLANT MOLECULAR BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Contents

- Morphology and anatomy of plants.
- Mechanisms of ion and biomolecule uptake and transfer.
- Innorganic nutrition.
- Plant Growth.
- Photosynthesis.
- Circadian rhythms.
- Molecular biology of the mechanism of photosynthesis.
- Light adaptation.
- Molecular adaptation of plants.
- Plant tolerance to insects, viruses, bacteria and fungi.
- Biotechnology and environment.

Recommended reading

Title:	Plant Biotechnology
Author(s):	P. Chatzopoulos
Publishing Company:	Paschalidis Ed
Place & Year of Publishing:	1st 2006
ISBN:	9789603994046
EUDOXUS code:	13256404

Teaching methods

Lectures, seminars, e-class

Assessment methods

Written examination

Language of instruction:

Greek

MECHANISMS OF ONCOGENESIS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The objectives of the course are: To enhance knowledge and understanding of the molecular mechanisms of cancer initiation and progression and to present current strategies in cancer therapy.

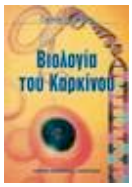
Course Contents

1. Introduction – Cancer Epidemiology
2. Cellular Oncogenes
3. Tumor Suppressor Genes – p53 and apoptosis
4. Cell Cycle deregulation and Cancer
5. Hypoxia – Angiogenesis
6. Metastasis
7. Rational Treatment of Cancer
8. Gene microarrays and Cancer
9. Molecular Diagnosis
10. Molecular Treatment

Name of Lecturer

Dr. Alex Galanis, Assistant Professor of Molecular Biology

Recommended Reading



Title:	Biologia tou Karkinou
Author(s):	Kitraki, Trougkos Pasxalidis
Publishing Company:	
Place & Year of Publishing:	Athina 2006
ISBN:	9789603994046
EUDOXUS code:	13256404

Title:	Recombinant DNA
Author(s):	J.D. Watson
Publishing Company:	Akadimaikes Ekdosis
Place & Year of Publishing:	Alexandroupolis 2006
ISBN:	9789608841253
EUDOXUS code:	2625

Teaching Methods

Lectures, use of e-class

Language of instruction

Greek

Assessment Methods

End of term written examination

PRINCIPLES OF LABORATORY ANIMAL MANAGEMENT

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The objectives of the course are:

a) To introduce the student to the basic principles of Laboratory Animal Science

b) To provide the student with general information on laboratory animal management

c) To provide the student with species-specific information regarding the biology, husbandry, anesthesia, euthanasia and non-surgical experimental procedures of the most commonly used laboratory animal species.

Course Contents

Lectures

Section 1

1. The use of animals in biomedical research
2. Ethics in the use of animals for research purposes
3. Alternative to the use of animals
4. Legislation
5. Basic principles of laboratory animal husbandry
6. Administration of drugs and other substances
7. Collection of body fluids
8. Anesthesia
9. Recognition of pain – analgesia
10. Euthanasia
11. Health monitoring and control
12. Methodology of examination
13. Zoonoses

Section 2

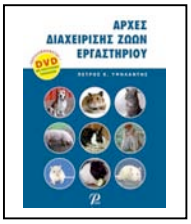
1. Rodents
    a. Mouse
    b. Rat
    c. Gerbil
    d. Hamster
    e. Guinea pig
2. Lagomorphs
    a. Rabbit

3. Carnivores
    a. Dog
    b. Cat
4. Ungulates
    a. Pig – minpig

Instructor

Petros Ypsilantis, Assistant Professor of Experimental Surgery *with emphasis in laboratory animal management*, School of Medicine, Democritus University of Thrace.

Recommended Reading



Title: Principles of Laboratory Animal Management
Author(s): P. Ypsilantis
Publishing Company: Rotonda
Place & Year of Publishing: Thessaloniki, 2011
ISBN: 978-960-6894-20-6
EUDOXUS code: 127429

Teaching Methods

Lectures, Power Point presentations, videos, demonstration of techniques on live animals with the students' participation

Language of instruction

Greek

Assessment Methods

Verbal examinations, project assignment, mid-term exams.

ASPECTS OF MEDICINAL AND NATURAL PRODUCT CHEMISTRY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

40% of drugs which are used today are produced or originated from natural products. In some therapeutic fields, like cancer or bacterial infections the percentages of the contribution of natural products is more than 75%. Natural products are secondary metabolites, which have important, nevertheless not vital to the producing organism. They represent a very useful tool for biological chemistry and molecular biology for the discovery of biological pathways and target proteins of various diseases.

The objectives of the course are:

a) The knowledge of the main categories of secondary metabolites-natural products (alkaloids, terpenoids, flavonoids, lipids, macrolides, carbohydrates etc

b) The knowledge of their biosynthetic pathways

c) The knowledge of their biological activities and their structure-activity relationship

Course Contents

Lectures

- Prostaglandines, thromboxanes, leucotrienes, aromatic polyketides-biosynthesis and biological activities
- Phenylpropanoids, coumarines, quinones, flavonoids- biosynthesis and biological activities
- Terpenoids and steroids-biosynthesis and biological activities
- Alkaloids- biosynthesis and biological activities
- Peptides, proteins and other amino acid derivatives- biosynthesis and biological activities
- Carbohydrates- biosynthesis and biological activities
- Natural Products with anticancer activity, structure-activity relationships
- Natural Products with antimicrobial activity, structure-activity relationships
    - Marine Natural Products
    - Allergies

Instructor

K. C. Fylaktakidou, Assoc. Prof. of Chemistry of Organic Compounds.

Recommended Reading

Title:	Φαρμακευτικά Προϊόντα Φυσικής Προέλευσης
Author(s):	Samuelsson Gunnar
Publishing Company:	Πανεπιστημιακές Εκδόσεις Κρήτης
Place & Year of Publishing:	1η έκδοση 2004
ISBN:	978-960-524-015-8
EUDOXUS code:	469

Teaching Methods

Electronic presentations of the courses are provided during the lectures, which are accessible to the students via e-class program and seminars.

Language of instruction

Greek

Assessment Methods

Assignment and oral presentation.

MOLECULAR BIOTECHNOLOGY AND NURTITION

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

The main objective of the course is to introduce the students to the basic principles of Molecular Biotechnology and Nutrition. Biotechnology is currently involved in all key processes of food production involving the improvement of quality and safety, development of novel products, as well as improving consumer's health. Combining principles of Molecular Biology and Biotechnology, Nutrition, Microbiology and Chemistry and paying attention to the prospects and applications of molecular techniques, enzymes and microorganisms, the course was designed to meet the needs of students for a wider range of knowledge.

Course Contents

1. Introduction
2. Molecular techniques in Food Biotechnology – TTGE, DDGE, Multiplex PCR, Real-Time PCR.
3. Genetic modification of plants and microorganisms – Genetically modified foods – Bioethical issues.
4. Functional Foods: Probiotics, Prebiotics, Symbiotics.
5. Nutraceuticals – Edible Vaccines.
6. Molecular techniques for the detection of food forgery.
7. The red wine, resveratrol, and the French paradox.
8. Biotechnology products of high nutritional value.
9. Plant extracts with antioxidant – anti-cancer activity.
10. Molecular interactions and sensory quality.

Instructors

Alex Galanis, Assistant Professor of Molecular Biology

Ioannis Kourkoutas, Assistant Professor of Applied Biotechnology

Recommended Reading

Title:	Nutrition and Food Chemistry
Author(s):	K. Galanopoulou, G. Zametakis, M. Mauri-Babagianni,A. Siafa
Publishing Company:	Stamoulis Press
Place & Year of Publishing:	Athens 2007
ISBN:	9789603516941
EUDOXUS code:	22696

Title:	Biotechnology
Author(s):	Kyriakidis
Publishing Company:	Ziti
Place & Year of Publishing:	2000
ISBN:	9604315951
EUDOXUS code:	11133

Teaching Methods

Lectures, e-class

Language of instruction

Greek

Assessment Methods

Final written exams

Oral presentations

Written courseworks

Acquired Genetic Diseases and Translational Medicine

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
G'	E	2	0	2	3

Course Objectives

This course provides the basis for understanding the relationship between developmental biology, genetics, molecular biology, bioinformatics and medicine. It analyzes the connections between basic and clinical research with the prospect of their application to patients. The course translates the clinical picture to the level of the gene and the genome and analyzes the current therapeutic approaches

Course Contents

1. Cancer Genetics

Cancer Cell Biology -Natural selection and the evolution of cancer- Tumor cells addiction in oncogenes and tumorigenesis. Oncogene addiction : a new therapeutic target in cancer.

–Cancer Stem Cells in Oncogenesis –Cancer Epigenetics- Genes expression profiles in cancer using microarrays - Biological Indicators (Biomarkers) in oncology to improve prognosis, diagnosis and treatment of cancer-The value of Cancer Genomics-. Translational research and treatment development.

2. *Genetics* of *Neurodegenerative Diseases*

Biology of Neurodegenerative Cell – *stem cells* and *regenerative* therapy for *Parkinson's and Alzheimer's Diseases- Epigenetics* of *neurodegenerative diseases* - Gene *expression profiling* in *neurodegenerative disease- Neurodegenerative Disease Biomarker* to aid diagnosis/*prognosis and* monitor *drug* response - *Genomics* of *neurodegenerative disorders - translational research* in *neurodegenerative* diseases and Drug Discovery

3. *Translational Science*

Translational Medicine- Personalize Medicine-Translational research: current status, challenges and strategies

Name(s) of Lecturer(s)

Ioanna Maroulakou, Professor of Genetics

Recommended Reading

Articles,reviews

Teaching Methods

Classes/Lectures, Study sections

Language of instruction

Greek

Assessment Methods

Writing a review paper *on an* assigned scientific topic and oral presentation

HISTOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

The objectives of the course are:

The aim of Histology has to do with the biological material's study and the various ways that the distinct elements of which are structurally and functionally jointed. In the course introduction, is made mention of the cell's structure and function as well as in the cell division. Afterwards, the basic tissue types (connective tissue, epithelial tissue, muscular tissue and neural tissue) are analyzed. In the last part, the course focused in the following systems: circulatory, immune, respiratory, central neural system, male and female reproductive system, skin, gastrointestinal, liver, pancreas and endocrine glands.

Course Contents

- Gross anatomy and special techniques in Histology (Histochemistry, Cytochemistry, Immunohistochemistry and others Molecular techniques).
- Cell.
- Epithelial tissue.
- Connective tissue.
- Neural tissue.
- Muscular tissue.
- Cardiovascular system.
- Gastrointestinal tract.
- Respiratory System.
- Skin
- Female and Male Reproductive system.
- Placenta.
- Congenital diseases.

Instructor

MARIA LAMBROPOULOU, Ass. Professor of Histology-Embryology

Recommended Reading

Title:	HISTOLOGY
Author(s):	TALLITSCH R. & GUASTAFERI R.
Publishing Company:	"ROTONTA"
Place & Year of Publishing:	THESSALONIKI 2011
ISBN:	978-960-6894-28-2
EUDOXUS code:	7950625

Teaching Methods

Lectures and group discussions.

Language of instruction

Greek

Assessment Methods

Final oral exams.

PHARMACOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

The objectives of the course are:

a) To describe and define the basic concepts in Pharmacology.

b) To provide a fundamental understanding of the molecular mechanisms and the principles of drug action.

d) To describe the molecular mechanisms of drugs acting on the autonomous nervous system, central nervous system, and cardiovascular system.

e) To outline the basic principles of chemotherapy.

f) To identify novel molecular targets for drug development.

Course Contents

- Introduction to Pharmacology - Principles of Pharmacology
- Pharmacokinetics (Administration, absorption, metabolism and excretion of drugs)
- Pharmacodynamics (Mechanisms of drug action, drug receptor interactions)
- Pharmacogenetics - Pharmacogenomics
- Autonomic and Neuromuscular Pharmacology
- Drugs that act on the Central Nervous System
- Cardiovascular Pharmacology
- Principals of Chemotherapy
- Microbial Chemotherapy
- Cancer Chemotherapy
- Drug Development: Preclinical research and clinical trials
-

Instructor

A. Pappa, Assistant Professor of Molecular Physiology – Pharmacology

Recommended Reading

Title:	Pharmacology
Author(s):	Harvey R.A., Champe P.C.
Publishing Company:	Parisianos A.E.
Place & Year of Publishing:	Athens, 3rd edition/2007
ISBN:	978-960-394-502-4
EUDOXUS code:	41693

Title:	Pharmacology
Author(s):	Rang H.P., Dale M.M., Ritter J.M., Moore P.K.
Publishing Company:	Parisianos A.E.
Place & Year of Publishing:	Athens, 5th edition/2007
ISBN:	978-960-394-429-4
EUDOXUS code:	41692

Course Notes

Course lecture notes are available at https://eclass.duth.gr/eclass/courses/ALEX01132/

Teaching Methods

Lecture course, e-class, guided literature research assignments

Language of instruction

Greek

Assessment Methods

Students' evaluation is based on their performance on written and oral assignments (30%) and final exams (70%).

ADVANCED THEMES OF BIOINFORMATICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

Applied Bioinformatics: Perl.

Course Contents

Lectures

Perl: the de facto scripting language for Bioinformatics, Introduction to the language, My first perl program, Scalars, for, while, 1st exercise, arrays and 2D-3D arrays, foreach, sort, reading from standard input, split, 2nd exercise, Input/output from named files, hash arrays, 3rd exercise, functions and parameters, 4th exercise, Regular expressions, 5 th exercise, A longer application: writing a perl program that will find and print the longest common subsequence of a set of sequences, 6th exercise.

Practicals

1st practical exercise, 1 hour

Analyse the function $\rho = f(x,y) = [\ 10.0 - \mathrm{sqrt}(x^2+y^2)\ ]\ \cos[\ \mathrm{sqrt}(x^2+y^2)\ ]$

using a perl script.

2nd practical exercise, 1 hour

Write a perl script to implement the Bradford method for determination of protein concentration.

3rd practical exercise, 1 hour

Write a perl script to determine a protein's molecular weight from its sequence.

4th practical exercise, 1 hour

Write a perl script which will read a PDB file and will determine the dimensions (in the orthogonal frame and in Angstroem) of the corresponding macromolecule.

5th practical exercise, 1 hour

Write a perl script which will read a FASTA file containing all swissprot (protein) sequences, and will determine the length and identification code of the longest sequence.

6th practical exercise, 1 hour

Write a perl script which given a set of sequences, will find all their common subsequences (and their positions in the original sequences).

Instructor

Nicholas M. Glykos, Assistant Professor (**Structural and Computational Biology**).

Recommended Reading.

Title:	Teach Yourself Perl in 24 Hours
Authors:	Pierce Clinton
Edition:	2005
ISBN:	978-960-512-468-7
EUDOXUS code:	12346

Χωρίς Εξώφυλλο

Title:	Pro Perl (e-book).
Authors:	Wainwright, Peter.
Edition:	2005
ISBN:	9781430200147
EUDOXUS code:	170303

Teaching Methods

Lectures, six practical exercises.

Assessment Methods

Assignments 30%, Exams (multiple choice), 70%

ADVANCED TECHNIQUES AND APPLICATIONS IN CELL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

The aim of this advanced course is a deeper understanding of the recent techniques and applications used in Molecular Cell Biology and especially in Microscopy, as well as to discuss and present the newest literature on the above topics. The approach is problem – based learning. The goal is to stimulate self-directed learning and develop flexible knowledge on the advanced microscopic techniques, as well as effective collaboration and intrinsic motivation

Course Contents

The course occurs in small groups, and each group (6-7 people) is organized around a certain challenge/question/problem, which is chosen on the first lesson. Each topic is extracted from the recent literature and involves Advanced Microscopic Techniques and their applications in Cell Biology and forms the basis for organized focus and stimulus for learning. The questions are discussed weekly, and deepen student's learning by centering on significant issues, questions and/or problems.

Instructor

Maria Koffa, Assistant Professor of Cell Biology

Course Notes

Scientific articles, web sites and videos related to the project of each group are up-loaded on the e-class of the course

Teaching Methods

Problem-based learning creates opportunities for groups of students to investigate meaningful questions that require them to gather information and think critically.

Language of instruction

Greek. Study of original scientific literature (in English) will be required for the review and presentation of the advanced topics of the molecular cell biology field.

Assessment Methods

The final mark is based on the overall participation of each student in the weekly meetings, as well as based on the publicly presentation of the topic each group has chosen.

STEM CELL AND REGENERATIVE BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

This advanced theoretical course is open to students interested in the area of stem cell biology and regenerative biology. The main objective of this course is to introduce the students to the basics of regenerative Biology, stem cell biology and the medical applications of cell therapy. Students are also introduced to key technologies utilized in stem cell research. The course also covers key concepts in translational research from the laboratory to the clinic.

Course contents

- Regenerative Biology.
- Introduction to Stem cell Biology.
- The Molecular basis of pluripotency.
- Stem cell niche.
- Isolation, culture and differentiation of embryonic stem cells and iPS cells.
- Adult stem cells.
- Stem Cell-Based Tissue Regeneration.
- Cancer Stem cells
- Stem cells and therapeutics.
- Gene therapy and stem cells.
- Ethical/legal issues associated with stem cell biology and regenerative medicine.

Instructor

Maria Grigoriou, Associate Professor of Molecular Biology-Developmental Biology

Recommended reading:

Title:	"Stem cell Biology"
Authors:	Georgatos, Kouklis, Lazarides and Melidoni
Edition:	1st 2008
ISBN:	978-960-89692-5-4
EUDOXUS code:	2519

Review/Research papers.

Course Notes

Title: Stem cell and Regenerative Biology"

Authors: Maria Grigoriou
Edition: Alexandroupolis, 2008

Language of instruction

Greek

Teaching methods

Lectures, seminars, journal clubs and group discussions.

Assessment methods

Comprehensive final exam and/or oral or written presentations.

BEHAVIORAL BIOLOGY

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

An introductory course to Behavioral Biology. Emphasis is given on the design of experimental approaches.

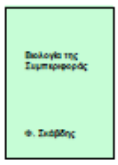
Course contents:

I. Introduction to Behavioral Biology.
II. Altrouistic behavior.
III. Ethology – Nature / Nurture Controversy.
IV. Game Theory.
V. Sexual behavior of *Drosophila melanogaster*.
VI: Aggresive behavior

Instructor

George Skavdis, Assistant Professor of Molecular Biology

Recommended reading



Title: Behavioral Biology- Course Notes
Authors: George Skavdis
Edition: Alexandroupolis, 2008

Review papers and book chapters.

Teaching methods

Courses/Group discussions.

Assessment methods

Comprehensive final exam.

Language of instruction

Greek.

MBG 607 – BIOETHICS

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

PRACTICAL TRAINING

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F’	E	2	0	2	3

GENETICS IN FORENSIC SCIENCE

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F’	E	2	0	2	3

INTRODUCTION TO BIOSCIENCE ENTERPRISE

Semester	C/E	Lectures	Practicals	Teaching units	ECTS
F'	E	2	0	2	3

Course Objectives

The objectives of the course are:

a) To introduce final-year students to the basics of entrepreneurial ventures involving bioscientists (biotechnology and pharmaceutical industries, healthcare providers etc.) and inspire them to pursue their careers in those sectors.

b) To describe the complex regulatory framework encompassing entrepreneurial activities in biosciences and present common routes for development of innovation and technology transfer.

c) To enable students to attend lectures by experienced professionals from the biotechnology and pharmaceutical industries, encouraging early networking with potential future employers.

d) To connect students with the job market, through case studies and visits to biotechnology or pharmaceutical companies.

Course Contents

Lectures

Part I (14 hours): *Introduction and regulatory framework*

- Introduction to the course content and aims (S. Boukouvala, 2 hours)
- Research and Development in the biotechnology industry (S. Boukouvala, 2 hours)
- Career options for bioscientists beyond the academia (Invited Lecturer from the Democritus University Career Office, 2 hours)
- Introduction to entrepreneurship – Corporate ethics and sustainable environmental management (Invited Lecturer from the Democritus University Department of Environmental Engineering, 2 hours)
- The regulatory framework for drugs and other medicinal products (Invited Lecturer from the National Drug Administration, 2 hours)
- Innovation and patenting (Invited Lecturer from the Industrial Property Organization, 2 hours)

- The regulatory framework for medical and *in vitro* diagnostic devices – Quality Management Systems Certification and Inspection Agencies (Invited Lecturer from the National Evaluation Center for Quality and Technology in Health, 2 hours)

Part II (14 hours): *Bioscientists in the industry*

- Marketing and customer support (Invited Lecturer from the industry, 2 hours)
- Biotechnological entrepreneurship and innovation (S. Boukouvala, 2 hours)
- Introduction to corporate management – Total quality management (Invited Lecturer from the biotechnology industry, 2 hours)
- Production management and quality control (Invited Lecturer from the biotechnology industry, 2 hours)
- Biopharmaceutical Research and Development (Invited Lecturer from the pharmaceutical industry, 2 hours)
- Clinical development (Invited Lecturer from the pharmaceutical industry, 2 hours)
- Medical affairs and pharmacovigilance (Invited Lecturer from the pharmaceutical industry, 2 hours)

Course Coordination/Lectures

Sotiria Boukouvala, Assistant Professor in Molecular Genetics

External Invited Lecturers

Recommended Reading

Title: Innovation & Enterprise
EUDOXUS code: 1104
Edition: 1st ed./2010
Authors: Karagianis E, Bakouros I.
ISBN: 978-960-6706-33-2

Title: The strategic management of technology and innovation
EUDOXUS code: 11600
Edition: 1st ed./2010
Authors: White Margaret A.,Bruton Garry D.
ISBN: 978-960-218-674-9
Publisher: KRITIKI

Title: Entrepreneurship and Innovation
EUDOXUS code: 31411
Edition: 1st ed./2009
Authors: Hatzikonstantinou G.T., Goniadis H.I.
ISBN: 978-960-01-1253-5
Publisher: G. DARDANOS – K. DARDANOS

Title: Principles of Marketing

EUDOXUS code: 16297
Edition: 1st ed./2004
Authors: Lamb Charles, Hair Joseph, McDaniel Carl
ISBN: 978-960-286-753-2
Publisher: G. PARIKOS & Co.

Title: The genius of marketing

EUDOXUS code: 48769
Edition: 1st ed./2010
Authors: PETER FISK
ISBN: 978-960-461-384-7
Publisher: KLEIDARITHMOS

Title: Enterpreneurship, innovation and business clusters
EUDOXUS code: 23102
Edition: 1st ed./2008
Authors: Piperopoulos P.G.
ISBN: 978-960-351-771-9
Publisher: STAMOULIS

Title: Enterprise and Innovation

EUDOXUS code: 4867
Edition: 1st ed./2003
Authors: Georganta Z.
ISBN: 9605160226
Publisher: DANIKOULA-ALEXIKOS

Course Notes

No cover

Title: Introduction to Bioscience Enterprise (Lecture handouts)
Author(s): Lecturers
Place & Year of Publishing: Alexandroupolis 1012

Teaching Methods

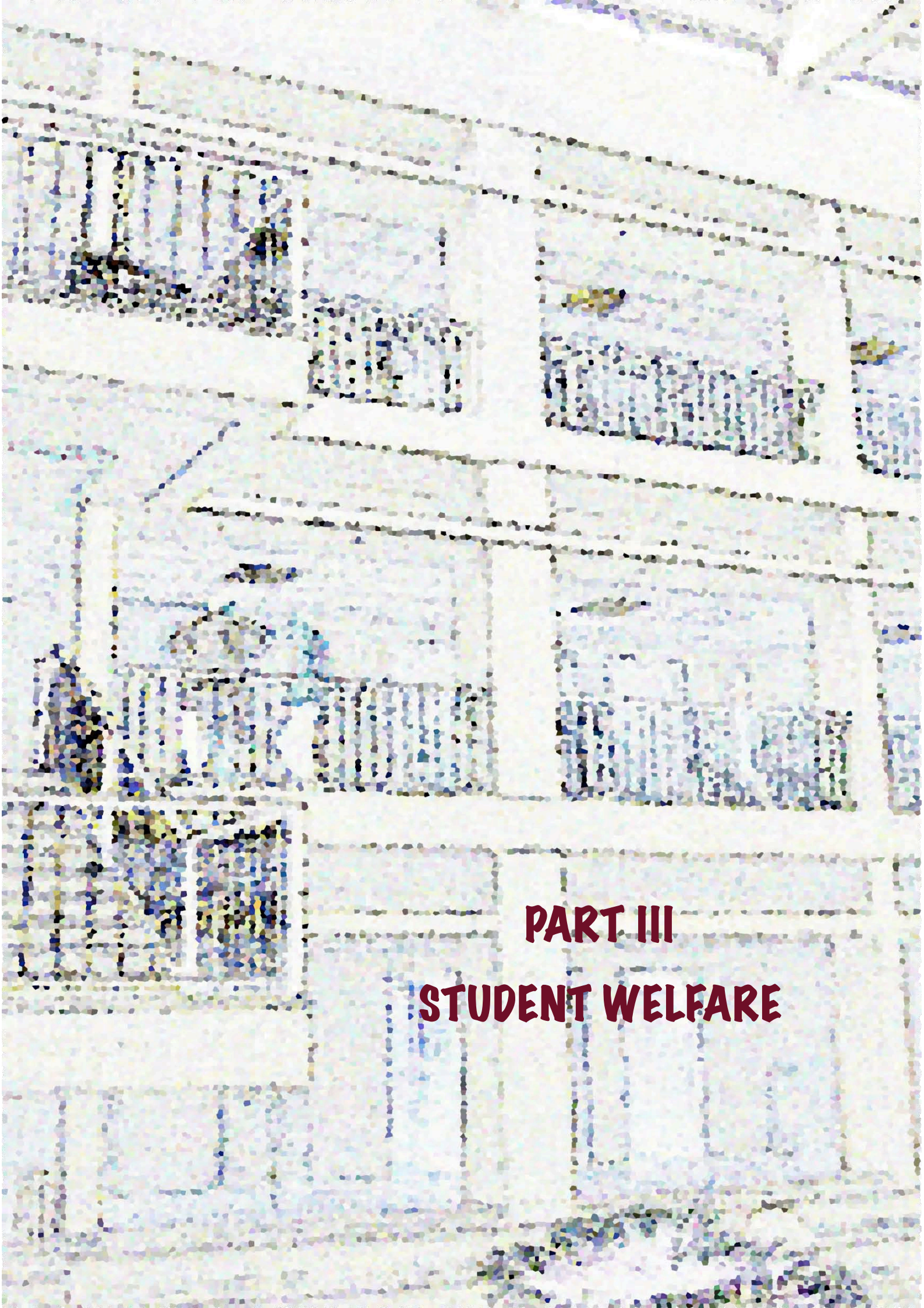
Lectures by invited experienced professionals, the internet, case studies, visit to companies.

Language of instruction

Greek, English.

Assessment Methods

Attendance of lectures, written tests, optional essay.



PART III
STUDENT WELFARE

STUDENT WELFARE

1. Teaching Books/ E-teaching

Students are entitled to free textbooks. The University enables e-teaching through e-Class: http://eclass.duth.gr/eclass

2. Student Restaurant

Students with low income are entitled to free meals at the student restaurant, which is located at the Department of Primary Level Education (for further information please contact the Secretariat of the Department).

3. Accommodation, Travelling and Medical Care

Students with low income are entitled, subject to the fulfillment of certain conditions stipulated by the law, to free accommodation. In addition, undergraduate students are provided with card passes for ticket discounts when travelling with public transport. Finally, the University offers medical care to students who have no other form of insurance (for further information please contact the Secretariat of the Department).

4. Student Grants-Scholarships

Student grands are available to students who are not entitled to free accommodation in order to cover their living expenses. Moreover, all students are eligible for scholarships, which are granted by the Greek State Scholarship Foundation. Grants and Scholarships are provided to students on the basis of their academic performance (for further information please contact the Secretariat of the Department).

5. Library

The library is located at the University campus and its resources meet the needs of all users-members of both the Department of Molecular Biology and Genetics and the Department of Medicine. It comprises a building of about 1400m^2 in area , with 18,000 books and 230 journals. The building has reading rooms where students can use the resources within the library. Moreover, there are computer Workstations for students to search for on line journals.

The library is open from Monday till Friday (7:00pm-7:00am)

Librarian : Theodoros Kyrkoudis

For further information please contact:

Tel - Fax: (+30 25510-30902)

Website: www.lib.duth.gr

E-mail: Medical@lib.duth.gr

6. Careers Office

Careers Office was founded in 1997 in Xanthi, while there are two branches in Komotini and Alexandroupoli. The Careers Office aims to inform and help students and graduates with matters considering their future career (for further information please contact tel/ fax: +30 ***25510 – 39235).***

Student Care Office

Ouranis Poufina

Phone: +3025310 39211-39212

Fax: +3025310 39213

Maria Voutsa

Phone: +3025410 79028

Fax: +3025410 79028

7. Erasmus

Erasmus is a European Commission exchange program that enables students in 31 countries to study for part of their degree in another country (for further information visit the website of the European Commission- http://europa.eu.int/comm/education/socrates.html)

Collaborating Universities

The Department of Molecular Biology and Genetics supports the Erasmus program, and during the academic year 2012-2013, developed collaborations with the universities listed below

1. University of Liverpool, Cancer Research Centre.

Laboratory Dr. T. Liloglou

Laboratory Dr. G. Xinarianos

www.liv.ac.uk/cancerstudies/research/research.htm

2. Erasmus MC University, Medical Center, Department of Biochemistry

Laboratory Prof. C.P.Verrijzer

www.erasmusmc.nl/biochemie/research/397758/

3. Universitat de Barcelona, Lombarte Departament de Biologia Animal.

Laboratory Prof. Miquel Arnedo.

www.marnedo.net/home.php

Further information for Erasmus:

- M.Grigoriou (Coordinator), Associate Professor, Department of Molecular Biology and Genetics, Building 10, Campus, Dragana, Gr-68100, tel: (+3025510-30657), email: mgrigor@mbg.duth.gr
- University Office for International Affairs/Socrates (Administration building, Komotini, tel. +3025310 39084, e-mail: intrela@duth.gr)

The city of Alexandroupolis

Alexandroupolis is a coastal city with a population of about 48.000 (as estimated in 2001). It is the capital of the Prefecture of Evros. With bus, train and air services to Athens and Thessaloniki (as well as to other Greek cities) and a sea connection with the island of Samothrace, it is one of the best centers from which one can explore Thrace. In Samothrace one can visit the Sanctuary of the Great Gods and the traditional village of Chora.

At a short distance from the city one can find important archaeological sites which date from the Classical, Hellenistic, Roman and Byzantine era.

Within its geographical district there is the Delta of Evros, one of the most important wildlife parks not only in Greece but in Europe too, and the wildlife park in the forest of Dadia.

In Alexandroupolis there are four departments of the Democritus University of Thrace: the School of Medicine, the School of Molecular Biology and Genetics, the School of Primary Education, the School of Sciences of Education for Pre-School Ages.

The University Campus is located at Dragana about 6 km away from the city.

Useful Phone Numbers (+0030 25510)

Airport Democritus	45198
Central Bus Station	26479
Port	26468
Hospital	25772
Central Train Station	26398
Taxi	27700, 27200, 27770
Tourist Police	37411