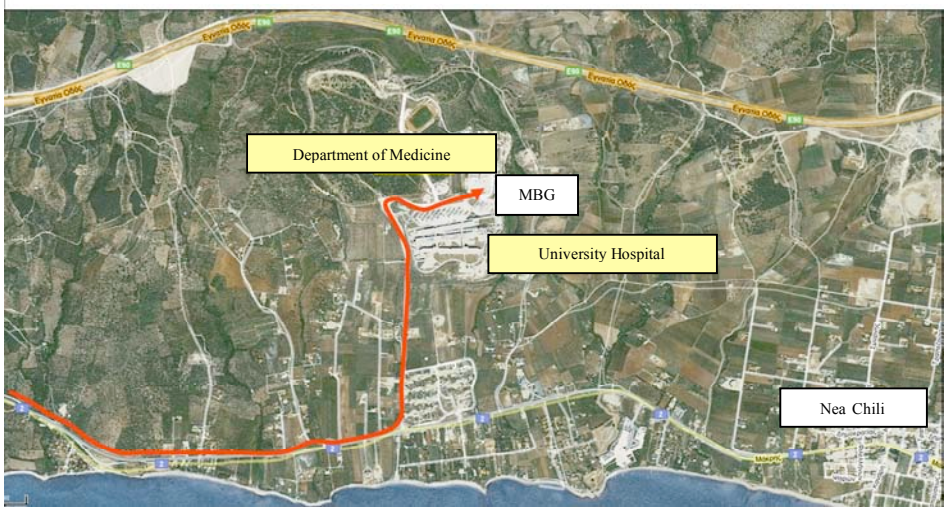
DEMOCRITUS UNIVERSTITY OF THRACE

DEPARTMENT OF MOLECULAR BIOLOGY AND GENETICS

UNDERGRADUATE PROSPECTUS 2009-2010

ALEXANDROUPOLIS

ENTRY 2009



ADDRESS

Democritus University of Thrace

Department of Molecular Biology and Genetics,

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GR. 68100

WEBSITE

www.mbg.duth.gr

INFORMATION

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The prospectus was organized by Dr C.Staneloudi and M.Grigoriou, Assistant Professor

CONTENTS

ACADEMIC DIARY 2009-2010

REGISTRATION

Students are registered within dates assigned by the Ministry of National Education and Religious Affairs.

WINTER SEMESTER

1. Courses start……(*)
2. Courses end……...(*)
3. Exam period……..……..(*)

SPRING SEMESTER

1. Courses start……(*)
2. Courses end……. ……(*)
3. Exam period……..……...(*)

(*) the dates for each semester of any academic year are assigned by the Senate and announced in due time by the Departmental Secretariat.

BANK HOLIDAYS

No lectures, seminars, practicals or exams take place

WINTER SEMESTER

October 28th	National Holiday
November 17th	Bank Holiday
Decemer 23rd till January 6th	Christmas Holidays
January 30th	Bank Holiday

SPRING SEMESTER

Februry 15th	Bank Holiday
March 25th	National Holiday
March 29th till April 11th	Easter Holidays
May 1st	Labour Day
May 14th	Local Bank Holiday
Pentecost	
Student's elections day	

A Preface By The President of the Department of Molecular Biology and Genetics

The Department of Molecular Biology and Genetics (MBG) of the Democritus University of Thrace was founded in 1999 with the vision of becoming a centre of excellence in biomedical research and training. The research and teaching interests of the faculty include fundamental, as well as medically relevant, problems in molecular biology, genetics, development, genomics, cell biology, biochemistry, and macromolecular structure.

The mission of MBG is threefold: research, teaching, and service to society.

MBG is the only University Department in Greece dedicated to providing a Molecular Biology and Genetics curriculum. We offer a stimulating environment for students to pursue studies in molecular biosciences. Teaching includes formal classroom courses - practical training in the laboratory, and development of communication skills for both oral and written presentation of scientific data.

Research is the second mission of MBG. Since its establishment, 10 years ago, the Department has recruited sixteen young and enthusiastic faculty members who have already established a strong research capacity. MBG has also invested considerable resources developing an effective infrastructure to support cutting edge research. To this end MBG maintains a number of research instruments and facilities for common use by Departmental investigators. Faculty members direct research programs that involve multidisciplinary approaches to address novel biological questions at the level of organization of molecules to cells and of cells to organisms.

Service to society is the third mission of MBG. Thrace, the North-Eastern part of Greece has traditionally been an agricultural region lacking state of the art technological development. MBG aims to raise the level of research in molecular biosciences in an effort to concentrate skills and funds that will promote economic development for the benefit of the local society.

I am honoured and humbled to be the President of MBG, and to participate in this collaborative effort to build a Department of excellence that will serve both science and sociery in North-Eastern Greece.

A. Kortsaris
Professor of Biochemistry
Alexandroupolis July 2009

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 organised 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 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 Resouces, 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.

2. Administration

Under the Act N. 1268/82, Greek Universities are organised 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 byt 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 specialised-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 carreers in basic research in University and Research Institutes, in the biotechnological and biomedicinal sector or in teaching Biosciences.

1. Administration and Teaching Staff

President :

Alexandros Kortsaris, Professor

Tel.(+30) 25510/ 30520 email: akortsar @med.duth.gr

Departmental Secretary:

Head of Secretariat

Dimitrios Asimakopoulos

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

Secretariat-Staff

Eleni Grigoriadou Tel. (+30)25510-30612

Hlias Dagkalis Tel. (+30)25510-30613

Sofia Kiriaki Tel. (+30)25510-30642

Roi Litsikaki Tel. (+30)25510-30614

Sotirios Tsompanoudis Tel. (+30)25510-30611

1.

Academic Faculty Members

Name	Title	Telephone (+30 25510)	email
Raphael M. Sandaltzopoulos	Associate Professor of Molecular Biology	30622	rmsandal@mbg.duth.gr
Konstantina Fylaktakidou	Associate Professor of Chemistry of Organic Compounds	30663	kfylakta@mbg.duth.gr
Nikolaos Glykos	Assistant Professor of Computational and Structural Biology	30620	glykos@mbg.duth.gr
Maria Grigoriou	Assistant Professor of Molecular Biology	30657, 30674	mgrigor@mbg.duth.gr
Margy D. Koffa	Assistant Professor of Cell Biology	30661, 30675	mkoffa@mbg.duth.gr
Aglaia Pappa	Assistant Professor of Physiology and Molecular Pharmacology	30625	apappa@mbg.duth.gr
George Skavdis	Assistant Professor of Molecular Biology	30626	gskavdis@mbg.duth.gr
Katerina Chlichlia	Assistant Professor of Molecular Immunology	30630	achlichl@mbg.duth.gr
Bogos (Pavlos) Agianian	Lecturer of Molecular and Structural Biology	30668	magiania@mbg.duth.gr
Alexis Galanis	Lecturer of Molecular Biology	30634	agalanis@mbg.duth.gr
Katerina R. Katsani	Lecturer of Protein Chemistry	30635	kkatsani@mbg.duth.gr
Ioannis Kourkoutas	Lecturer of Applied Biotechnology	30633	ikourkou@mbg.duth.gr
Sotiria Boukouvala	Lecturer of Molecular Biology	30632	sboukouv@mbg.duth.gr
Peristera Paschou	Lecturer of Population Genetics	30658	ppaschou@mbg.duth.gr
Giannoulis Fakis	Lecturer of Human Genetics and Cytogenetics	30628	gfakis@mbg.duth.gr
Maria Chatzaki	Lecturer of Biology	30636	mchatzak@mbg.duth.gr

Teaching Associate

Chrysovalanto Staneloudi	Bsc, PhD Biology		cstanelo@mbg.duth.gr

Research Associate

Chrysoula Metallinou	Bsc, Biology	30641	cmetalli@mbg.duth.gr

2. Divisions

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

1. Division of Basic Sciences, Biochemistry and Biotechnology

Members	Position	Research Interests
1. Konstantina Fylaktakidou	Associate Professor	Chemistry of Organic Compounds
2. Katerina R. Katsani	Lecturer	Protein Chemistry
3. Ioannis Kourkoutas	Lecturer	Applied Biotechnology

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
1. Raphael M. Sandaltzopoulos	Associate Professor	Molecular Biology
2. Nikolaos Glykos	Assistant Professor	Computational and Structural Biology
3. Aglaia Pappa	Assistant Professor	Physiology and Molecular Pharmacology
4. Katerina Chlichlia	Assistant Professor	Molecular Immunology
5. Alexis Galanis	Lecturer	Molecular Biology

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
1. Maria Grigoriou	Assistant Professor	Developmental Biology
2. Maria D. Koffa	Assistant Professor	Cell Biology
3. George Skavdis	Assistant Professor	Molecular Biology
4. Bogos (Pavlos) Agianian	Lecturer	Molecular and Structural 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 Topic
1. Sotiria Boukouvala	Lecturer	Molecular Biology
2. Peristera Paschou	Lecturer	Population Genetics
3. Giannoulis Fakis	Lecturer	Human Genetics and Cytogenetics
4. Maria Chatzaki	Lecturer	Biology

Division's Laboratories

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

3. Admission

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

PART II

STUDYING IN M.B.G

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 attent 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 programme 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 (or in case they chose to attent 10 optional modules instead of a degree dissertation, successful attendance of the moldules)
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 optional and can be substituted with the successful completion of 10 optional modules.
- 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, Assistant Professor, mgrigor@mbg.duth.gr

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

Giannoulis Fakis, Lecturer, gfakis@mbg.duth.gr

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

Two representatives of the Student Union

DEPARTMENT OF MOLECULAR BIOLOGY AND GENETICS

COURSE TIMETABLE

ACADEMIC YEAR 2009-2010

COMPULSORY MODULES

MODULES	LECTURES	PRACTICALS/ SEMINARS	HOURS/WEEK	TEACHING UNITS	ECTS
1st Semester					
MBG101: Physics for Biological Sciences	3	1	**4**	**4**	**5**
MBG102: Inorganic Chemistry	3	3	**6**	**4**	**6**
MBG103: Introduction to Biology	3	3	**6**	**4**	**6**
MBG104: Biostatistics	2		**2**	**2**	**4**
MBG105: Introduction to Computational Biology	3	3	**6**	**4**	**6**
MBG106: English I	2		**2**	**2**	**2**
TOTAL			**26**	**20**	**29**
2nd Semester					
MBG111: English II	2		**2**	**2**	**2**
MBG112: Introduction to Organismal Biology	3	3	**6**	**4**	**6**
MBG113: Organic Chemistry	3	3	**6**	**4**	**6**
MBG114: Physical Chemistry and Elements of Biophysics I	3	2	**5**	**4**	**5**
MBG115: Biochemistry I	3	3	**6**	**4**	**6**
MBG116: Genetics I	3	3	**6**	**4**	**6**
TOTAL			**31**	**22**	**31**

3rd Semester					
MBG201: Biochemistry II	4	3	**7**	**5**	**6**
MBG202: Physiology I	4	2	**6**	**5**	**5.5**
MBG203: Cell Biology	3	3	**6**	**4**	**5.5**
MBG204: Introduction to Molecular Biology Techniques	3	3	**6**	**4**	**5.5**
MBG205: Molecular Biology I	4	1	**5**	**5**	**5**
TOTAL			**30**	**23**	**27.5**

MODULES	**LECTURES**	**PRACTICALS/ SEMINARS**	**HOURS/WEEK**	**TEACHING UNITS**	**ECTS**
4th Semester					
MBG211: Genetcs II	3	3	**6**	**4**	**5.5**
MBG212: Physiology II	4	2	**6**	**5**	**5.5**
MBG213: Molecular Structure and Function I	3	3	**6**	**4**	**5.5**
MBG214: Molecular Biology II	3	1	**4**	**4**	**5**
MBG215: Molecular Microbiology	3	3	**6**	**4**	**5.5**
MBG216: Gene Expression and Signalling I	3	3	**6**	**4**	**5.5**
TOTAL			**34**	25	**32.5**

5th Semester					
MBG301: Molecular Structure Function II	3		**3**	3	**4**
MBG302: Molecular Immunology I	3	3	**6**	4	**5**
MBG303: Advanced Molecular Biology Techniques	3		**3**	3	**4**

MBG304: Bioinformatics	4	3	**7**	5	**5.5**
MBG305:Developmental Biology	4	3	**7**	5	**5.5**
MBG306: Population and Evolutionary Genetics	3	3	**6**	4	**5**
TOTAL			**32**	24	**29**

6th Semester					
MBG311: Applied Biotechnology	3	2	**5**	**4**	**5**
MBG312: Gene Expression and Signalling I I	3	2	**5**	**4**	**5**
MBG313: Molecular Immunology II	3		**3**	**3**	**4**
MBG314: Molecular Cell Biology	3	3	**6**	**4**	**5**
4 Optional Modules	8		**8**	**8**	**12**
TOTAL			**27**	**23**	**31**

7th Semester					
MBG401: Human Genetics	4	3	**7**	**5**	**6**
MBG402: Applications of Molecular Biology in Medical Sciences	3	2	**5**	**4**	**6**
MBG403: Molecular Neurobiology	3	2	**5**	**4**	**6**
4 Optional Modules	8		**8**	**8**	**12**
TOTAL			**25**	**21**	**30**

MODULES	LECTURES	PRACTICALS/ SEMINARS	HOURS/WEEK	TEACHING UNITS	ECTS
8th Semester					
ΜΒΙ411: Degree Dissertation or 10 Optional Modules			**20**	**20**	**30**
TOTAL			**20**	**20**	**30**
TOTAL			**225**	**178**	**240**

Total Teaching Units	**178**	
Total ECTS Units		**240**

OPTIONAL MODULES

MODULES	LECTURES	PRACTICALS/ SEMINARS	HOURS/WEEK	TEACHING UNITS	ECTS
Optional Modules-Winter Semester					
MBG501: Molecular Ecology	***2***		***2***	**2**	**3**
MBG502: Virology	***2***		***2***	**2**	**3**
MBG503: Radiobiology	***2***		***2***	**2**	**3**
MBG504: Teaching Biosciences	***2***		***2***	**2**	**3**
MBG505: Chemicals in our Daily Life	***2***		***2***	**2**	**3**
MBG506: C++	***2***		***2***	**2**	**3**
MBG507: Molecular Plant Biology	***2***		***2***	**2**	**3**
MBG508: Mechanisms of Oncogenesis	***2***		***2***	**2**	**3**
MBG509: Introduction to Bioscience Enterprise	***2***		***2***	**2**	**3**
MBG510: Protein Technology	***2***		***2***	**2**	**3**
Optional Modules-Spring Semester					
MBG601: Histology	***2***		***2***	**2**	**3**
MBG602: Pharmacology	***2***		***2***	**2**	**3**
MBG603: Advanced Themes of Bioinformatics	***2***		***2***	**2**	**3**
MBG604: Advanced techniques and applications in cell biology	***2***		***2***	**2**	**3**
MBG605: Stem Cell and Regenerative Biology	***2***		***2***	**2**	**3**
MBG606: Behavioral Biology	***2***		***2***	**2**	**3**

MBG607: Bioethics	***2***		***2***	**2**	**3**
MBG608: Practical Training	***2***		***2***	**2**	**3**
MBG609: Genomics	***2***		***2***	**2**	**3**

DESCRIPTION OF COMPULSORY MODULES

MBG101

Course title: Physics for Biologists
Type of course: Compulsory
Year of study: 1st
Semester: 1st
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes,ECTS): 5
Name of lecturer: Eleni Kaldoudi

Objectives of the course

- 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.
- Present the physical foundations of technological tools and techniques commonly used for studying and interacting with biological systems.
- Outline the basic philosophical concepts that bridge physics with life (thermodynamics of evolution, complex systems, self-organization, etc.)
- Trigger further discussion, inquiry and study in the area of physics application in molecular biology and genetics.
- Present the scientific methodology, as well as concepts and best practices of scientific knowledge management.

Course contents

1. 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.
2. 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.
3. 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.
4. Evolution of Physics I II: 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.
5. 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.

6. 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).

7. 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.

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

Recommended reading

Recommended for free distribution: :

• Ε. Οικονόμου, "Η Φυσική Σήμερα. Τόμος Ι. Τα Θεμέλια & Τόμος ΙΙ. Οι Δέκα Κλίμακες της Ύλης", Πανεπιστημιακές Εκδόσεις Κρήτης, 1989 (5η εκδ. 2004)

• Α. Αναγνωστόπουλος, Ε. Δόνη Θ. Καρακώστας, Φ. Κομνηνού "Κεφάλαια Φυσικής", Εκδόσεις Ζήτη, Θεσσαλονίκη, 1998

Further recommended reading:

• Crowell B ., "Light and Matter Series, Books 1,2,6", Fullerton, California, 2007 (http://www.lightandmatter.com/)

• Einstein A., Infled L., "The Evolution of Physics", Simon & Schuster, New York, 1938

• Eisberg R., Rescnick R., "Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles", John Wiley & Sons, NY (1974) 1985

• Feynman R.P., Leighton R.B., Sands M., "The Feynman Lectures in Physics", Addison-Wesley, Reading MA, 1963 (1977)

• Hewitt P.G., "Οι Έννοιες της Φυσικής", Πανεπιστημιακές Εκδόσεις Κρήτης, Ηράκλειο, 2004

• Serway R.A., Moses C.J., Moyer C.A., "Σύγχρονη Φυσική", Πανεπιστημιακές Εκδόσεις Κρήτης, Ηράκλειο, 2002

• Τραχανάς Σ., "Κβαντομηχανική, Τόμοι Ι, ΙΙ και ΙΙΙ", Πανεπιστημιακές Εκδόσεις Κρήτης, Ηράκλειο 1988

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.

Assessment methods

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

Language of instruction:

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

MBG102

Course title: Inorganic Chemistry
Type of course: Compulsory
Year of study: 1st
Semester: 1st
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes,ECTS): 4
Name of lecturer: 407

Course contents: Atomic theories, atomic and molecular orbitals, hybridization, chemical bond, periodic table of the elements. Covalent, non covalent and metallic bond, electronic properties, hydrogen bond, Van der Waals forces. Stereochemistry, coordination chemistry, nomenclature. Solutions, chemical equillibrium, kinetics, acids, bases and ions in aqueous soltions. Important biological elements and their compounds.
Practicals

- Introduction to the laboratory equipment, solutions
- Phasmatophotometry UV-Vis
- Titration
- pH
- Buffer solutions

Recommended reading: All books that refer to basic Inorganic Chemistry issues. For the lab practicals the book "Safety, Theory and Practice of Laboratory Techniques", Fylaktakidou Konstantina, Ed DUTH, is recommented.
Teaching methods: Lectures, seminars, lab exercises
Assessment methods: End of term written examinations
Language of instruction: Greek

MBG103

Course title: Introduction to Biology
Type of course: Compulsory
Year of study: 1st
Semester: 1st
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: Maria Chatzaki

Objective of the course: The scope of this class is the introduction of the first year scholars to the basic knowledge of structural and functional biology from unicellular to multicellular organisms as well as the presentation of biodiversity (flora and fauna) and the main aspects of evolutionary process.
Course contents: Origin and properties of life. Macromolecules and their characteristics. Structure and function of prokaryotic and eukaryotic cells. Viruses-viroids-prions. Principles of taxonomy and evolution of organisms. Protists and yeasts. Plant and animal diversity. PRACTICALS: 1. Microscopy, 2. Prokaryotic cells, 3. Eukaryotic cells – dying techniques, 4. Principles of invertebrate taxonomy, 5. Fauna of Greece.
Recommended reading: Biology. A. Zish, Z. Mamouris, K. Moutou. *University of Thessalia 2008*
Integrated Principles of Zoology. Vol. I & II. C.P. Hickman, L.S. Roberts, A. Larson. (Translated edition *Ion 2002*).
Teaching methods: Lectures, practical excercises, documentaries.
Assessment methods: written examination at the end of the semester
Language of instruction: Greek

MBG104

Course title: Biostatistics

Type of course: Compulsory

Year of study: 1st

Semester: 1st

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4

Name of lecturer: TRYPSIANIS

MBG105

Course title: Introduction to Computational Biology
Type of course: Compulsory
Year of study: 1st
Semester: 1st
Number of credits allocated (ECTS): 6
Name of lecturer: Nicholaos M. Glykos

Objective of the course: Introduction to scientific computing, Unix, C

Course contents:

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
Practical Exercises

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: introduction

* 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

Recommended reading:
* The unix programming environment, B. Kernighan and R. Pike.
* The guide to Linux, M. Welsh, M. K.Dalheimer and Kaufman, L.

Teaching methods: Lectures, eight practical exercises
Assessment methods: Practical exercises, 30% Exams (multiple choice), 70%
Language of instruction: Greek

MBG106

Course title: English I

Type of course: Compulsory

Year of study: 1st

Semester: 1st

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS) : 2

Name of lecturer: Eleni Nalbandi

The objectives of the course:

- 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.

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.

MBG111

Course title: English II

Type of course: Compulsory

Year of study: 1st

Semester: 2nd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS) : 2

Name of lecturer: Eleni Nalbandi

The objectives of the course:

- 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).

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.

MBG112

Course title: Introduction to Organismal Biology

Type of course: Compulsory

Year of study: 1st

Semester: 2nd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS) : 6

Name of lecturer: Maria Chatzaki

The objectives of the course:

The scope of this class is the introduction of the first year scholars to organismal biology. It is an approach to the diversity of systems and physiology of animals and plants emphasizing the comparison from unicellular organisms to humans. Part of the class is devoted to the introduction to the principles of ecology and conservation.

Course contents:

Plant istology and anatomy. Plant reproduction and development. Animal tissues and systems. Animal reproduction and development. Principles of ecology. Lab Exercises: 1. Fish anatomy, 2. Frog anatomy, 3. Mouse anatomy, 4-6. Field excursion and data analysis.

Recommended reading:

Biology. A. Zish, Z. Mamouris, K. Moutou. *University of Thessalia 2008*

Integrated Principles of Zoology. Vol. I & II. C.P. Hickman, L.S. Roberts, A. Larson. (Translated edition *Ion 2002*).

Teaching methods: Lectures, practical excercises, documentaries, field excursion.

Assessment methods: written examination at the end of the semester

Language of instruction: Greek

MBG113

Course title: Organic Chemistry
Type of course: Compulsory
Year of study: 1st
Semester: 2nd
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4
Name of lecturer: Konstantina Fylaktakidou

Objective of the course: To enhance the knowledge of the nature of organic compounds (structure and stereochemistry) and their electronic and spectroscopic characteristics. Furthermore, the teaching of the structural and electronic characteristics of heterocyclic compounds, amino acids and sugars will assist the understanding of the configuration and interactions of those biological molecules.
Course contents: Nomenclature, Isomerism, Electronic phenomena, Stereochemistry, Spectroscopy, Mechanisms of Organic Reactions, Aromaticity, analysis of specific issues in the various classes of organic compounds such as carbohydrates, alcohols, carbonyl, aromatic, and heterocyclic compounds, lipids, amino acids, sugars.
The course involves 3 hour practicals (lab exercises) on the following subjects
1. Recrystallization
2. Extraction
3. Distillation
4. Chromatography methods (layer, column, and ιon exchange chromatography)
5. Detections of structural features (double bonds, carbonyls, sugars, amino acids)
Recommended reading: All books that refer to basic Organic Chemistry issues. For the lab practicals the book "Safety, Theory and Practice of Laboratory Techniques", Fylaktakidou Konstantina, Ed DUTH, is recommented.
Teaching methods: Lectures, seminars, lab exercises
Assessment methods: End of term written examinations
Language of instruction: Greek

MBG114

Course title: Physical chemistry and elements of biophysics **I**
Type of course: Compulsory
Year of study: 1st
Semester: 2nd
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: 407

Objective of the course: The course is an introduction to the physical laws that govern biological systems and also to the laws and principles of laboratory techniques (separation, structural etc.).
Course contents: Introductory lessons to mathematics and basic physical measures – Equation of state and gas laws - First law of thermodynamics and applications – Second law of thermodynamics and applications – Third law of thermodynamics and how it relates to the other two – State changes and states of matter – Waves and the electromagnetic spectrum –Interactions of light and matter – Separation techniques – Chromatigraphy – Electrophoresis – Mass spectrometry – Fluorescence spectrometry – Circular dichroism spectroscopy – X-ray crystallography – Nuclear magnetic resonance
Practicals* **:**
1) Isoelectric point of proteins (3 hrs), 2) Velocity of a reaction with a gas product (2-3 hrs)
Recommended reading:
• Atkins – Physical Chemistry 1
• G. Karaiskakis — Physical Chemistry
Teaching methods: power-point lectures, videos, practical courses.
Assessment methods: final exams, practical courses report (homework).
Language of instruction: Greek

** practical's may change every 2 years.*

MBG115

Course title: Biochemistry I
Type of course: Compulsory
Year of study: 1st
Semester: 2nd
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: Dr. Katsani Katerina, Lecturer

Objective of the course: The course is an Introduction to General Biochemistry which aims to introduce the students to the chemistry, structure, function and properties of biomolecules and major cellular constituents
Course contents: water properties and its solutions - structure and function of proteins – Enzymes : basic principles and kinetics, enzyme inhibition and regulation – From DNA to proteins – co-enzymes and vitamins- sugars - fatty acids - lipids and
membranes.
Practicals* :
1) Aqueous Solutions : application of the Dilution Law (3 hrs), 2) Protein Quantification (Bradford) (2-3 hrs), 3) Acid Phosphatase - Assay (3 hrs).
Recommended reading:
• Biochemistry: Basic Concepts. Author: Lehninger S./ Nelson D. (greek edition)
•Stryer – Biochemistry (greek edition)
•Concepts in Biochemistry. Author: Rodney Boyer – εκδοσεις : Wiley
•Biochemistry - Author: Donald J. Voet, Judith G. Voet, - Wiley-Liss Ed
•Textbook of Biochemistry With Clinical Correlations. Author: Thomas M.Devlin- Wiley-Liss. Ed.
Teaching methods: power-point lectures, videos, practical courses.
Assessment methods: final exams, practical courses report (homework).
Language of instruction: Greek

** practical's may change every 2 years.*

MBG116

Course title: Genetics I
Type of course: Compulsory
Year of study: 1st
Semester: 2nd
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: Peristera Paschou, Lecturer in Population Genetics

Objective of the course: Introduction to the basic concepts of genetics, familiarization of students with the principles of Mendelian inheritance as well as their extensions.
Course contents:
Introduction to Genetics
The history of Genetics
The nature of the genetic material and the genome
Mendel's experiments – Mendelian analysis
Extensions to Mendelian analysis
Genotype – environment interactions
Mitosis, meiosis, gametogenesis, reproduction
Sex determination, sex linked inheritance
Extra-nuclear inheritance
Mutation
Chromosomal abnormalities (structural – numerical)
Laboratory practicals
- Blood group determination (3 hours/student section)
- Barr body (3 hours/student section)
Recommended reading:
- Genetics, volume A', Michel G. Loukas, Stamoulis Publications
- Classical and Molecular Genetics, K. Triantafyllidis, Kyriakidis Brothers SA Publishing House
- Instructor's notes and handouts
Teaching methods: Lectures, laboratory practicals
Assessment methods: final exams
Language of instruction: Greek

MBG201

Course title: Biochemistry II

Type of course: Compulsory

Year of study: 2nd

Semester: 3rd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS**): 6**

Name of lecturer: Dr. Katsani Katerina, Lecturer

Objective of the course:

Introduction to the central metabolic pathways, which are similar in all forms of life. Emphasis is given to the degradative phase of metabolism (catabolism) in which organic nutrient molecules (carbohydrates, fats, and proteins) are converted into smaller, simpler end -products releasing energy, some of which is conserved in the formation of ATP and reduced electron carriers (NADH, NADPH, and FADH2). A special focus is given on metabolism regulation, tissue metabolic profile in diet and exercise and the view of these pathways in the context of the whole human organism and in disease.

Course contents: Glucose and sugar metabolism **(**Glycolysis, Gluconeogenesis, the Pentose Phosphate Pathway, glycogen metabolism) - The Citric Acid Cycle and Oxidative Phosphorylation – Fatty Acid metabolism (biosynthesis and β-oxidation) - Amino Acids metabolism (biosynthesis, oxidation and the production of Urea) – Nucleotide biosynthesis - Integration and regulation of human metabolism: Tissue-Specific Metabolism and metabolic profile during diet and exercise – (Metabolic pathways in plants).

Practicals: 1) glucose detection in solutions of unknown concentration*, 2) protein purification techniques* : gel filtration, 3) redox enzymes in metabolism (duration: 3hrs)

Recommended reading:

• Biochemistry: Basic Concepts. Author: Lehninger S./ Nelson D. (greek edition)

•Stryer – Biochemistry (greek edition)

•Concepts in Biochemistry. Author: Rodney Boyer – Wiley-Liss Ed

•Biochemistry - Author: Donald J. Voet, Judith G. Voet, - Wiley-Liss Ed

•Textbook of Biochemistry With Clinical Correlations. Author: Thomas M.Devlin- Wiley-Liss. Ed.

Teaching methods: power-point lectures, videos, practical courses.

Assessment methods: final exams – lab participation - practical courses report (homework).

Language of instruction: Greek

** Exercises may change every 2 years.*

MBG202

Course title: Physiology I

Type of course: Compulsory

Year of study: 2nd

Semester: 3rd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 2

Name of lecturer: Aglaia Pappa

Objective of the course: Presentation and comprehension of the basic principals and mechanisms of physiology. Special emphasis is given on how molecular mechanisms and cellular functions integrate together to maintain system homeostasis and body function

Course contents: Introduction to Physiology – Fundamental principals of Physiology – Movement of molecules through membranes – Homeostatic mechanisms and intracellular communication – Nervous tissue – Membrane potentials – Synapses – Structure and function of Nervous System – General and special senses – General principals of hormonal regulation– Muscle physiology – Control of body movements – Consciousness and behavior - Blood physiology

Recommended reading:

1. "Human Physiology: The mechanisms of Body Function" Μηχανισμοί της Λειτουργίας του Οργανισμού", Vander et al., 8η edition (Greek edition)
2. "Principals of Physiology", Berne & Levy, (Greek edition)

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, mid-term exams and final exams.

Language of instruction: Greek

MBG203

Course title: Cell Biology

Type of course: Compulsory

Year of study: 2nd

Semester: 3rd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5

Name of lecturer: Maria Koffa

Objective of the course: 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 a microscopical and molecular level.

Course contents:

- Cell structure and function-Methodology
  - Light and electron Microscopy
  - Immunocytochemistry
  - fractionation of cells extracts
  - 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

Practical classes:

- Mitosis
- Cell fractionation, organelle separation, protein extraction
- SDS PAGE electrophoresis, coomassie blue staining

Recommended reading:

Essential Cell Biology, Alberts et al., second edition, Garland Science

Powerpoint presentations

Teaching methods: Lecture course (powerpoint presentations, videos, e-class etc), laboratory course

Assessment methods: Written exam at the end of the semester, mainly based on multiple-choice questions. Active participation in the practical classes is also rewarded.

Language of instruction: Greek

MBG204

Course title: Introduction to Molecular Biology Techniques

Type of course: Compulsory

Year of study: 2nd

Semester: 3rd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5

Name of lecturer: Giorge Skavdis

Objective of the course:

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).

Practicals

1. Minipreparation of DNA using boiling method – Digest by restriction enzymes.
2. Preparation of competent cells and transformation of DNA.
3. Fragment isolation from agarose gel by electroelution.
4. RNA isolation by guanidinium thiocyanate-phenol-chloroform extraction.
5. PCR.

Recommended reading:

1. Recombinant DNA –Genes and Genomes J. D. Watson, A. A. Caudy, R. M. Myers, J. A. Witkowski. (W. H. Freeman and Company 2007).

2. Restriction Enzymes and their use in Molecular Biology. Sandalzopoulos and Skavdis, Alexandroupolis 2005.

Teaching methods: Courses/ Practicals

Assessment methods: Comprehensive final exam.

Language of instruction: Greek

MBG205

Course title: Molecular Biology I

Type of course: Compulsory

Year of study: 2nd

Semester: 3rd

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS):5

Name of lecturer: Raphael Sandaltzopoulos

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.

Recommended reading:

GENES VIII (B. Lewin), Greek edition.

Vol. A': Ch. 1, 2, 9-12.

Vol. B': Ch. 19, 20.

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.

MBG211

Course title: Genetics II

Type of course: Compulsory

Year of study: 2nd

Semester: 4th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5

Name of lecturer: Giannoulis Fakis, Lecturer in Human Genetics and Cytogenetics

Objectives of the course:

"Genetics II" is an undergraduate course taught to second year students. It is the continuation of "Genetics I", an earlier course taught during the 1st year of studies. Taken together, these two courses cover all the basic material of Genetics. Their objective is to provide students with an understanding of all the concepts and basic applications of classical and molecular genetics.

This is a course covering the fundamentals of the field of Genetics and therefore it is essential to students of MBG and other underdraduates studying biological sciences.

Course contents:

- Linkage in diploid organisms
- Genetic recombination and linkage maps
- Genetics of haploid eukaryotic organisms – Linkage and mapping in fungi
- Molecular mechanisms of genetic recombination
- Microbial genetics – Recombination in bacteria and phages
- The evolving concept of the gene – Gene fine structure
- Transposable genetic elements
- Genetics of cancer
- Genomics – Mapping and sequencing whole genomes

Practical classes:

- Optimisation of the polymerase chain reaction (PCR)
- Polymorphic genetic markers
- Restriction mapping

Book reports, paper presentations and solving genetics problems.

Attendance of class practicals and seminars is obligatory.

Typically, practicals and seminars are taught to groups of 20-25 students. Their duration is 3 hours.

Recommended reading:

Students can choose one of the following textbooks (in the Greek language):

- *iGenetics – a Mendelian approach* — Peter J. Russel (2009)

- *Classical and Molecular Genetics* — (2004)
- *Introduction to Genetics* — S. Alahiotis (2005)

Other greek or international textbooks used in preparing and teaching this course:

- *Genetics, volume A* — M. Loukas
- *Recombinant DNA* — Watson, Myers, Caudy, Witkowski
- *Genes VIII* — Benjamin Lewin
- *DNA I* – The Human Genome — Carina Dennis & Richard Gallagher
- *DNA II* – 50 Years of DNA — Julie Clayton & Carina Dennis
- *Principles of Medical Genetics (2nd edition)* — Gelehrter, Collins, Ginsburg
- *Genetics in Medicine (*Thompson & Thompson) — Thompson, McInnes, Willard
- *Introduction to Genetic Analysis* — Griffiths, Wessler, Lewontin, Gelbart, Suzuki, Miller — Freeman
- *Concepts of Genetics* — William S. Klug & Michael R. Cummings — Prentice Hall
- *Analysis of Genes and Genomes* — R.J. Reece — Wiley
- *Molecular Biology of the Gene* — Watson, Hopkins, Roberts, Steitz, Weiner — Benjamin/Cummings
- *Principles of Genetics* — Gardner, Simmons, Snustad — εκδ. Wiley

Additional bibliography:

The following books were used in some lectures and in class or student activities. They are general interest, historic or popular science books.

- *The Double Helix* — James D. Watson
- *What a Mad Pursuit* — Francis Crick
- *Francis Crick* – Discoverer of the Genetic Code — Matt Ridley — HarperCollins
- *A Passion for DNA* — James D. Watson — Oxford
- *DNA – the secret of life* — James D. Watson — Knopf
- *The Common Thread* — John Sulston & Georgina Ferry — Bantam Press

Teaching methods:

Teaching is performed in a way that aims to encourage the active participation of students to the educational process. The lecturer's goal is to achieve a balance between the teacher-centric and student-centric methods of teaching.

In the laboratory practicals and small-group seminar classes, students are encouraged to discover the truth and to work as a group helping each other. The ultimate goal is to train the students in the scientific method which involves observation of a phenomenon, forming hypothesis, and planning and conducting experiment to test the hypothesis.

Assessment methods:

The assessment of students is predominantly done though the written exam at the end of the semester or at subsequent exam periods.

During the semester, students prepare reports after each lab practical.

Essays, book reports, oral presentations and other class activities are also assessed.

Active participation in the classroom, the practical classes and other course activities are also rewarded. The ability of innovative thought and independent work is highly regarded.

Language of instruction: Teaching takes place predominantly in the Greek language. Students choose a

textbook which is required to be in greek. In many occasions however, students are required to use reading material and bibliography in the English language. Typically this is needed for the preparation of reports on lab practicals, essays, oral presentations, book reports, or other class activities. This material is

MBG212

Course title: Physiology II
Type of course: Compulsory

Year of study: 2nd
Semester: 4th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5

Name of lecturer: Aglaia Pappa

Objective of the course: Presentation and comprehension of the basic principals and mechanisms of physiology. Special emphasis is given on how molecular mechanisms and cellular functions integrate together to maintain system homeostasis and body function
Course contents: Introduction to Physiology – Fundamental principals of Physiology – Structure, organization and regulation of cardiovascular system – Hemodynamics – Structure, organization and regulation of respiratory system – Kidney function – Regulation of water and ionic homeostasis – Food digestion and absorbance – Regulation of developmental metabolism and energy balance – Reproductive system
Recommended reading:

1. "Human Physiology: The mechanisms of Body Function" Μηχανισμοί της Λειτουργίας του Οργανισμού", Vander et al., 8η edition (Greek edition)
2. "Principals of Physiology", Berne & Levy, (Greek edition)

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, mid-term exams and final exams.
Language of instruction: Greek

MBG213

Course title: Molecular Structure and Function - Part I
Type of course: Compulsory
Year of study: 2nd
Semester: 4th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5
Name of lecturer: Pavlos (Bogos) Agianian

Objective of the course:
This course provides an introduction to fundamental Structural Biology with focus in the structure of biological macromolecules, in particular proteins and nucleic acids. The main aim of the course is to direct students to an understanding of biomolecular structure architecture and the basic mechanisms through which structure determines biological function. In practicals, students use (hands-on) molecular graphics computer programs to understand key elements of macromolecular structure and to study key examples of structure-function relationships.

Course contents:
Introduction-Fundamental concepts, Structural Biology methods, weak forces in biomolecules, the PDB database, molecular graphics, polypeptide folding, secondary structure and super-secondary motifs, structural architecture of domains (class α, β and a/β, the SCOP and CATH databases), topological diagrams, structure of nucleic acids, DNA-binding motifs, structural principles in the recognition of DNA/RNA by proteins (examples of key protein-DNA complexes), introduction to the structural basis of signal transduction (Ras, $G_{\alpha\beta\gamma}$, GHR/PLR, SH2, SH3, tyrosine kinase etc.), structural basis of enzymatic function (structures of serine proteases), structure of immunoglobulin domains and antibody-antigen complexes, introduction to protein mechanics (structure of catalytic antibodies, etc.).

Recommended reading:

1. Carl Branson & John Tooze Εισαγωγή στη Δομή των Πρωτεϊνών. Ακαδημαϊκές Εκδόσεις 2006. Επιμέλεια Ν.Γλυκός, Σ. Χαμόδρακας, Μ. Κοκκινίδης. (given).
2. David Whitford, Proteins: Structure and Function. 2005, WileyBlackwell, USA
3. Gregory Petsko & Dagmar Ringe, Protein Structure and Function. 2008, Oxford University Press, UK

Teaching methods:
Lectures, tutoring and critical discussion during lectures, interactive, hands-on computer lab practicals.
Assessment methods: Final exams
Language of instruction: Greek

MBG214

Course title: Molecular Biology II
Type of course: Compulsory
Year of study: 2nd
Semester: 4th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5
Name of lecturer: Dr. Sotiria Boukouvala

Course objectives: This core module provides knowledge essential for all Molecular Biology & Genetics students. The molecular mechanisms of living systems are described in detail during lectures, and the students study and present landmark scientific articles during journal clubs.
Course content: Replicon (3 hours); DNA replication (6 hours); messenger, transfer and ribosomal RNA (3 hours); catalytic RNA (3 hours); proteinosynthesis (6 hours); genetic code (6 hours); protein localization (6 hours).
Compulsory practical work:
Study and presentation of scientific literature (3 hours, 3-4 groups): Students undertake the study and oral presentation of scientific articles related to the lecture curriculum. These may be either historic articles describing landmark discoveries or contemporary articles in the field.
Recommended reading: GENES VIII by B. Lewin (chapters 5-8, 13, 14 and 25).
Teaching and learning methods: Lectures, journal clubs, study of scientific articles. Excerpts from biographies of distinguished scientists are also provided during lectures and Nobel laureate interviews are shown on video.
Assessment methods: End of semester written examinations (90% of final grade), literature presentation (10% of final grade).
Language of instruction: Greek, study of literature in English.

MBG215

Course title: Molecular Microbiology

Type of course: Compulsory

Year of study: 2nd

Semester: 4th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4

Name of lecturer: I. Kourkoutas

Objective of the course: The course aims at the consolidation of the basic principles of microbiology. Microbiology is the science which studies the microbial world and is considered as the base of modern biology. The main goal of the course is the comprehension of the molecular mechanisms of microbial structure and action in 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 presented, such as the understanding of microbial life on molecular level, the clarification of microbial genetics, the principles of modern virulogy, etc.

Course contents (Syllabus): 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 eykaryotic microorganisms: Genetics of eykaryotic microorganisms, Protozoa, Mycetes, Alagae. Control of microbial growth: Antimicrobial agents. Microbial pathogenesis-Toxins. Biotechnological applications of microorganisms. Virology: General principles of viruses, quantitative determination of viruses, growth of virueses, bacterophages, animal viruses, retro-viruses and prion proteins.

Laboratory exercises: a) Aseptic methods. Preparation of culture media. Sterilization (2h), b) Microbial solid and liquid cultures (2h),

c) Quantitative determination of bacteria by serial dilutions. Isolation of lactic acid bacteria from dairy products (2h), d) Resistance of microbes to antibiotics. Antimicrobial effect of essential oils (2h), e) Gram

staining. Use of microscope. Microbial examination of human teeth and mouth.

Recommended reading:

i) M. T. Madigan, J. M. Marinko, J. Parker, Brock. The biology of microorganisms, Volume 1, Crete University Press, 2005.

ii) Madigan, J. M. Marinko, J. Parker, Brock. The biology of microorganisms, Volume 1, Crete University Press, 2007.

iii) Koliais S. Microbiology University Studio Press, 2001.

iv) Aggelis, G. Microbiology and Microbial Technology. Stamoulis Press, 2007.

iv) Laboratory Notes.

Teaching methods:

i) Lectures.

ii) Laboratory exercises.

iii) Tutorials.

iv) Lectures by invited speakers (invited scientists, invited scientists by the industrial sector, etc).

Assessment methods: Mid-term exams, Laboratory assessments, Final exams.

Language of instruction: Greek

MBG216

Course title: Gene Expression and Signalling I

Type of course: Compulsory

Year of study: 2nd

Semester: 4th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5

Name of lecturer: Assoc. Professor Raphael Sandaltzopoulos, *PhD, MBA*

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.

Practical courses:

Course No.1: Bacterial transformation – Colony selection based on lacZ expression – Plasmid miniprep – Detection of DNA insert in plasmids by restriction digestion – Agarose electrophoresis.

Number of students groups: 4

Duration: 9 hours (three 3-hour periods) per group.

Course No 2: Overexpression of Taq polymerase gene in *E. coli*. – Purification of the enzyme by heat treatment – Enzymatic activity test by PCR – Agarose gel electrophoresis.

Number of students groups: 4

Duration: 9 hours (three 3-hour periods) per group.

Recommended reading:

GENES VIII (B. Lewin), Greek edition.

Vol. B': Ch. 21, 22, 23, 24

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.

MBG301

Course title: Molecular Structure and Function - Part II

Type of course: Compulsory

Year of study: 3rd

Semester: 5th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4

Name of lecturer: Pavlos (Bogos) Agianian

Objective of the course:

In this course, basic knowledge in Structural Biology obtained by students in course 213 is uses as foundation for an in-depth understanding of structure-function and structure-regulation/deregulation relationships in key for life macromolecular systems.

Course contents:

Structure and Function in: Bacterial and eukaryotic DNA/RNA polymerases and HIV reverse transcriptase, membrane ion channels, aquaporins, glyceroporins, protein machines (myosines, kinesins, dyneins), other membrane proteins (bacteriorodopsin, porins, plant PRC and LH), immunoproteins (MHC class I&II TCR and their immuno-related complexes). Fibrous proteins (collagen, intermediate filaments, silk) and the structural basis of amyloid-based diseases (BSE, Prion, Alzheimer). Sequence-based structure prediction, prediction of transmembrane helices, protein mechanics and structure-based design, Structural Genomics. Protein folding and flexibility (CDKs, troponin, calmodulin serpins), structure-function in chaperones (GroEL/ES and other). Structure and regulation of key transcription factors and their functional complexes. Structural basis of bacterial recognition by receptors of the innate immune system in insects and mammals (TLRs, PGRPs). Structure-based drug design (anti-viral and anti-cancer drugs).

Recommended reading:

1. Carl Branson & John Tooze Εισαγωγή στη Δομή των Πρωτεϊνών. Ακαδημαϊκές Εκδόσεις 2006. Επιμέλεια Ν.Γλυκός, Σ. Χαμόδρακας, Μ. Κοκκινίδης (given).
2. Gregory Petsko & Dagmar Ringe, Protein Structure and Function. 2008, Oxford University Press.
3. David Whitford, Proteins: Structure and Function. 2005, WileyBlackwell, NY.

Teaching methods:

Lectures, tutoring and critical discussion during lectures. Essays (obligatory) in which students elaborate on a key theme related to the course presented in a recent peer-reviewed publication.

Assessment methods: Final exams

Language of instruction: Greek

MBG302

Course title: Molecular Immunology I
Type of course: Compulsory
Year of study: 3rd
Semester: 5th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5
Name of lecturer: Katerina Chlichlia

Objective of the course: To understand the basic principles of Molecular Immunology (the structure and function of the immune system) and the complex mechanisms of immune responses. Laboratory exercises will equip students with techniques that are frequently used in immunology protocols.

Course contents:

Structure of the Immune System, cells and organs of the Immune System. Innate/Native vs. Adapted/Acquired/Specific Immunity. Recognition and Function of Innate Immunity. Recognition and Function of Adapted Immunity. Antigens, Antigen-Recognition. Structure and Function of Antibodies. T-Cell Receptor. Organization and Expression of Immunoglobulin Genes. Mechanisms of Immunoglobulin Gene Diversity. Major Histocompatibility Complex (MHC). Antigen-Processing and Presentation to T cells. Thymus and T cell development. Maturation, Activation and Differentiation of T lymphocytes. Effector T cells. Cytokines. Cell-mediated Immunity. Macrophage Activation. Production, Activation and Differentiation of B lymphocytes. Humoral Immunity. The Complement System.

The course involves the following practicals (lab exercises)

1. Blood Smear Tests and Morphological Cell Examination (3hours/3 groups)
2. Isolation of PBMC's in Histopaque-Ficoll; Cell Counting using Haematocytometer (3hours/3 groups)
3. Hemagglutination Assay (2hours/3 groups)
4. Enzyme-Linked Immunosorbent Assay-ELISA (6 hours/3 groups)
5. Immunofluorescence-IFT (6 hours/3 groups)
6. Seminar on Modern Immunology Techniques -Discussion of practical's results
7. Basic Principles of Flow Cytometry (FACS)

Recommended reading

- Immunology (translated in Greek), R. Goldsby, T. Kindt, B. Osborne, J Kuby
- Clinical Immunology (translated in Greek), C A Janeway, P Travers
- Powerpoint Presentation of Lectures

Teaching methods: Lectures, seminars, lab exercises, e-class
Assessment methods: End of term written examinations
Language of instruction: Greek

MBG303

Course title: Advanced Molecular Biology Techniques

Type of course: Compulsory

Year of study: 3rd

Semester: 5th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4

Name of lecturer: Georgios Skavdis

Objective of the course:

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.

Recommended reading:

1. Recombinant DNA –Genes and Genomes J. D. Watson, A. A. Caudy, R. M. Myers, J. A. Witkowski. (W. H. Freeman and Company 2007).

Teaching methods: Courses

Assessment methods: Comprehensive final exam.

Language of instruction: Greek

MBG304

Course title: Bioinformatics
Type of course: Complulsory
Year of study: 3rd
Semester: 5th
Number of credits allocated (ECTS): 5.5
Name of lecturer: Nicholas M. Glykos

Objective of the course: Bioinformatics: data bases, algorithms and and tools
Course contents:
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). 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"
Recommended reading: * Bioinformatics : a practical guide to the analysis of genes and proteins, edited by Andreas Baxevanis and Francis Ouellette, 2nd edition, Wiley-Interscience, ISBN 0-471-38390-2. * Terry Attwood and David Parry-Smith, "Introduction to bioinformatics", Longman, ISBN 0-582-327881 * Bioinformatics : Methods and Protocols, edited by Stephen Misener and Stephen Krawetz, Humana Press, ISBN 0-89603-732-0. * Peter Clote and Rolf Backofen, "Computational Molecular Biology : An Introduction", Wiley, ISBN 0-471-87251-2. **Teaching methods:** Lectures, three homework assignments**Assessment methods:** Homework assignments, 30% Exams (multiple choice), 70%
Language of instruction: Greek

MBG305

Course title: Developmental Biology
Type of course: Compulsory
Year of study: 3rd
Semester: 5th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5.5
Name of lecturer: Maria E. Grigoriou

Objective of the course:
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* (by Dr. G. Skavdis).
- Pattern formation II: *D. melanogaster* (by Dr. G. Skavdis).
- 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.

Practicals

- *In vitro transcription.*
- *In situ* hybridization.
- Mouse development.

Recommended reading:

1. Essential Developmental Biology by J. Slack, Blackwell Publishing 2006.
2. Early development of *C. elegans* by M. Grigoriou and G. Skavdis (Alexandroupolis 2005)
3. Early development of *D. melanogaster* by G. Skavdis and M. Grigoriou (Alexandroupolis 2004)

Teaching methods: Courses / Practicals

Assessment methods: Comprehensive final exam.

Language of instruction: Greek

MBG306

Course title: Population and Evolutionary Genetics
Type of course: Compulsory
Year of study: 3rd
Semester: 5th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5
Name of lecturer: Peristera Paschou, Lecturer in Population Genetics

Objective of the course:
Introduction to the basic concepts of Population Genetics. Familiarization of students with the basic principles that determine genetic variation. Understanding the forces that shape species evolution, and familiarization with relevant analytic methodology.

Course contents: 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, Neutral Theory 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)

Laboratory practicals
- The genome and genetic databases (3 hours/ student section)
- Introduction to software for SNP data analysis and estimation of linkage disequilibrium (3 hours/ student section)

Recommended reading:
- Evolutionary Biology Douglas J. Futuyma, Crete University Press
- Instructor's notes and handouts

Teaching methods: Lectures, laboratory exercises
Assessment methods: final exams
Language of instruction: Greek

MBG311

Course title: Applied Biotechnology
Type of course: Compulsory
Year of study: 3rd
Semester: 5th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5
Name of lecturer: I. Kourkoutas

Objective of the course: 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: 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. Intoduction to application of HAACP in the industrial sector.

Laboratory exercises: a) Single cell protein production: Aerobic fermentation of molasses (2h), β) Yeast immobilization on natural supports (2h), γ) Fermentation technology with immobilized yeast (2h), δ) Visit to an industrial unit (3h).

Recommended reading:

i) Klonis I. Enzyme biotechnology. Crete University Press, 1997.

ii) Kiriakidis, D.A. Biotechnology. Ziti Press, 2000.

iii) Aggelis, G. Microbiology and Microbial Technology. Stamoulis Press, 2007.

iv) Laboratory notes.

Teaching methods:

v) Lectures.

vi) Laboratory exercises.

vii) Tutorials.

viii) Lectures by invited speakers (invited scientists, invited scientists by the industrial sector, etc).

Assessment methods: Mid-term exams, Laboratory assessments, Final exams.

Language of instruction: Greek

MBG312

Course title: Signaling and Gene Expression II

Type of course: Compulsory

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5

Name of lecturer: Alex Galanis

Objective of the course:

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:

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 signaling pathways
5. Cell Cycle
6. Regulation of Cell Cycle
7. Apoptosis
8. Cellular Oncogenes
9. Tumor Suppressor Genes
10. Cell Immortalization and Senescence

Recommended reading: Genes 8, Lewin B.

Teaching methods: Lectures, use of e-class, tutorials and seminar classes: scientific paper presentations. Attendance of class tutorials and seminars is obligatory. Tutorials and seminars are taught to groups of 4-5 students. The duration of each presentation is approximately 30 minutes.

Assessment methods: End of term written examination, mid-term written examination

Language of instruction: Greek

MBG313

Course title: Molecular Immunology II

Type of course: Compulsory

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 4

Name of lecturer: Katerina Chlichlia

Objective of the course: To understand the important role of the Immune System and its dysfunctions in Health and Disease

Course contents:

Leucocyte Migration. Inflammation and Inflammatory Response. Immune Responses to Infection. T-Cell and B-Cell Memory. Vaccines. DNA Vaccines. Immunodeficiencies. Acquired Immune Deficiency Syndrome (AIDS) and Human Immunodeficiency Virus (HIV) Autoimmunity. Hypersensitivity Reactions. Transplantation Immunology. Cancer and Immune System. Cancer Immunotherapy.

The course does not have lab exercises.

Recommended reading

- Immunology (translated in Greek), R. Goldsby, T. Kindt, B. Osborne, J Kuby
- Basic Immunology (translated in Greek), A. K. Abbas, A. H. Lichtman
- Powerpoint Presentation of Lectures

Teaching methods: Lectures, seminars, lab exercises, e-class

Assessment methods: End of term written examinations, Written Assignment and Oral Presentation

Language of instruction: Greek

MBG314

Course title: Molecular Cell Biology

Type of course: Compulsory

Year of study: 3rd

Semester:6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 5

Name of lecturer: Maria Koffa

Objective of the course: A deeper understanding of the field of Molecular Cell Biology, the molecular mechanisms involved in cell function, as well as a closer review of the literature.

Course contents:

- Fluorescence Microscopy techniques
- Intracellular compartments and protein sorting: nuclear-cytoplasmic transport, intracellular vesicular traffic
- 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

Practical classes:

- Cell fractionation, protein extraction
- SDS PAGE electrophoresis
- Electroblotting
- Western blotting

Recommended reading:

Essential Cell Biology, Alberts et al., second edition, Garland Science

Molecular Biology of the Cell, Alberts et al., 4th edition.

Molecular Cell Biology, Lodish et al., 5th edition.

Powerpoint presentations

Teaching methods: Lecture course (powerpoint presentations, videos, e-class etc), laboratory course

Assessment methods: Written exam at the end of the semester, mainly based on multiple-choice questions. Active participation in the practical classes is also rewarded.

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 cell biology.

MBG401

Course title: Human Genetics
Type of course:Compulsory
Year of study: 4th
Semester: 7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: Giannoulis Fakis, Lecturer in Human Genetics and Cytogenetics

Objective of the course:
This course aims to present the principles of Genetics as they apply to humans. A significant part of the course deals with the role of genetics in human health and the relationship between basic scientific knowledge and clinical applications. There is extensive coverage of the genetic, molecular and chromosomal basis of inherited disease, cancer, and other disorders with genetic component. Teaching consists of presenting all the basic principles and a large number of examples and case studies. The course also covers the areas of genetic diagnosis, genetic counselling and the genetic medicine (or molecular medicine).
This is the last of the 4 obligatory courses in Genetics taught to undergraduate students of MBG. To obtain the full educational benefits, it is important that students have acquired a deep understanding of classical, molecular and population genetics through courses taught in earlier semesters. This is a specialist course covering a particular branch of genetics, but it is essential to students of MBG and other underdraduates studying biological sciences.
Course contents:

- Introduction to Human Genetics – the role of genetics in human health
- Mendelian inheritance of traits in humans – single gene disorders
- Haemoglobinopathies and thalassaemias
- Biochemical and molecular basis of genetic disease
- Pharmacogenetics
- Cytogenetics – autosomal chromosomes and their abnormalities
- Cytogenetics – sex chromosomes and their abnormalities
- Cancer cytogenetics
- Population genetics
- Multifactorial inheritance of traits in humans
- Clinical genetics and genetic counselling
- Genetic testing and population screening
- Mapping of human disease genes

- Positional cloning
- Human genome project
- Ethical and legal issues in Human Genetics
- Gene therapy

Practical classes:

- Pharmacogenetics
- Haemoglobinopathies and thalassaemias
- Molecular genetic methods for sex determination

Seminar classes:

- Genetic counseling – clinical genetics and dealing with genetic disease
- Book reports, paper presentations and case studies

Attendance of class practicals and seminars is obligatory.

Typically, practicals and seminars are taught to groups of 20-25 students. Their duration is 3 hours.

Recommended reading:

Students can choose one of the following textbooks (in the Greek language):

- *Principles of Medical Genetics* (2nd edition) — Gelehrter, Collins, Ginsburg (2003)
- *Human Genetics* (2nd edition) — T. Pataryas, V Aleporou (2005)
- *Principles of Applied Human Genetics* (2nd edition) — D. Mourelatos (2009)
- *Human Genetics* — C. Triantaphyllidis, A. Kouvatsi (2003)
- *Medical Genetics* — K. Lamnisou (2004)

Other greek or international textbooks used in preparing and teaching this course:

- *Genetics in Medicine* (Thompson & Thompson) — Thompson, McInnes, Willard
- *Genetic Counselling* — E. Kanavakis, S. Kitsiou-Tzeli, A. Kalpini-Mavrou
- *Classical and Molecular Genetics* — C. Triantaphyllidis
- *Genetics, volume A* — M. Loukas
- *Introduction to Genetics* — S. Alahiotis
- *Recombinant DNA* — Watson, Myers, Caudy, Witkowski
- *Genes VIII* — Benjamin Lewin
- *DNA I – The Human Genome* — Carina Dennis & Richard Gallagher
- *DNA II – 50 Years of DNA* — Julie Clayton & Carina Dennis
- *Human Genetics, a problem-based approach* — Bruce R. Korf — Blackwell Science, 2000
- *New Clinical Genetics* — Andrew Read, Dian Donnai — Scion, 2007
- *Prenatal diagnosis – the human side* — Lenore Abramsky & Jean Chapple — Nelson Thornes, 2003
- *Introduction to Genetic Analysis* — Griffiths, Wessler, Lewontin, Gelbart, Suzuki, Miller — Freeman
- *Concepts of Genetics* — William S. Klug & Michael R. Cummings — Prentice Hall
- *Analysis of Genes and Genomes* — R. J. Reece — εκδ. Wiley
- *Molecular Biology of the Gene* — Watson, Hopkins, Roberts, Steitz, Weiner —Benjamin/Cummings
- *Principles of Genetics* — Gardner, Simmons, Snustad — Wiley
- *Recombinant DNA* — Watson, Gilman, Witkowski, Zoller — Scientific American Books

- *Genetic Mapping of Disease Genes* — Pawlowitzki, Edwards, Thompson — Academic Press
- *Genome Mapping – practical approach* — Paul Dear — IRL Press

Additional bibliography:

The following books were used in some lectures and in class or student activities. They are general interest, historic or popular science books.

- *Genome* — Matt Ridley — εκδ. Harper Perennial
- *A Passion for DNA* — James D. Watson — εκδ. Oxford
- *DNA – the secret of life* — James D. Watson — εκδ. Knopf
- *The Common Thread* — John Sulston & Georgina Ferry — εκδ. Bantam Press

Teaching methods:

Teaching is performed in a way that aims to encourage the active participation of students to the educational process. The lecturer's goal is to achieve a balance between the teacher-centric and student-centric methods of teaching.

In laboratory practicals and in small-group seminar classes, students are encouraged to discover the truth and to work as a group helping each other. The ultimate goal is to train the students in the scientific method which involves observation of a phenomenon, forming hypothesis, and planning and conducting experiment to test the hypothesis.

Assessment methods:

The assessment of students is predominantly done though a written exam at the end of the semester or at subsequent exam periods.

During the semester, students prepare reports after each lab practical.

Essays, book reports, oral presentations and other class activities are also assessed.

Active participation in the classroom, the practical classes and other course activities are also rewarded. The ability of innovative thought and independent work is highly regarded.

Language of instruction:

Teaching takes place predominantly in the Greek language. Students choose a textbook which is required to be in greek. In many occasions however, students are required to use reading material and bibliography in the English language. Typically this is needed for the preparation of reports on lab practicals, essays, oral presentations, book reports, or other class activities.

MBG402

Course title: Applications of Molecular Biology in Medical Sciences
Type of course: Compulsory
Year of study: 4th
Semester: 7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6
Name of lecturer: Dr. Sotiria Boukouvala

Course objectives:
To introduce students to the principles and methodologies of applied research in biotechnological fields associated with human health. To describe the link between basic research, industrial R&D and clinical application. To introduce concepts like innovation, intellectual property, total quality and resource management in applied research. To present the current regulatory framework encompassing drug and IVDD development. To describe major technological breakthroughs and current career prospects in the field.
Course content:
Part I: *From basic to applied research*
1) The history and progress of applied biomedical research (3 hours). 2) Innovation and intellectual property (3 hours). 3) Funding and managing a biotechnology business (3 hours).
Part II: *The applications of molecular biology and genetics in modern diagnostics*
1) The regulatory framework for *in vitro* diagnostic devices in the EU and the USA (3 hours). 2) Quality management in the industrial and clinical setting – Laboratory safety principles (3 hours). 3) Modern technologies for nucleic acid detection for the purpose of diagnosis: Applications in clinical microbiology, preventive and predictive population genetic screening, preimplantation and prenatal genetic diagnosis and forensics (9 hours).
Part III: *The applications of molecular biology and genetics in modern therapeutics*
1) The regulatory framework for drug development in the USA and the EU (3 hours). 2) From drug discovery to drug development – Clinical trials (3 hours). 3) 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 therapies for cancer; 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; methods for guiding drugs to their target tissues (9 hours).
Compulsory practical work:
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, research

institutes, public 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 genetic 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 in order to retrieve essential information concerning both the disease and the target of interest, but also to assess the IP status 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 molecular 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.

Recommended reading: Lecture material and relevant literature from the departmental library. The book *"Molecular Diagnostics"* by G. Patrinos & W. Ansorge is also distributed to students.

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

Assessment methods: End of semester written examination (80% of final grade). Essays, laboratory reports and presentations (20% of final grade).

Language of instruction: Greek, study of literature in English.

MBG403

Course title: Molecular Neurobiology

Type of course: Compulsory

Year of study: 4th

Semester: 7th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 6

Name of lecturer: Maria E. Grigoriou

Objective of the course:

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 cellurar 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
- Schizophrenia
- Ageing of the nervous system –Alzheimer's disease.
- Analysis of 5 research papers

➢ The molecular Biology of olfaction is analysed by students who volunteer to present outstanding research articles of the field.

Recommended reading:

1. Kandel, Schwartz and Jessell, *Principles of Neural Science.*

2. Kandel, Schwartz and Jessell *Essentials of Neural Science and Behavior*

Teaching methods: Courses / Group discussions.

Assessment methods: Comprehensive final exam, reports, and oral presentations.

Language of instruction: Greek.

DESCRIPTION OF ORTIONAL MODULES

MBG501

Course title: Molecular Ecology

Type of course: Optional

Year of study: 3rd-4th

Semester: 5th, 7th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: Maria Chatzaki

Objective of the course:

The scope of this class 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. Προαπαιτήσεις: NONE

Course contents:

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.

Recommended reading:

1. **An Introduction to Molecular Ecology**. Travor J.C. Beebee & Graham Rowe. *Oxford University Press, 2004*
2. **Ecology.** D. Veresoglou. *«έλλα», 2004*
3. **Evolutionary Biology** D.J. Futuyama, (translated version *University of Crete, 1991*)
4. **Molecular Markers, Natural History, and Evolution**. John C. Avise, *2nd edition, Sinauer Associates, 2004*
5. **Advances in Molecular Ecology**. Gary R. Carvalho*, IOS Press, 1998*
6. **Evolutionary Ecology**. Eric R. Pianka, (translated version *University of Crete, 2006*)

Teaching methods: Lectures and seminars from visiting lectures.

Assessment methods: oral presentations/seminars and/or written examination at the end of the semester.

Language of instruction: Greek.

MBG502

Course title: Virology
Type of course: Optional
Year of study: 4th
Semester: 7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: 407

Objective of the course: To understand the structure and nature of viruses; viral multiplication based on their genetic material (viral infection); the use of viruses as vehicles for gene therapy; molecular methods for detection and ways of prevention and treatment of a viral infection.
Course contents:

- Classification of Viruses according to Baltimore, Viral Infection
- Bacteriophages
- Picorna, Reoviridae, Rhabdoviridae, Coronaviridae
- Arbo viruses, Myxoviruses, Paramyxoviruses
- Retroviruses, Hepatitis viruses
- Parvoviruses, Adenoviruses, Pox viruses, Prions
- Herpes viruses
- Viruses as vehicles in Gene Therapy and Immunotherapy

The course does not have lab exercises.
Recommended reading
- Medical Microbiology and Virology, Papapanagiotou, Kyriazopoulou-Dalaina, University Studio Press
- Virology, Kalkani-Mpousiakou, Ellin Press
- Powerpoint Presentation of Lectures

Teaching methods: Lectures, e-class
Assessment methods: End of term written examinations, Written Assignment and Oral Presentation
Language of instruction: Greek

MBG503

Course title: Radiobiology

Type of course: Optional

Year of study: 4th

Semester: 7th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: A, Zissimopoulos

MBG504

Course title: Teaching Biosciences

Type of course: Optional

Year of study: 4th

Semester: 7th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: Katerina Kedraka

Objective of the course:

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.

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:

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)

Recommended reading:

Proposed for study: Kedraka, D. K, (2009). *Adult Educators in Greece.* Thessalonica: Kyriakidis Publ

For the specific needs of the students, additional *Notes* are given in a cd.

Also, plenty of titles are suggested, but their content is not asked for the exams. Indicatively:

🕮 Bolles, N., R., (2001) (29th ed.). *What Color is your parachute?* Berkley -Toronto: Ten Speed Press.

🕮 Courau, S., (2000). *The basic "tools" of the Adult Educator*. Athens: Metaixmio.

🕮 Goleman, D., (1999). *The Career Intelligence*. Athens: Ellinika Grammata.

🕮 Herr. E., & Cramer, S., (1996). *Career Guidance and Counseling Through the Life Span: Systematic Approaches* (5th ed). New York: HarperCollins.

🕮 European Committee (2000). "Paper on Lifelong Learning" SEC (2000),1832 , 30-10-2000.

🕮 Kedraka, D. K., (2004). Career development and job entry of young people. *Ta Ekpedeftika,* **71-72,** 123-134. Athens.

🕮 *White Book on Education and Training.* European Committee, 1995. www.europa.eu

🕮 Taratori_Tsalkatidou, E., (2003). The *Project Method in Theory and in practice (2nd ed).* Thessalonica: Kyriakidis Publ

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.

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 attendance is considered of core importance and for this reason it is included in the final evaluation.

Language of instruction: Greek

MBG505

Course title: Chemicals in our Daily Life
Type of course: Optional
Year of study:4th
Semester:7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: Konstantina Fylaktakidou

Objective of the course: The aim of the module is to make students familiar with every day chemical compounds. Emphasis is given to the interrelationships of those chemicals with the biological organisms. Students have 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 pollutants, fuel etc
Recommended reading: "Chemistry and Everyday Life", Varvoglis A., 2006, ISBN: 960-7778-91-X, (Ed. Katoptro) and "Heterocycles in Life and Society", Pozharskii Alexander F., 2004, ISBN: 960-418-038-X, (Ed. Tziola).
Teaching methods: Lectures, seminars
Assessment methods: Assignment and Oral Presentation
Language of instruction: Greek

MBG506

Course title: Computer Programming C++

Type of course: Optional

Year of study:4th

Semester:7th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer:407

Objective of the course: The aim of the module is the understanding and application of C++

Course contents

- Introduction to Computers
- Introduction to Boolean Algebra
- Introduction to Programming Language C++
- Loops in C++
- Matrices and Functions in C++
- Pointers and Files in C++
- Object-oriented Programming in C++
- Computational Models

Recommended reading:

- C++, Theory and Practice, K.E. Lazou, Publisher: K.E. Lazos
- Guide of C++, Herbert Schildt, Publisher : Giourdas

Teaching methods: Lectures, e-class

Assessment methods: Written examination

Language of instruction: Greek

MBG507

Course title: Molecular Biology of Plants
Type of course: Optional
Year of study:4th
Semester:7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: 407

Objective of the course: Morphology and anatomy of plants. Mechanisms of ion and biomolecule uptake and transfer. Innorganic nutrition. Plant Growth. Photosynthesis. Circadian rhythms.
Course contents: 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: «Biotechnology of Plants» P. Xatzopoulos
Teaching methods: Lectures, seminars
Assessment methods: Written examination
Language of instruction: Greek

MBG508

Course title: Mechanisms of Oncogenesis
Type of course: Optional
Year of study: 4th
Semester: 7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: Alex Galanis

Objective of the course: 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

Recommended reading:

- Recombinant DNA by J. Watson
- Genes 8 by B. Lewin
- Biology of Cancer, Trougkos, Kitraki Greek Edition Pasxalidis 2006

Teaching methods: Lectures, use of e-class.
Assessment methods: End of term written examination
Language of instruction: Greek

MBG509

Course title: Introduction to Bioscience Enterprise
Type of course: Optional
Year of study: 4th
Semester: 7th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes,ECTS): 3
Name of lecturer: Dr. Sotiria Boukouvala (course organizer, responsible for the syllabus and the recruitment of visiting lecturers)

Course objectives: Final-year students are introduced to the basics of business administration and management, focusing on industrial and other commercial sectors involving bioscientists (e.g. pharmaceutical and biotechnology industry, healthcare etc.). Emphasis is on technology transfer from the academia to the industry, including management of innovation and IP. The course is delivered by experienced professionals, while students become familiar with aspects of entrepreneurship through case studies and visits to pharmaceutical companies, science parks etc.
Course content:
Part I (8 hours): Introduction to general management and business administration, business strategy, human resource management and organizational behaviour, risk management, total quality management, project management, product management, environmental management, corporate social responsibility and business ethics.
Part II (4 hours): Introduction to the basics of financial management and managerial economics, covering aspects of microeconomics, financial planning and decision making, sources of corporate funding etc.
Part III (4 hours): Introduction to the basics of marketing and strategy, market research, sales management, public relations etc.
Part IV (10 hours): Entrepreneurship, developing a successful business plan, financing an entrepreneurial venture, management of technology and innovation, the biotechnology industry, the pharmaceutical industry, healthcare management and economics. Profile of the successful professional in the global job market.
Recommended reading: Lecture material, relevant literature.
Teaching & learning methods: Lectures by invited experienced professionals, the internet, case studies, visit to companies.
Assessment methods: Attendance of lectures, written test at the end of each lecture, optional essay.
Language of instruction: Greek, study of literature in English.

MBG510

Course title: Protein Technology
Type of course: Optional
Year of study: 3rd – 4th
Semester: 6th – 7th – 8th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: Pavlos (Bogos) Agianian (50%) – Katerina R. Katsani (50%)

Objective of the course:
Proteins are the main functional molecules of life and their study has always a central role in Molecular Biology. In this course, we summarize the most important technologies of protein identification, production, purification, and characterization in general with emphasis in biophysical techniques. The course aims at revealing to students the key role of Protein Technology in the Biosciences through a deep understanding of key themes.

Course contents:
Introduction in Protein Technology techniques, recombinant protein overexpression in bacterial and eukaryotic expression systems, protein identification and purification, spectroscopic analysis of proteins, hydrodynamic analysis, mass spectrometry and proteomics, current microscopic techniques, protein arrays and optical biosensors, qualitative and quantitative analysis of protein interactions, analysis of post-translational modifications, current and specialized technologies in protein analysis.

Recommended reading:

1. Charles R. Cantor, Paul R. Schimmel Biophysical Chemistry (Pt. 1, 2 & 3), W.H.Freeman & Co Ltd (1980)
2. Nicholas Price, Jacqueline Nairn Exploring Proteins: a student's guide to experimental skills and methods, Oxford University Press (2009)
3. Daniel M. Bollag, Michael D. Rozycki, Stuart J. Edelstein Protein Methods, WileyBlackwell (1996)
4. Jay A. Glasel, Murray P. Deutscher Introduction to Biophysical Methods for Protein and Nucleic Acid Research, Academic Press (1995)

Teaching methods: Lectures, tutoring and critical discussion during lectures.
Assessment methods: Final exams
Language of instruction: Greek

MBG601

Course title: Histology
Type of course: Optional
Year of study: 4th
Semester: 8th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: Maria CH. Lambropoulou

Objective of the course: 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:

Courses

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

Recommended reading: Basic Histology I & II, 5th Greek Edition, Luiz Carlos Junqueira, Josi Carneiro, Medical publications P.CH. Paschalidis

Teaching methods: Lectures and group discussions.

Assessment methods: Final oral exam.

Language of instruction: Greek

MBG602

Course title: Pharmacology

Type of course: Optional

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: Aglaia Pappa

Objective of the course: This is an introductory course in Pharmacology aiming at the comprehension of the basic principals of Pharmacology with emphasis on the molecular mechanisms of drug action

Course contents: Fundamental principals of Pharmacology – Pharmacokinetics – Pharmacodynamics – Drug absorption, distribution, metabolism and excretion – Pharmacogenetics – Molecular and cellular targets of drugs – Mechanisms of drug action through examples of drugs affecting various systems, e.g. Autonomous Nervous System, Central Nervous System, Cardiovascular System – Principals of Chemotherapy and chemotherapeutic agents – Drug development

Recommended reading:

1. "Pharmacology", Page et al.., Medical Publications Pashalidis (Greek edition)
2. "Pharmacology", Harvey & Champe, 2nd edition, Publications Pashalidis (Greek edition).

Teaching methods: Lectures and guided literature research assignments

Assessment methods: Students evaluation is based on their performance on written/oral assignments and final written exams.

Language of instruction: Greek

MBG603

Course title: Advanced Themes of Bioinformatics
Type of course: Optional
Year of study: 3rd
Semester: 6th
Number of credits allocated (ECTS): 3
Name of lecturer: Nicholas M. Glykos

Objective of the course: Applied Bioinformatics: Perl
Course contents:
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, 5th 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 $\rho = f(x,y) = [\ 10.0 - \mathrm{sqrt}(x^2+y^2)\ ] \cdot \cos[\ \mathrm{sqrt}(x^2+y^2)\ ]$ 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).
Recommended reading:
* ``Learning Perl'', Randal L. Schwartz & Tomas Christiansen.
* ``The guide to Perl'', C. Pierce.
Teaching methods: Lectures, six practical exercises
Assessment methods: Practical execises, 30% Exams, 70%
Language of instruction: GREEK

MBG604

Course title: Advanced techniques and applications in cell biology
Type of course: Optional
Year of study: 3rd
Semester: 6th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: Maria Koffa

Objective of the course: 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.

Course contents:

-Advanced Molecular Cell Biology techniques: Confocal Microscopy, Live cell microscopy, FRAP (Fluorescence Recovery After Photobleaching), FRET (fluorescence resonance energy transfer), FLIM (Fluorescence lifetime imaging microscopy systems), etc.

-Specific scientific topics as:

- mitosis and spindle formation
- microtubule dynamics
- MAPs (microtubule associated proteins)
- centomers / centrosomes
- spindle assembly checkpoint
- nuclear envelope formation

Recommended reading:

Review papers and book chapters.

Molecular Biology of the Cell, Alberts et al., 4th edition.

Powerpoint presentations

Teaching methods: Lecture course (powerpoint presentations, videos, e-class etc), Group discussions

Assessment methods: Oral or written presentations.

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.

MBG605

Course title: Stem cell and Regenerative Biology

Type of course: Optional

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3

Name of lecturer: Maria E. Grigoriou

Objective of the course:

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:

Courses

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

Recommended reading:

"Stem cell Biology" Georgatos, Kouklis, Lazarides and Melidoni Efyra Publications 2008.

Review/Research papers.

Teaching methods: Lectures, seminars, journal clubs and group discussions.

Assessment methods: Comprehensive final exam and/or oral or written presentations.

Language of instruction: Greek

MBG606

Course title: Behavioral Biology

Type of course: Optional

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes - ECTS) : 3

Name of lecturer: George Skavdis

Objective of the course:

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 (By Dr. M. Grigoriou)

Recommended reading: Review papers and book chapters.

Teaching methods: Courses/Group discussions.

Assessment methods: Comprehensive final exam.

Language of instruction: Greek.

MBG607

Course title: Bioethics

Type of course: Optional

Year of study: 3rd

Semester: 6th

Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes - ECTS) : 3

Name of lecturer: 407

MBG608

Course title: Intership under the EU supported program "Life-Long education"
Type of course: Optional
Year of study: 3rd
Semester: 6th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes - ECTS) : 3
Responsible: Dr. Katsani Katerina, Lecturer

Objective of the course:
1. To give a first opportunity to students to use their knowledge and capabilities in a professional environment
2. The convergence of different scientific areas that encourages students self determination in a professional level.
3. To help students obtain experience in order to better choose their future carriere
4. To open communication avenues between academia and production units and make the academic curriculum more contemporary and more relevant to the market demands

Course contents:
Intership in a research or clinical laboratory, production unit, pharmaceuticals, or other professional environment relative to the students training.

Recommended reading: -

Teaching methods: -
Assessment methods: written final report.
Language of instruction: Greek

MBG609

Course title: Genomics
Type of course: Optional
Year of study: 3rd
Semester: 6th
Number of credits allocated (based on the student workload required to achieve the objectives or learning outcomes, ECTS): 3
Name of lecturer: Dr. Sotiria Boukouvala

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 content: 1) The history and progress of genomics (1 hour). 2) Experimental and computing tools in genomic research (3 hours). 3) Genome mapping and sequencing (4 hours). 4) The Human Genome Project: Mapping, sequencing, transcriptomics, SNP consortia, the HapMap project, whole genome cytogenetics etc. (4 hours). 5) The genomes of model organisms and other eukaryotes – Comparative genomics (2 hours). 6) The genomes of prokaryotes: Comparative genomics and pathogenomics (2 hours). 7) Oncogenomics and the Cancer Genome Project (2 hours). 8) Pharmacogenomics, toxicogenomics, ecogenomics, nutrigenomics etc. (3 hours). 9) The anticipated impact of genomics – Ethical, legal and social implications (1 hour).
Recommended reading: Lecture material and relevant literature from the departmental library. The books *Recombinant DNA* by Watson et al. and *Pharmacogenomics & Proteomics* by Wong et al. are also distributed to students.
Teaching methods: Lectures, study of scientific literature, database searches.
Assessment methods: Attendance of Lectures (up to 3/10 points), end of semester written examinations (up to 7/10 points).
Language of instruction: Greek, study of literature in English.

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. Accomodation, 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 a student rate on tickets for city and long-distance 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. Carreers Office

Carreers Office was founded in 1997 in Xanthi, while there are two brances in Komotini and Alexandroupoli. The Carreers Office aims to inform and help students and graduates with matters considering their fututе carreer (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 programme 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)

Collaborative Universities

The Department of Molecular Biology and Genetics supports the Erasmus programme, and during the academic year 2008-2009, 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. University of Tuebingen, Dept. of Medical Genetics.
Laboratoty Prof O. Riess
www.uni-tuebingen.de/ Klinische_Genetik

3. Erasmus MC University, Medical Center, Department of Biochemistry
Laboratory Prof. C.P.Verrijzer
www.erasmusmc.nl/biochemie/research/397758/

4. Universitat de Barcelona, Lombarte Departament de Biologia Animal.
Laboratory Prof. Miquel Arnedo.
www.marnedo.net/home.php

5. University of Montpelier II, Laboratory of Genome, Populations, Interactions and adaptations.
Laboratory Prof. François Bonhomme.
www.univ-montp2.fr/~genetix/labo.htm

6. University of Peruggia, Faculty of Pharmacy, Dpt. of Internal Medicine, Section of Applied Biochemistry and Nutritional Sciences.
Laboratory Prof. F. Galli.
www.unipd.it

Further information for Erasmus:

- M.Grigoriou (Coordinator), Assistant Professor, Department of Molecular Biology and Genetics, Building 10, Campus, Dragana, Gr-68100, tel: (+3025510-30657), email: mgrigor@mbg.duth.gr
- University Office for Internation 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 38.000. 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 centres 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 and the construction of the buildings is still in progress.

Usefull Phone Numbers (+0030 25510)

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