

SECTION OF BIOTECHNOLOGY AND APPLIED BIOLOGY

This Division covers various applications of biology and biological processes in mechanics, technology, environment and medicine.

Faculty staff– Fields of teaching and research activities

SECTION OF BIOCHEMISTRY, MOLECULAR BIOLOGY, CELLULAR AND DEVELOPMENTAL BIOLOGY

Irene Athanasakis, Professor, PhD 1988, University of Alberta.

Immunology.

George Garinis, Professor, PhD 2001, National and Kapodistrian University of Athens

Molecular genetics of mice – Senescence, Cancer and Longevity.

Christos Delidakis, Professor, PhD 1988, Harvard University.

Molecular Biology of Drosophila -Neurogenetics.

George Zachos, Associate Professor, PhD 1997, University of Crete.

Cellular Biology, Cell cycle and Division, Mechanisms of Carcinogenesis, Checkpoints.

Ioanna Keklikoglou, Assistant Professor, PhD 2012 University of Heidelberg.

Molecular Mechanisms of Animal Differentiation and Development.

Dimitrios Papadopoulos, Associate Professor, PhD 2010, University of Basel.

Molecular Biology

Pavlos Pavlidis, Associate Professor, PhD 2011, University of Munchen Deutschland.

Bioinformatics

Charalampos Spilianakis, Associate Professor, PhD 2003, University of Crete.

Biochemistry, Molecular Immunology, Transcriptional regulation in the Immune System, Nuclear Organization of Chromosomes.

Dimitris Tzamarias, Professor, PhD 1990, University of Crete.

Biochemistry, Molecular Biology, Chromatin Structure, Transcriptional regulation, Epigenetic Inheritance

George Chalepakis, Professor, PhD 1988, University of Marburg.

Cellular Biology.

SECTION OF BIOLOGY OF ORGANISMS, POPULATIONS, ENVIRONMENT AND MARINE BIOLOGY

Angeliki Doxa, Assistant Professor, PhD 2010, Musèum National d' Histoire Naturelle de Paris

Complex population dynamics in a changing world.

Kriton Kalantidis, Professor, PhD 1995, University of Nottingham.

Evolutionary Developmental biology of higher plants.

Kyriakos Kotzambasis, Professor, PhD 1987, University of Marburg.

Plant Biochemistry and Physiology, Photosynthesis, Photobiology, Plant Biotechnology and Bioenergetics

George Koumoundouros, Professor, PhD 1998, University of Crete.

Marine Biology –Fish Biology

Emmanouil Ladoukakis, Associate Professor, PhD 2001, University of Crete.

Evolutionary Zoology

Konstantina Lyka, Associate Professor, PhD 1996, University of Tennessee.

Biomathematics

Panagiotis Moschou, Associate Professor, PhD 2009, University of Crete.

Molecular Physiology and Plant Biotechnology

Michael Pavlidis, Professor, PhD 1990, National & Kapodistrian University of Athens.

Biology – Marine Ecology, Fish Physiology – Endocrinology

Nikolaos Poulakakis, Professor, PhD 2005, University of Crete.

Systematic Zoology, Molecular Phylogenesis, Phylogeography and genetic management of animal populations, Ancient DNA (aDNA)

Stergios Pирintzos, Professor, PhD 1993, Aristotle University of Thessaloniki.

Plant Ecology, Ecology and Management of Terrestrial Ecosystems, Ecology of Rare and Endemic Plant Species, Biomonitoring of Environmental Changes, Environmental Risk Assessment.

Kyriaki Sidiropoulou, Associate Professor, PhD 2003, Rosalind Franklin University.

The role of intrinsic excitability on learning and memory. The role of inhibition in cortical information processing, Computational Neuroscience.

Anastasios Tselepidis, Professor, PhD 1992, University of Crete

Marine Environment

SECTION OF BIOTECHNOLOGY AND APPLIED BIOLOGY

Maria Dafni Bazopoulou, Assistant Professor, PhD 2009, University of Crete.

Oxidative stress; Redox signaling during aging and host-microbe interactions. Aging of the nervous system and amyloid-induced pathologies in C. elegans. Microfluidics for nervous system and behavioral studies in small model organisms

Electra Gizeli, Professor, PhD 1993, University of Cambridge.

Bio-Nano Technology – Biosensors

Ioannis Karakassis, Professor, PhD 1991, University of Crete.

Marine Ecology.

Panagiotis Sarris, Assistant Professor, PhD 2009, University of Crete.

Microbiology

Retired Faculty Staff and Emeritus Professors

Despina Alexandraki, Vassilis Bouriotis, Michael Damanakis, Aristidis Economopoulos, Anastasios Eleftheriou, Eleftherios Zouros, Fotis Kafatos, Maroudio Kentouri, Michael Kokkinidis, Christos (Kitsos) Louis, Moysis Mylonas, Vassilis Nafpaktitis, Nikolaos Panopoulos, Josef Papamattheakis, Kalliopi Roubelakis-Aggelakis, Emmanuel Stratakis, Efthymia (Mina) Tsagri, Nikolaos Tsimenidis.

Procedures of Admission

Students are admitted to the Department of Biology, University of Crete, is consistent following all legal ways defined by the Ministry of Education and Religious Affairs for all Universities (Panhellenic Exams, special categories of immigrants, Greek emigrants, people suffering from serious diseases, ranking following exams. Recognition of courses complies with 4115/30-1-2013 Law, Article 35.

Participation in the ERASMUS Program

The Department participates in European Union (EU) Programs designed to promote free student mobility, while recognizing successfully completed courses from other European Universities within the framework of the above-mentioned Programs.

Education and research objectives of Biology Department

The students of the Biology Department have the opportunity to obtain an adequate theoretical background and practical experience in advanced technologies in various biological fields such as Molecular Biology and Genetics, Cellular and Developmental Biology, Evolutionary Biology, Ecology, Marine Biology, Applied Biology, as well as Bio- and nano-technology.

The Department collaborates with the internationally recognized Research Institutes, located in Crete under the supervision of the General Secretary of Research and Technology (ΓΓΕΤ), the Institute of Molecular Biology and Biotechnology (active participation of Faculty professors) (IMBB/ITE, <http://www.imbb.forth.gr>) and the Hellenic Centre of Marine Research (HCMR, <http://www.hcmr.gr/indexel.php>). Additionally, it collaborates with the Natural History Museum of the University of Crete (<http://www.nhmc.uoc.gr>) which provides valuable scientific and educational services on Eastern Mediterranean environmental matters, as well as with the Botanical Garden of the University of Crete (<http://www.bg.uoc.gr>) and the National Agricultural Research Foundation (<http://www.nagref.gr>).

Occupational profile of graduates

Graduates of the Biology Department at the University of Crete have been pursuing a professional career towards various directions in the public and private sector in organizations concerned with biomedicine and health in general, with biotechnology, environment, aquacultures, as well as with education and research in the above-mentioned fields.

Access to further studies

The Post-graduate Studies Programs which are carried out by the Department lead to the acquisition of a specialization Master's Degree, followed by a Doctoral Degree (Ph. D.) in the following fields: 1) Molecular Biology and Biomedicine, 2) Molecular Biology and Plant Biotechnology 3) Environmental Biology -Management of Terrestrial and Marine Resources

4) Protein Biotechnology 5) Bioethics and 6) Erasmus Mundus Joint Master Degree in Aquaculture, Environment and Society.

Regulations and Curriculum

Summary of the curriculum. Central axes / directions of the curriculum

The curriculum comprises several courses whose subject matter covers a wide range of biological fields, while offering students high standard of knowledge in contemporary Molecular Biology, Cell Biology, Biology of Populations and Organisms (mandatory courses). At the beginning of the 4th semester of studies, students choose one of the two directions of the curriculum and attend all mandatory courses of their selected direction, while also choose a series of optional courses. The **directions** (according to decree No 66442A/B1, Government Gazette Issue (FEK) 1658 / 12-11-2003) constitute two cutting edge areas of research in biological sciences and are as follows:

- A. **Biomolecular Sciences and Biotechnology** (*Molecular Direction*)
- B. **Environmental Biology and Management of Biological Resources** (*Environmental Direction*)

Brief Description of Course Units – Type of Courses:

A. MANDATORY COURSES	NUMBER OF COURSES	Total ECTS
Common Mandatory Courses of Molecular and Environmental Direction	30	138
Molecular Direction	5	25
Environmental Direction	4	16
B. COMPULSORY ELECTIVE COURSES	NUMBER OF COURSES	Total ECTS
Common Compulsory Elective Courses of Molecular and Environmental Division	17	84
Diploma Thesis		20
Trimester Laboratory Course		4
Internship (3-month duration)		3
Erasmus Internship (3-month duration)		3 (20 will be indicated in the Diploma Supplement)
Molecular Direction	9	43
Environmental Direction	8	40
Γ. FREE CHOICE COURSES	NUMBER OF COURSES	Total ECTS
Free Choice Courses	All mandatory and obligatory elective courses of the other division	32 (they are considered upon graduation)
COURSES OFFERED FROM OTHER DEPARTMENTS	NUMBER OF COURSES	Total ECTS
Courses from other Departments	Courses offered from other Departments	18 (included in 32 ECTS allocated to Free Choice Courses and are considered for graduation)

Courses offered each semester (winter and spring) are clearly outlined at the beginning of each academic year. Throughout the first three (3) semesters of study, students are registered in **20** mandatory common courses for both directions, coupled with **2** English language courses. At the beginning of the 4th semester, students are asked to choose the direction corresponding to the areas of their scientific interest. At the 4th, 5th, and 6th semesters of study, they are registered in both the common mandatory courses of the two directions and the compulsory ones of their direction.

At each academic semester students are registered for the first time in courses (compulsory, elective, free choice) that should not exceed 35 ECTS. On top of the 35 ECTS, students are allowed to register for courses that they were previously

registered for but not successfully examined. Also, on top of the 35 ECTS can be considered the Practical Training as long as it takes place during the summer period.

Foreign Language courses

Compulsory Elective Courses may be taught in English in case of Erasmus students' attendance.

Transfer of ECTS through the Erasmus Program

Students who participate in the Erasmus Program, after selecting one of the network Universities, can attend courses of their choice and achieve the corresponding credit transfer for their division, after approval of the Undergraduate Studies Committee and the Department's Assembly. It should be clarified that if a course title-content of the receiving University selected by the students coincides with our department's curriculum courses, it can be recognized as such, only after consulting the instructor in charge. Foreign languages cannot be recognized.

Since the academic year 2007-2008 the students of our department are eligible to be offered an internship within the framework of Erasmus Lifelong Learning Programme at a University or other organization abroad. Three months of Erasmus internship correspond to 3 ECTS, as well as 17 additional ECTS for the Degree Supplement.

Examination periods and exams

The end of teaching each academic semester is followed by a written examination period whose duration is decided by the Dean of the School. In case students fail at a subject in the proper exam period of the academic semester, they can be re-examined during the second examination period. If they fail again, they are allowed to be re-examined according to the instructions of the current Law.

Grade re-evaluation

Students are allowed to apply for re-evaluation of grades obtained at either past or current academic semester courses. For the former they should apply to the Secretary during the period of each semester course declaration. Students who wish to improve their grades -although they could be graduates - are eligible to request re-grading and postponement of their graduation for one examination period. They should hold an identity card and sign when applying, while their application should be assigned with a protocol number upon submission.

Grading system and requirements for students' graduation

There is a continuous process of students' evaluation throughout the whole semester, which is indispensable to the educational process. Grading is determined based on a 0 to 10 scale. Examination is considered successful if students get at least five (5). The instructor in charge of each course is fully responsible for deciding how to test students' progress, as well as grading and announcing the results. The exact format of the examination process (number of tests-frequency-way of testing and evaluation of student progress) is determined and described at the beginning of each semester by the instructor who is responsible for each course. Exams take place following the Exam Rules of the Department, whose complete text can be accessed in the Department's website (<https://www.biology.uoc.gr/index.php/en/>).

The requirements for graduation are the attendance of 8 teaching academic semesters, the successful completion of **35** mandatory courses for the Direction of Biomolecular Sciences and Biotechnology (concerning students who entered the Department in the academic year 2011-12) or **34** mandatory courses for the Direction of Environmental Biology and Management of Biological Resources, and the completion of at least **240 ECTS** for both directions.

Course structure diagram with credits (60 per academic year)

(<https://www.biology.uoc.gr/el/studies/undergraduate/complete-courses-list>)

A' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-101 Introduction to Zoology (N. Poulakakis)	4 X13	4	6
BIOA-102 Laboratory Course "Introduction to Zoology" (N. Poulakakis)	3 X11	2	3

BIOL-105 General Chemistry (G. Chatzidakis)	3 X13	3	5
BIOL-107 Organic Chemistry (E. Gizeli)	3 X13	3	5
BIOL-111 English I (M. Koutraki)	3 X13	3	4
BIOL-156 Biomathematics (K. Lyka)	5 X13	4	6

B' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-150 Cell Biology (G. Chalepakis)	5 X13	4	6
BIOL-151 Physical Chemistry (G. Tserevelakis)	4X13	4	6
BIOL-152 Structure and Function of Plants (K. Kotzabasis)	3 X13	3	4
BIOL-153 Laboratory Course in Structure and Functional Organization of Plants (K. Kotzabasis)	3 X11	2	3
BIOL-154 Biochemistry I (D. Tzamarias)	4 X13	4	6
BIOL-155 General Methods for the Identification and Analysis of Biological Macromolecules (D. Tzamarias, Ch. Spilianakis, K. Kotzabasis)	4 X11	2	3
BIOL-158 English II (M. Koutraki)	3 X13	3	4

C' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-200 Introduction to R programming language and Linux (P. Pavlidis)	4 X13	4	6
BIOL-201 Microbiology (P. Sarris)	4 X13	4	6
BIOL-203 Ecology (S. Pirintsos)	3 X13	3	4
BIOL-204 Methods in Ecology (S. Pirintsos)	2 X11	2	3
BIOL-205 Genetics I (Ch. Delidakis)	4 X13	4	6
BIOL-207 Molecular Biology (Ch. Spilianakis)	4 X13	4	6
BIOL-208 General Methods in Genetics and Microbiology (Ch. Delidakis)	3 X11	2	3

D' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-251 Methods for the Functional Analysis of Biological Macromolecules (E. Athanasakis, K. Kotzabasis)	3 X12	2	3
BIOL-252 Biochemistry II (D. Tzamarias)	3 X13	3	4
BIOL-254 Genetics II (G. Garinis)	3 X13	3	4
BIOL-257 Biodiversity and Plant Evolutionary Ecology (S. Pirintsos)	3 X13	3	4
BIOL-259 Laboratory Course in Plant Biodiversity (S. Pirintsos)	3 X11	2	3
BIOL-263 Laboratory Course in Animal Biodiversity (G. Koumoundouros, N. Poulakakis)	3 X11	3	4

BIOL-265 Marine Biology (I. Karakassis, G. Koumoundouros, A. Tselepidis)	3 X13	3	4
BIOL-266 Laboratory Course in Marine Biology (I. Karakassis, M. Pavlidis, G. Koumoundouros)	3 X11	2	3

E' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-300 Advanced Methods for the Analysis of Cellular Processes (D. Alexandraki, E Athanasakis, K. Kotzabasis, G. Zachos)	3 X11	2	3
BIOL-303 Evolution (E. Ladoukakis)	5 X13	4	6
BIOL-307 Immunobiology (E. Athanasakis)	4 X13	4	6
BIOL-313 Biogeography (N. Poulakakis)	3 X13	3	4

F' Semester Course/ Instructor	hours	C.C.	ECTS
BIOL-309 Biostatistics (K. Lyka)	5 X13	4	6
BIOL-315 Computational Biology (P. Pavlidis)	4 X13	4	5
BIOL-350 Developmental Biology (I. Keklikoglou)	4 X13	4	6
BIOL-352 Biotechnology (K. Kalantidis, M.D. Bazopoulou)	4 X13	4	6
BIOL-355 Methods of Analysis for Physiological Processes (K. Kotzabasis, K. Sidiropoulou, P. Moschou)	4 X11	2	3
BIOL-357 Animal Physiology (K. Sidiropoulou)	3 X13	3	4
BIOL-358 Plant Physiology (P. Moschou)	3 X13	3	4

Elective Courses

WINTER SEMESTER

a. Biomolecular Sciences and Biotechnology			
Course/ Instructor	hours	C.C.	ECTS
BIOL-412 Cell Growth, Proliferation and Cancer (G. Zachos) <i>(Successful examination at the courses of Cell Biology, Molecular Biology, Genetics I and Genetics II is recommended)</i>	3 X13	3	5
BIOL-418 Human Genetics: from molecular mechanisms to disease (G. Garinis) <i>(Successful examination at the courses of Genetics I, Genetics II, Biochemistry I, Biochemistry II and Molecular Biology is required)</i>	2 x 13	2	4
BIOL-419 Introduction to the tumour microenvironment and targeted therapies (I.Keklikoglou) <i>The course will be taught in English every even academic year.</i> <i>The course will be taught in Greek every odd academic year.</i>	2 x 13	2	4
BIOL-426 Biology of Aging (M.D. Bazopoulou) <i>(The course will be taught every odd academic year)</i>	3 x 13	3	5

b. Environmental Biology and Management of Biological Resources			
Course/ Instructor	hours	C.C.	ECTS
BIOL-403 Aquacultures (obligatory attendance) (G. Koumoundouros)	3 X13	3	5
BIOL-405 Applied Ecology and terrestrial Ecosystem Management (S. Pirintsos) <i>(The course will be taught every even academic year)</i>	3 X13	3	5
BIOL-409 Marine Pollution (I.Karakassis) <i>(The course will be taught every even academic year)</i>	2X13	2	4
BIOL-411 Benthic Ecology (I. Karakassis)	3 X13	3	5
BIOL-428 Deep-Sea Biology (A. Tselepidis)	3 X13	3	5
c. Courses Common to both Directions			
Course/ Instructor	hours	C.C.	ECTS
BIOL-403DEM Advanced bioimaging techniques (G.Tserevelakis)	2X13	2	4
BIOL-429 Cellular Neurobiology (K. Sidiropoulou) <i>(The course will be taught every even academic year)</i>	3 X13	3	5
BIOL-430 Neurobiology of Behaviour (K. Sidiropoulou) <i>(The course will be taught every odd academic year)</i>	3 X13	3	5
BIOL-431 English III (M. Koutraki)	3 X13	3	5
BIOL-440 Photosynthesis (K. Kotzabasis)	3 X13	3	5
BIOL-444 Quarterly Laboratory Course Faculty Member		2	4
BIOL-445 Laboratory Course – Green Biotechnology (K. Kotzabasis, K. Kalantidis, S. Pirintsos, I. Vontas, P. Moschu, P. Sarris)	3 X13	3	5
BIOL-447 Developmental Plant Biology (K. Kalantidis) <i>(The course will not be taught at the academic year 2024-25)</i>	3 X13	3	5
BIOL-494 Introduction to Programming (P. Pavlidis)	4 X13	4	6

SPRING SEMESTER

a. Biomolecular Sciences and Biotechnology			
Course/ Instructor	hours	C.C.	ECTS
BIOL-414 When Biochemistry meets Epigenetics. (Ch. Spilianakis) <i>(The course will be taught every odd academic year)</i>	3 X13	3	5
BIOL-456 Molecular Oncogenesis (obligatory attendance) (I. Papamathaiakis) <i>(Successful examination at the courses of Genetics I, Genetics II, Cell Biology, Molecular Biology and Developmental Biology is recommended)</i>	3 X13	3	5
BIOL-462 Special Topics in Immunology (E. Athanasakis) <i>(Successful examination at the course of Immunobiology is recommended)</i>	4 X13	4	6
BIOL-468 Developmental Biology of Drosophila (obligatory attendance)	2 X13	2	4

(Ch. Delidakis) (Successful examination at the courses of Cell Biology, Molecular Biology, Genetics I and Genetics II is recommended)			
BIOL-475 Transcription factor biophysics (obligatory attendance) (D. Papadopoulos) <i>The course will be taught in English every even academic year.</i> <i>The course will be taught in Greek every odd academic year.</i> (Successful examination at the courses of General Chemistry, Physical Chemistry, Developmental Biology, Biochemistry I and Biochemistry II Molecular Biology, Genetics I and Genetics II is recommended)	3X13	3	5
b. Environmental Biology and Management of Biological Resources			
Course/ Instructor	hours	C.C.	ECTS
BIOL-407 Topics in Physical Geography and Geomorphology (Ch. Fasoulas)	3 X13	3	5
BIOL-461 Laboratory Course in Fauna of Greece (N. Poulakakis) (Successful examination at the courses of Laboratory Course in Animal Biodiversity is recommended)	4X13	4	6
BIOL-471 Evolutionary Ecology (N. Poulakakis) (The course will be taught every even academic year)	3 X13	3	5
c. Courses Common to both Directions			
Course/ Instructor	hours	C.C.	ECTS
BIOL-432 Biodiversity and Climate Change (A. Doxa)	2 X13	2	4
BIOL-444 Quarterly Laboratory Course Faculty Member		2	4
BIOL-446 Molecular Evolution (E. Ladoukakis)	2 X13	2	4
BIOL-450 Computational Methods in Evolution (N. Poulakakis, E. Ladoukakis, P. Pavlidis) (The course will be taught every odd academic year)	3 X13	3	5
BIOL-463 Photobiology (K. Kotzabasis)	2 X13	2	4
BIOL-473 Genomes (Ch. Spilianakis) <i>The course will be taught in English.</i> (Successful examination at the course of Molecular Biology is required) (The course will be taught every even academic year)	2 X13	2	4
BIOL-474 Research and Communication Skills in Biology (Obligatory attendance) Ch. Spilianakis	2 X13	2	4
BIOL-476 Analysis of Genetic Data (P. Pavlidis)	4 X13	4	6
BIOL-477 Mathematical Biology (K. Lyka) (The course will be taught every odd academic year)	3 X13	3	5
BIOL-478 English IV (M. Koutraki)	3 X13	3	5
BIOL-491 Special Topics in Biotechnology and Plant Imaging (P. Moschou)	3 X13	3	5
BIOL-493 Applications of Current Microscopy Techniques (Obligatory attendance)	2 X13	2	4

(G. Zachos)			
BIOL-495 Micro/nanotechnologies in Biology and Molecular Diagnostics (obligatory attendance) (E. Gizeli) <i>(Successful examination at the courses of Organic Chemistry and Biochemistry I is recommended)</i>	2 X13	2	4

Information

Department of Biology Secretariat

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