COURSE OUTLINE "GENETICS II"

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
LEVEL OF STUDIES	ISCED LEVEL 6		
COURSE CODE	**MBG211**	**SEMESTER**	4th
COURSE TITLE	GENETICS II		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**HOURS/WEEK**	**ECTS CREDITS**
	3	4

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	BACKGROUND
PREREQUISITES:	NO (BUT IT IS DESIRABLE THAT THE STUDENTS HAVE SUCCESSFULLY COMPLETED PREVIOUS COURSES IN THE SUBJECT OF GENETICS)
TEACHING & EXAMINATION LANGUAGE:	GREEK ENGLISH FOR ERASMUS STUDENTS
COURSE OFFERED TO ERASMUS STUDENTS:	YES
COURSE URL:	https://eclass.duth.gr/courses/ALEX01147/

2. LEARNING OUTCOMES

Learning Outcomes

Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

The course "Genetics II" (4th semester) is a continuation of the earlier course "Genetics I". Overall, these two courses cover basic and advanced concepts of the science of Genetics and aim to convey to students all aspects of classical and molecular Genetics. They also prepare students for future courses of the undergraduate curriculum such as Population Genetics, Genomics, etc.

The course "Genetics II" is considered a fundamental course for the students of the Department of Molecular Biology and Genetics, but it is also necessary for any Department of biological sciences.

Upon successful completion of the course, students will be able to:

-understand the concept of genetic linkage

-understand how genetic linkage can be used for mapping genes

-apply this understanding to design and set up experiments to perform linkage mapping

-comprehend in depth the rules of Mendelian inheritance, including its exceptions

-explain the mechanisms of genetic recombination at the cellular level

-be familiar with fungal genetics

-be familiar with bacterial and phage genetics

-know about mobile genetic elements in prokaryotes and eukaryotes

-understand the role of mobile genetic elements in genome evolution and disease

-have a solid grasp of the genetics of cancer and recognize why cancer is a genetic disease

-know how quantitative and complex traits are inherited

-have a good understanding DNA mapping and sequencing, as well as how these are applied in genome projects

General Skills

Name the desirable general skills upon successful completion of the module	
Search, analysis and synthesis of data and information, *ICT Use* *Adaptation to new situations* *Decision making* *Autonomous work* *Teamwork* *Working in an international environment* *Working in an interdisciplinary environment* *Production of new research ideas*	*Project design and management* *Equity and Inclusion* *Respect for the natural environment* *Sustainability* *Demonstration of social, professional and moral responsibility and sensitivity to gender issues* *Critical thinking* *Promoting free, creative and inductive reasoning*
Search, analysis and synthesis of data and information Adaptation to new situations Decision making Autonomous work Teamwork Working in an international environment Working in an interdisciplinary environment Production of new research ideas Project design and management Equity and Inclusion Respect for the natural environment Demonstration of social, professional and moral responsibility and sensitivity to gender issues Critical thinking Promoting free, creative and inductive reasoning	

3. COURSE CONTENT

The course content (syllabus) includes the following topics (taught by the faculty members in parentheses):

1. Linkage in diploid organisms (G. Fakis)
2. Genetic recombination and linkage maps (G. Fakis)
3. Genetics of haploid eukaryotes – linkage in fungi (G. Fakis)
4. Mechanisms of genetic recombination (G. Fakis)
5. Microbial genetics (G. Fakis)
6. Recombination in bacteria and phages (G. Fakis)
7. Transposable genetic elements (G. Fakis)
8. Cancer Genetics (I. Maroulakou)
9. Complex (quantitative) traits (I. Tokatlidis)
10. DNA mapping (G. Fakis)
11. Genome mapping and sequencing projects (G. Fakis)

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Face to face
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching, in communicating with students and in practical training. Use of the eClass platform for communication, for organising student essays and homework, for sharing lecture notes, literature. Use of MS Teams for video calls
TEACHING ORGANIZATION *The ways and methods of teaching are described in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.*	

Activity	***Workload/semester***
Lectures	100
Interactive teaching	10
Bibliographic research & analysis	10
Course Total	**120**

The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.	
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	Examinations take place typically in Greek, but can be in English if there is an international audience (e.g. Erasmus+ students). Concluding evaluation in the form of a written examination The examination may contain a mixture of multiple-choice questions, true or false questions, short answer questions, longer (essay) questions, problems solving, etc. Students are informed about the course requirements, evaluation, assessment, and examination style during the first week; this info is repeated at the last lecture. All relevant information can be found on eClass.

5. SUGGESTED BIBLIOGRAPHY

The following bibliography was used in the planning and preparing this course:

- Γενετική – από τα γονίδια στα γονιδιώματα — Hartwell Leland, Hood Leroy, Goldberg Michael, Reynolds Ann, Silver Lee — Utopia Εκδόσεις ΕΠΕ, 1η Ελληνική έκδοση (2013)
- Γονιδιώματα - σύγχρονες ερευνητικές προσεγγίσεις — T. A. Brown — Εκδόσεις Π.Χ. Πασχαλίδης, 2010
- Εισαγωγή στη Γενετική του Σταμάτη Αλαχιώτη (δ' έκδοση, εκδοτικός οίκος Λιβάνη, 2011). Κωδικός βιβλίου στον Εύδοξο: 12469325
- Κλασική και Μοριακή Γενετική — Κων. Τριανταφυλλίδης — εκδ. Κυριακίδη
- Γενετική τόμος Α' — Μ. Γ. Λουκάς — εκδ. Σταμούλης
- iGenetics - μια Μεντελική Προσέγγιση — Peter J. Russel — Ακαδημαϊκές Εκδ. (2009)
- Βασικές Αρχές Γενετικής — Klug, Cummings, Spencer & Palladino— Ακαδημαϊκές Εκδ. (2009)
- Ανασυνδυασμένο DNA — Watson, Myers, Caudy, Witkowski — Ακαδημαϊκές Εκδόσεις (2007)
- Genes VIII - Ελληνική Έκδοση — Benjamin Lewin — Ακαδημαϊκές Εκδόσεις (2004)
- DNA I – Το Ανθρώπινο Γονιδίωμα — Carina Dennis & Richard Gallagher — εκδ. Πασχαλίδης
- DNA II – 50 Χρόνια DNA — Julie Clayton & Carina Dennis — εκδ. Πασχαλίδης
- Αρχές Ιατρικής Γενετικής — Gelehrter, Collins, Ginsburg — εκδ. Πασχαλίδη
- Ιατρική Γενετική (Thompson & Thompson) — Nussbaum, McInnes, Willard — εκδ. Πασχαλίδης (2011)
- Genetics - Analysis & Principles — 2nd edition (2005) — Robert J. Broooker — εκδ. McGraw - Hill
- Introduction to Genetic Analysis — 8th edition (2005) — Griffiths, Wessler, Lewontin, Gelbart, Suzuki, Miller — εκδ. Freeman
- Analysis of Genes and Genomes — R.J. Reece — εκδ. Wiley
- Molecular Biology of the Gene — Watson, Hopkins, Roberts, Steitz, Weiner — εκδ. Benjamin/Cummings
- Η Διπλή Έλικα — James D. Watson — εκδ. Τροχαλία
- Τι Τρελό Κυνηγητό — Francis Crick — εκδ. Κάτοπτρο
- Francis Crick – Discoverer of the Genetic Code — Matt Ridley — εκδ. HarperCollins
- The Problems of Biology — John Maynard Smith — εκδ. Penguin
- Genome — Matt Ridley — εκδ. Harper Perennial

Recommended textbooks through the "Eudoxus" platform (textbooks available in Greek)

1. «Γενετική, Βασικές Αρχές» των Peter Snustad, Michael Simmons (7η Έκδοση, 1η Ελληνική Έκδοση-Εκδόσεις Τζιόλα 2018). Κωδικός Βιβλίου στον Εύδοξο: 68403832

2. «Βασικές Αρχές Γενετικής: Έννοιες και Συνδέσεις» του Benjamin Pierce (5η Έκδοση, 1η Ελληνική Έκδοση-Εκδόσεις Κλειδάριθμος 2022). Κωδικός Βιβλίου στον Εύδοξο: 112696304

3. «Βασικές Αρχές Γενετικής Ανάλυσης» των Anthony Griffith, Susan Wessler, Sean Carol, John Doebley (Broken Hill Publishers 2019). Κωδικός Βιβλίου στον Εύδοξο: 7710719