COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED BIOLOGY AND BIOTECHNOLOGY		
ACADEMIC UNIT	BIOTECHNOLOGY		
LEVEL OF STUDIES	*Undergraduate*		
COURSE CODE	**232**	**SEMESTER**	4th
COURSE TITLE	SPECIAL TOPICS IN MODERN GENETICS		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and Practicals	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background
PREREQUISITE COURSES:	No
LANGUAGE OF INSTRUCTION and EXAMINATIONS :	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/modules/auth/courses.php?fc=37

2. LEARNING OUTCOMES

LEARNING OUTCOMES

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The course is a continuation of the introductory course of Genetics.

The subject matter of the course aims to introduce students to special topics of modern Genetics.

It also refers to introductory concepts and methods of genetic analysis. Finally, the aim of the course is the understanding by students of the methodology of problem solving related to special issues of great importance and influence in modern Genetics.

Upon successful completion of the course the student will be able:

- To understand the process of sequencing a genome, and the contribution of bioinformatics to the functional analysis of the genome. He will also have knowledge of the main features of the human genome, and of -omic technologies.
- To understand the contribution of genetic engineering in vaccine production and the generation of transgenic organisms for the production of therapeutic proteins.

- To acquire knowledge about the available techniques used for the diagnosis of genetic disorders but also to be acquaint with ethical issues arising from the biotechnological applications.
- To understand how genetically modified plants are made, the potential as well as issues resulting from their use.
- To understand the current methods of standardizing DNA genotyping with autosomal, X-linked and mitochondrial microsatellites sequences.
- To understand the uniqueness of DNA fingerprint and the prosecutor's fallacy in criminal cases.
- To understand the mechanism of homologous recombination and the phenomenon of gene conversion.
- To understand the epigenetic code in the genetic background of an organism and the emerging phenotype, distinguishing it from the pure effects of DNA sequence and genes.
- To understand the importance of studying the genetically determined factors that affect the metabolism and action of drugs in human disease, and the purpose of improving them.
- To practice on tools and techniques of modern genetic analysis.
- To collaborate with fellow students to approach complex genetics problems in an analytical way.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Production of new research ideas*
Adapting to new situations	*Project planning and management*
Decision-making	*Respect for differences and multiculturalism*
Working independently	*Respect for the natural environment*
Team work	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Working in an international environment	*Criticism and self-criticism*
Working in an interdisciplinary environment	*Production of free, creative and inductive thinking*

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of new research ideas

3. SYLLABUS

1. Genomics and bioinformatics
2. Applications of genetic engineering and biotechnology in the production of pharmaceutical proteins by transgenic organisms, in the production of vaccines, in the diagnosis of genetic diseases and pathogens
3. Ethical issues arising from applications of genetic engineering and biotechnology
4. Forensic genetics and forensic science
5. Genetically modified organisms/food
7. Homologous recombination and gene conversion
8. Genomics and personalized medicine
9. Epigenetics

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face to face, in class.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Power point presentations. Course material also made available to the students via the e-class platform.
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	*Semester workload*
Lectures	39
Laboratory work (tutorials) focused on Genetics problem-solving in smaller groups	20
Essay preparation	5
Independent study	61
Course total (Total contact hours and training)	***125***

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	I. Theory: Written Examination (50%) II. Practicals: Written Examination (50%) Both to include: - Multiple Choice or short-answer Questions. -Problem solving

5. ATTACHED BIBLIOGRAPHY

-Suggested bibliography :
-Relevant scientific journals:

Concepts of Genetics, (11th Edition) ISBN 0321948912, Klug, Cumminngs, Spencer, Palladino 2015 Pearson Education Inc.