COURSE OUTLINE

1. GENERAL INFORMATION

FACULTY/SCHOOL	School of Plant Sciences		
DEPARTMENT	Department of Crop Science		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	**3505**	**Semester:**	2nd
COURSE TITLE	**PRINCIPLES OF MOLECULAR BIOLOGY**		
INDEPENDENT TEACHING ACTIVITIES *in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits*		**WEEKLY TEACHING HOURS**	**ECTS**
Lectures and Laboratory Exercises		3+1	4
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail under section 4			
COURSE TYPE *Background knowledge, Scientific expertise, General Knowledge, Skills Development*	*Scientific expertise*		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION:	Greek		
LANGUAGE OF EXAMINATION/ASSESSMENT:			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://oeclass.aua.gr/eclass/		

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

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

• understand basic topics of Molecular Biology,

• understand the structure, organization and function of genes in prokaryotic and eukaryotic organisms,

• understand the mechanisms of transfer and modification of genetic information,

• compare and analyze the content of genomes through Bioinformatics,

• become familiar with basic techniques of Molecular Biology,

• acquire knowledge of genetic material handling techniques

• become familiar to the use of Molecular Biology methodologies in solving problems of agricultural interest

• apply standard bioinformatics software for gene and genome analysis.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Teamwork	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

Search for, analysis and synthesis of data and information by the use of appropriate technologies
Decision-making
Individual/Independent work
Group/Teamwork
Critical thinking
Development of free, creative and inductive thinking

3. COURSE CONTENT

LECTURES

1. Structure and Organization of genetic material in prokaryotic and eukaryotic cells
2. Main features and properties of prokaryotic and eukaryotic genes
3. DNA replication – Transcription and Translation: from DNA to protein
4. Gene expression regulation in prokaryotic and eukaryotic cells
5. Mechanisms of DNA damage and repair
6. Transposable elements in plant and microbial genomes
7. Viruses in Molecular Biology
8. Basic principles of Recombinant DNA Technology
9. Genome sequencing and Analysis – Bioinformatics
10. Applications of Molecular Biology and DNA Technology in Agriculture

LABORATORY EXERCISES

1. DNA isolation techniques
2. Polymerase chain reaction (PCR)
3. DNA Electrophoresis
4. Digestion with restriction enzymes (endonucleases) - Ligation

5. Transformation of bacterial cells
6. Clone analysis

4. TEACHING METHODS-ASSESSMENT

MODES OF DELIVERY *Face-to-face, in-class lecturing, distance teaching and distance learning etc.*	Lectures in the auditorium and laboratory exercises in the Microscopy Rooms of the Laboratory of General & Agricultural Microbiology
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in teaching, Laboratory Education, Communication with students*	Use of Powerpoint slides. Communication with students via e-mail. Learning process support through e-class access.
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.*	

Activity/ Method	Semester workload
Lectures	13X3=39
Laboratory practice	13X1=13
Individual laboratory project (data processing and commenting)	26
Personal study	22
Total of Course (25 hours of workload per ECTS)	**100**

STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work,* *other……etc.* *Specifically defined evaluation criteria are stated, as well as if and where they are accessible by the students.*	I. The exam on the course lectures includes a final exam (written). Exams will be short answer questions and various types of multiple-choice tests. II. A final exam on the laboratory exercises (written). Exams will be short answer questions and various types of multiple-choice tests.

5. SUGGESTED BIBLIOGRAPHY:

- Burton E. Tropp (2015). Βασικές Αρχές Μοριακής Βιολογίας. Ακαδημαϊκές Εκδόσεις Μπάσδρα και ΣΙΑ Ο.Ε Αλεξανδρούπολη

- James J Watson και αλλοι (2007). Ανασυνδιασμένο DNA. Ακαδημαϊκές Εκδόσεις Μπάσδρα και ΣΙΑ Ο.Ε Αλεξανδρούπολη

- Jocelyn E. Krebs, Elliot S. Goldstein, Stephen T. Klipatrick (2022). Lewin's Βασικές Αρχές Γονιδίων. Εκδόσεις Broken Hill

6. TEACHERS:

-Lectures:
A. Karnaouri (Assistant Professor, Microbial Fermentations – Molecular Biotechnology of Microorganisms)
M. Dimou (Assistant Professor, Microbiology – Biotechnology of Microorganisms)

-Laboratory Exercises:
A. Karnaouri (Assistant Professor, Microbial Fermentations – Molecular Biotechnology of Microorganisms)
M. Dimou (Assistant Professor, Microbiology – Biotechnology of Microorganisms)