

COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
ACADEMIC UNIT	ANIMAL PRODUCTION, FISHERIES AND AQUACULTURE		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	AS_401	SEMESTER	4th
COURSE TITLE	MOLECULAR BIOLOGY -BIOTECHNOLOGY		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS
		5	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general background, specialised general knowledge, skills development</i>	general background, special background, specialised general knowledge,		
PREREQUISITE COURSES:	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK. It can be taught in English in case of foreign students' presence.		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

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 student, at the end of the relevant Learning Process, is in a position:

- know the organization of DNA and genes in the cell
- be familiar with DNA replication and repair mechanisms.
- Explain the basic molecular mechanisms of transferring genetic information from DNA to proteins
- Understand the principles of the mechanisms of gene regulation

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	Project planning and management
Adapting to new situations	Respect for difference and multiculturalism
Decision-making	Respect for the natural environment
Working independently	Showing social, professional and ethical responsibility and sensitivity to gender issues
Team work	Criticism and self-criticism
Working in an international environment	Production of free, creative and inductive thinking
Working in an interdisciplinary environment
Production of new research ideas	Others...

Search for, analysis and synthesis of data and information, with the use of the necessary technology
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3. SYLLABUS

Lectures:

1. DNA as genetic material: landmark experiments, evolutionary angle in molecular biology, mutations and their consequences.
2. Cell and genomes
3. Membrane Structure
4. Membrane Transfer of Small Molecules and Electrical Properties of Membranes
5. DNA, chromosomes, genomes
6. Copy, Repair, DNA Recombination
7. The content of genomes: genomic mapping, model organisms and human genomes, polymorphisms, mitochondrial and chloroplast genomes.
8. Interrupted genes: intron origin, exons and protein domains, alternative splicing.
9. Genomic families: family structure and evolution, pseudogenes.
10. How Do the Cells Read The Genome: From DNA to Protein
11. Control of Gene Expression

Laboratory Part Description:

1. Export DNA.
2. Agarose gel electrophoresis.
3. DNA amplification by PCR (COI, microsatellite in groups of students)
4. Cloning of a gene into a plasmid vector
5. Electrophoresis of PCR products in Genetic Analyzer
6. Collection and processing of sequencing results
7. Collection and processing of genotyping results
8. Summary and presentation of results

1. TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	<p>Face to face teaching. During the course the students will be invited to approach a research question and write a brief bibliographic essay, form their own questions to their colleagues based on the new information and participate in the interaction and learning activities after the lectures (eg coaching of colleagues, questioning their colleagues, class summary, "teach my classmate", etc.).</p>																									
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> ○ Power Point in lectures ○ Power Point in laboratory exercises ○ Using the e-Class platform for: <ul style="list-style-type: none"> ➢ Distribution of lectures ➢ Self-assessment exercises ➢ Learning streamline ➢ Deposit, monitoring and evaluation of work ➢ "After-class" activities ➢ Laboratory Examinations ➢ Progress evaluation 																									
<p>TEACHING METHODS <i>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.</i></p> <p><i>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</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Activity</th> <th style="width: 40%;">Semester workload</th> </tr> </thead> <tbody> <tr> <td>1. Lectures (3 hours X 13 weeks)</td> <td style="text-align: center;">39</td> </tr> <tr> <td>2. literature search and reading connected with (1) (2 hours X 13 weeks)</td> <td style="text-align: center;">26</td> </tr> <tr> <td>3. Self-evaluation exercises in e-Class (1 hours X 13 weeks)</td> <td style="text-align: center;">13</td> </tr> <tr> <td>4. LAB exercises (2 hours X 13 weeks)</td> <td style="text-align: center;">16</td> </tr> <tr> <td>5. Writing short lab reports or lab evaluation connected to (4) (1 hours X 13 weeks)</td> <td style="text-align: center;">8</td> </tr> <tr> <td>6. Participation in the "after class" activities (2hours X 13 weeks)</td> <td style="text-align: center;">26</td> </tr> <tr> <td>7. Study and preparation for the evaluation workload</td> <td style="text-align: center;">37</td> </tr> <tr> <td>8. Final exams</td> <td style="text-align: center;">3</td> </tr> <tr> <td>Course total (6X25)</td> <td style="text-align: center;">150</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		Activity	Semester workload	1. Lectures (3 hours X 13 weeks)	39	2. literature search and reading connected with (1) (2 hours X 13 weeks)	26	3. Self-evaluation exercises in e-Class (1 hours X 13 weeks)	13	4. LAB exercises (2 hours X 13 weeks)	16	5. Writing short lab reports or lab evaluation connected to (4) (1 hours X 13 weeks)	8	6. Participation in the "after class" activities (2hours X 13 weeks)	26	7. Study and preparation for the evaluation workload	37	8. Final exams	3	Course total (6X25)	150				
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<p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>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,</i></p>	<p>The evaluation will be done in Greek unless there is necessity for an evaluation in English because of the presence of foreign students.</p> <p>The evaluation will be done as following:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Writing short lab reports or lab evaluation (Average of the report</td> <td style="width: 40%; text-align: center;">20%</td> </tr> </table>		Writing short lab reports or lab evaluation (Average of the report	20%																						
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<i>public presentation, laboratory work, clinical examination of patient, art interpretation, other</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	grades)	
	Participation in the "after class" activities (Average)	15%
	Participation in the "after class" activities (Average)	15%
	Final exams	50%
<i>Minimum grade to pass: 5 (Range: 0-10)</i>		
<p>In the case of evaluation failure (in theory of the lab) the exams will be repeated but the follow up of the lab exercises it is not obligatory as long as the student was present in all the necessary lab exercises.</p> <p>The evaluation grades of the other activities (eg after class) will be valid for the next two (2) years, meaning four (4) semesters from the typical semester taught.</p>		

2. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Alberts, Johnson, Lewis, Morgan, Raff, Roberts, Walter (2014). *Molecular Biology of the Cell*. Garland Science

Watson, Baker, Bell, Gann, Levine, Losick (2016) *Molecular Biology of the Gene* (7th Edition). Pearson; 7 edition (March 2, 2013)

Lewin B (Ελληνική Έκδοση). (2005). *Genes VIII*. Benjamin Cummings; United States Edition (December 15, 2003)

- Related academic journals:

Cell

Biochemistry

Genetics

Journal of Molecular Biology

Journal of Molecular Biology and Evolution