COURSE OUTLINE

1. GENERAL

SCHOOL	AGRICULTURAL SCIENCES		
ACADEMIC UNIT	ANIMAL PRODUCTION, FISHERIES AND AQUACULTURE		
LEVEL OF STUDIES	UNDERGRATUATE		
COURSE CODE	**AS_5005**	**SEMESTER**	ELECTIVE (8th,9th,10th)
COURSE TITLE	BIOINFORMATICS and GENOMICS		

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**
	2 LECTURES + 2 LAB	2
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	general background, special background, specialised general knowledge,
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK. I t 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:

- To integrate the existing bioinformatics and genomics association into modern research
- Manage, control and analyze molecular data for the ultimate purpose of extracting biological conclusions.
- To use and apply the numerous databases of biological information over the Internet.
- Recovers, compares and analyzes biological information in silico.
- Manages computer programs and web servers for homology, genetic analysis, genome analysis, phylogenetic analysis of DNA and amino acid sequences.

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
Adapting to new situations
Decision-making
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and

Working independently	*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
Decision-making
Working independently
Team work
Respect for the natural environment
Criticism and self-criticism
Production of free, creative and inductive thinking

3. SYLLABUS

Lectures:

1. What is Bioinformatics? Definitions
2. Databases (GOLD, NCBI, PubMed, Nucleotide, Proteins, OMIM, BOLD etc.) - Annotation problems
3. Information analysis tools stored in Protein and Genome Information Resources,
4. Genomes and Genomics. Import. What it is, definitions
5. Interaction: Conventional and New Generation Technologies, Single-Cell Sequencing.
6. Genomics and gene mapping
7. Structural and Functional Genomics
8. Microarray and Transcript
9. Proteomic and metabolic
10. Comparative genomics and evolution
11. Epogenomic
12. Genomic projects in various organizations
13. Application of genomics to diseases and productive features.

Laboratory Part Description:

1. Nucleic acid and protein databases. Search bibliography and extract information from biological data bases
2. BLAST - FASTA - CLUSTAL - Sequencing and Multiple Sequence Search Tools
3. Characterization of motifs and periodicities in protein and DNA sequences (Families - Groups)
4. Align and find sequence homology.
5. Design of primers.
6. Construction and evaluation of phylogenetic trees.
7. Evolution models.

1. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	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.).
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	○ Power Point in lectures ○ Power Point in laboratory exercises ○ Using the e-Class platform for: ➢ Distribution of lectures ➢ Self-assessment exercises ➢ Learning streamline ➢ Deposit, monitoring and evaluation of work ➢ "After-class" activities ➢ Laboratory Examinations ➢ Progress evaluation
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***
1. Lectures (3 hours X 13 weeks)	39
2. literature search and reading connected with (1) (2 hours X 13 weeks)	26
3. Self-evalution exesrcises in e-Class (1 hours X 13 weeks)	13
4. LAB exercises (2 hours X 13 weeks)	14
5. Writing short lab reports or lab evaluation connected to (4) (1 hours X 13 weeks)	7
6. Participation in the "after class" activities (2hours X 13 weeks)	13
7. Study and preparation for the evaluation workload	10
8. Final exams	3
Course total *(5X25)*	***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*	The evaluation will be done in Greek unless there is necessity for an avluation in English because of the presebce of foreign students. The evaluation will be done as following:

Writing short lab reports or lab evaluation (Average of the report grades)	20%

examination of patient, art interpretation, other *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Participation in the "after class" activities (Average) — 15% Participation in the "after class" activities (Average) — 15% Final exams — 50% *Minimum grade to pass: 5 (Range: 0-10)* 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. 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.

2. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Lesk A.M. (2008) Introduction to Genomics. Oxford University Press; 3 edition (June 2, 2008)
Baxevanis A.D. & Ouellette F. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, Second Edition 2nd Edition Wiley-Interscience; 2 edition (April 6, 2001)

- Related academic journals:

Bionformatics
BMC Bioinformatics
Evolutionary Bioinformatics
Genomics, Proteomics & Bioinformatics
Journal of Bioinformatics and Comparative Genomics