

COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF HEALTH SCIENCES		
DEPARTMENT	MBG / APPLIED BIOINFORMATICS - BIOLOGICAL DATA ANALYSIS		
LEVEL OF STUDIES	ISCED 7 - Masters degree or equivalent tertiary education level		
COURSE CODE	AB103	SEMESTER	2ND
COURSE TITLE	Principles of data analysis		
TEACHING ACTIVITIES <i>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.</i>	TEACHING HOURS PER WEEK	ECTS CREDITS	
	4	10	
<i>Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.</i>			
COURSE TYPE <i>Background, General Knowledge, Scientific Area, Skill Development</i>	Background, Scientific Area, Skill Development		
PREREQUISITES:	None		
TEACHING & EXAMINATION LANGUAGE:	Greek		
COURSE OFFERED TO ERASMUS STUDENTS:	No		
COURSE URL:	https://eclass.duth.gr/courses/ALEX01338/		

2. LEARNING OUTCOMES

Learning Outcomes <i>Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.</i>																		
<p>After successfully completing the course, participants will be able to:</p> <ul style="list-style-type: none"> • understand the theory and tools required for the analysis of biological data and gain experience in their use, leveraging the theoretical basis in Bioinformatics acquired in the first semester, • know the basic knowledge and understand the principles of Systems Biology, Structural Biology, Genomics and Metagenomics, • gain experience in bioinformatics analysis using NGS data processing tools, biomolecular structure analysis, population genetic analysis and metagenomic applications, • solve complex problems with the combined use of modern bioinformatics tools (pipelines), • design appropriate bioinformatics methodologies to address biological research questions, • work in interdisciplinary teams to address computational problems in biology • be familiar with biological data from experiments and how to search for data on the internet and in databases. 																		
<p>General Skills <i>Name the desirable general skills upon successful completion of the module</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search, analysis and synthesis of data and information,</i></td> <td style="width: 50%; border: none;"><i>Project design and management</i></td> </tr> <tr> <td style="border: none;"><i>ICT Use</i></td> <td style="border: none;"><i>Equity and Inclusion</i></td> </tr> <tr> <td style="border: none;"><i>Adaptation to new situations</i></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"><i>Decision making</i></td> <td style="border: none;"><i>Sustainability</i></td> </tr> <tr> <td style="border: none;"><i>Autonomous work</i></td> <td style="border: none;"><i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td style="border: none;"><i>Teamwork</i></td> <td style="border: none;"><i>Critical thinking</i></td> </tr> <tr> <td style="border: none;"><i>Working in an international environment</i></td> <td style="border: none;"><i>Promoting free, creative and inductive reasoning</i></td> </tr> <tr> <td style="border: none;"><i>Working in an interdisciplinary environment</i></td> <td></td> </tr> <tr> <td style="border: none;"><i>Production of new research ideas</i></td> <td></td> </tr> </table>	<i>Search, analysis and synthesis of data and information,</i>	<i>Project design and management</i>	<i>ICT Use</i>	<i>Equity and Inclusion</i>	<i>Adaptation to new situations</i>	<i>Respect for the natural environment</i>	<i>Decision making</i>	<i>Sustainability</i>	<i>Autonomous work</i>	<i>Demonstration of social, professional and moral responsibility and sensitivity to gender issues</i>	<i>Teamwork</i>	<i>Critical thinking</i>	<i>Working in an international environment</i>	<i>Promoting free, creative and inductive reasoning</i>	<i>Working in an interdisciplinary environment</i>		<i>Production of new research ideas</i>	
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- Searching, analyzing and synthesizing data and information, using the necessary technologies
- Generating new research ideas
- Designing and managing projects
- Respecting the natural environment
- Demonstrating social, professional and ethical responsibility and sensitivity to gender issues
- Promoting free, creative and inductive thinking
- Teamwork
- Independent work
- Exercising criticism and self-criticism
- Working in an interdisciplinary environment
- Adapting to new situations

3. COURSE CONTENT

The basic concepts of Systems Biology, Structural Biology, Genomics, Metagenomics, etc. are explained as well as tools for NGS data analysis, biomolecular structural analysis, population genetic analyses and metagenomics applications are presented.

4. LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD <i>Face to face, Distance learning, etc.</i>	Project work, distance learning	
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) <i>Use of ICT in Teaching, in Laboratory Education, in Communication with students</i>	Use of ICT in Teaching, in Communication with students <ul style="list-style-type: none"> • Digital slides • Video • MsTeams/ e-class, webmail 	
TEACHING ORGANIZATION <i>The ways and methods of teaching are described in detail.</i> <i>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.</i> <i>The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.</i>	Activity	Workload/semester
	Lectures	46
	Exercises	80
	Final project	80
	Bibliographic research & analysis	90
	Exams	4
	Total	300
STUDENT EVALUATION <i>Description of the evaluation process</i> <i>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</i> <i>Please indicate all relevant information about the course assessment and how students are informed</i>	Student evaluation languages : Greek Method : Formative Student evaluation methods : <ul style="list-style-type: none"> • Written Exam with Short Answer Questions & written exam with multiple choice test : 65% • Laboratory Report : 35% 	

5. SUGGESTED BIBLIOGRAPHY

- ΑΝΑΛΥΣΗ ΔΕΔΟΜΕΝΩΝ ΜΕ ΤΗΝ R. Έκδοση: 2/2023. Συγγραφείς: ΝΙΚΟΛΑΟΥ ΧΡΙΣΤΟΦΟΡΟΣ. ISBN: 978-618-202-154-5. Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ ΔΙΣΙΓΜΑ ΙΚΕ

- Βιοπληροφορική και Λειτουργική Γονιδιωματική (2018). Jonathan Pevsner
- Principles of Protein X-Ray Crystallography [electronic resource], Jan Drenth
- Μία μη μαθηματική εισαγωγή στην κρυσταλλογραφία πρωτεϊνών,
ΝΙΚΟΛΑΟΣ ΓΛΥΚΟΣ
- Βιοπληροφορική (2015), Παντελής Μπάγκος
- Ανασυνδυασμένο DNA, Watson D.A. κα ISBN: 978-960-88412-5-3

ANNEX OF THE COURSE OUTLINE

Alternative ways of examining a course in emergency situations

Teacher (full name):	Petros Kolovos
Contact details:	Email: pkolovos@mbg.duth.gr
Supervisors: (1)	Yes
Evaluation methods: (2)	Homework (35%). Written Assignment (65%)
Implementation Instructions: (3)	As described in Article 12 of Annex 7 ("Examination Regulations") of the Rules of Procedure of Democritus University of Thrace.

(1) Please write YES or NO

(2) Note down the evaluation methods used by the teacher, e.g.

- *written assignment* or/and exercises
- written or oral examination with distance learning methods, provided that the integrity and reliability of the examination are ensured.

(3) In the **Implementation Instructions** section, the teacher notes down clear instructions to the students:

a) in case of **written assignment and / or exercises**: the deadline (e.g. the last week of the semester), the means of submission, the grading system, the grade percentage of the assignment in the final grade and **any other necessary information**.

b) in case of **oral examination with distance learning methods**: the instructions for conducting the examination (e.g. in groups of X people), the way of administration of the questions to be answered, the distance learning platforms to be used, the technical means for the implementation of the examination (microphone, camera, word processor, internet connection, communication platform), the hyperlinks for the examination, the duration of the exam, the grading system, the percentage of the oral exam in the final grade, the ways in which the inviolability and reliability of the exam are ensured and any other necessary information.

c) in case of **written examination with distance learning methods**: the way of administration of the questions to be answered, the way of submitting the answers, the duration of the exam, the grading system, the percentage of the written exam of the exam in the final grade, the ways in which the integrity and reliability of the exam are ensured and any other necessary information.

There should be an attached list with the Student Registration Numbers only of students eligible to participate in the examination.