COURSE OUTLINE "APPLICATIONS IN BIOSTATISTICS USING PYTHON: FROM MATHEMATICAL FOUNDATION TO COMPUTATIONAL IMPLEMENTATION"

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
STUDY LEVEL	ISCED LEVEL 6		
COURSE CODE	**MBG618**	**SEMESTER**	4th and 8th
COURSE TITLE	APPLICATIONS IN BIOSTATISTICS USING PYTHON: FROM MATHEMATICAL FOUNDATION TO COMPUTATIONAL IMPLEMENTATION		

TEACHING ACTIVITIES *In case credits are awarded to individual components of the course eg. Lectures, laboratory practicals, etc. If credit units are awarded for the whole course, indicate the weekly teaching hours and total credits*	**HOURS/WEEK**	**ECTS CREDITS**
	2	3

COURSE TYPE *General, Background, Scientific field course, Expertise Course, Skills Development etc*	EXPERTISE
PREREQUISITE COURSES:	NO
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	https://eclass.duth.gr/courses/418335/

2. LEARNING OUTCOMES

Learning outcomes

Describe the learning outcomes of the course, the specific knowledge, skills and competencies that students will acquire after successfully completing the course. Refer to Appendix A.

• Description of learning outcomes for the course according to the level of study - refer to the European Higher Education Area Qualifications Framework

• Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B Curriculum Vitae Summary Guide

Course objectives

Teaching beyond the classical lectures incorporates a learning process based on the students' involvement in hands on project handling, where students are asked to implement, in groups, specific applications, combining individual study with the ability to search and compile information within collaboration, in small groups. Teaching starts initially with lectures on the basic concepts to all students, then students ate divided into groups (with a small number of people). Each group is unsigned with the implementation of a specific bio-statistical problem.

The course aims to familiarize students with the mathematical background and how it can be implemented using python programming.

Learning Outcomes

After the successful completion of the course the student acquires the ability and knowledge:

- Introduced to the essential mathematical background used in statistical analysis
- Learn how to develop applications using computational tools to solve bio-statistical problems
- To work both in groups cooperatively

General Skills

Which of the general competencies that the student will have acquired on the completion of the studies (see also the Diploma Supplement and below) are relevant to this course?

Research, analysis and synthesize of data and information, using the necessary technologies	*Work in an interdisciplinary environment*
Adaptation to new situations	*Production of new research ideas*
Decision making	*Project design and management*
	Respect for diversity and multiculturalism

Autonomous work *Team work* *Work in an international environment*	*Respect for the natural environment* *Development of social, professional and moral responsibility and gender sensitivity* *Promotion of free, creative and inductive thinking*

Search, analysis and synthesis of data and information, ICT Use
Teamwork
Critical thinking
Promoting free, creative and inductive reasoning

3. COURSE CONTENT

1. Introduction to basic mathematical concepts
 ? Functions
 ? integrals
 ? derivatives
2. Introduction to basic commutation tools (python)
3. Mathematical foundation of statistics I
4. Mathematical foundation of statistics II
5. Mathematical foundation of statistics III
6. Mathematical foundation of statistics IV
8. Confidence interval, hypothesis testing
9. Descriptive statistics
10. hypothesis testing: χ2 test
11. hypothesis testing: t-test
12. Fitting and parameter estimation
13. Applications

4. TEACHING and LEARNING METHODS - EVALUATION

TYPE OF TRAINING *Face-to-face, Distance learning, etc..*	Face to face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, and in communication with the students*	Use of ICT in Teaching Use of ICT in Laboratory Education
MODES OF DELIVERY *Describe the teaching methods in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, practicum, 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	Workload/semester
Lectures	26
Bibliographic research & analysis	64
Course Total	**90**

STUDENT PERFORMANCE EVALUATION *Describe of the methods of evaluation language, methods of evaluation, types of exams, 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* *Are evaluation criteria known to the students?*	**Student evaluation languages** Greek **Method (Formative or Concluding)** Summative **Student evaluation methods** Presentation in audience (100%)

5. SUGGESTED BIBLIOGRAPHY

1) Τίτλος: Στοιχεία πιθανοτήτων
Υπότιτλος: ΜΕ ΕΦΑΡΜΟΓΕΣ ΣΤΗ ΣΤΑΤΙΣΤΙΚΗ ΚΑΙ ΤΗΝ ΠΛΗΡΟΦΟΡΙΚΗ

Συγγραφείς: Κοντογιάννης, Ιωάννης
Τουμπής, Σταύρος
Είδος Τεκμηρίου: Σύγγραμμα
URI: http://hdl.handle.net/11419/2810
ISBN: 978-960-603-182-3
ID Ευδόξου: 320181
από τον Κάλλιπο

2) Τίτλος: Μαθηματική στατιστική
Υπότιτλος: ΕΛΕΓΧΟΙ ΥΠΟΘΕΣΕΩΝ
Συγγραφείς: Κολυβά Μαχαίρα, Φωτεινή
Χατζόπουλος, Σταύρος
Είδος Τεκμηρίου: Σύγγραμμα
URI: http://hdl.handle.net/11419/1899
ISBN: 978-960-603-068-0
ID Ευδόξου: 320117
από τον Κάλλιπο

3)Τίτλος: Εφαρμοσμένη Στατιστική και Στατιστική Μηχανική Μάθηση με χρήση των IBM SPSS, Statistics, R, Python
Κωδικός Βιβλίου στον Εύδοξο: 94689188
Έκδοση: 1η/2021
Συγγραφείς: Μπερσίμης Σωτήριος, Μπάρτζης Γεώργιος, Παπαδάκης Γεώργιος, Σαχλάς Αθανάσιος
ISBN: 978-960-418-877-2
Τύπος: Σύγγραμμα
Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε.