COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	APPLIED BIOLOGY AND BIOTECHNOLOGY		
DEPARTMENT	BIOTECHNOLOGY		
STUDY LEVEL	*Undergraduate*		
COURSE CODE	**338**	**SEMESTER**	3rd
COURSE TITLE	BIOSTATISTICS		
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 TEACHNG HOURS**	**ECTS**
Lectures		4	2,08
Autonomous study			1,92
TOTAL			**4,00**
COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes (in Greek)		
COURSE WEBSITE (URL)			

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*

Upon successful completion of the course, the student is expected to:

- know the role and basic principles of Biostatistics in biological and agricultural sciences
- distinguish stochastic and deterministic phenomena and experiments
- using enumeration methods and basic probability tools
- apply simple probability calculus
- recognize the practical value and importance of probabilities in the understanding of stochastic phenomena and experiments of biosciences
- describe and present summarized and/or graphically (biological or agricltural) data gathered from the observation of a phenomenon or the performance of an experiment
- translate a research question into appropriate statistical hypothesis
- apply estimation and statistical hypothesis testing methods to draw conclusions

from experimental or sample data in biosciences

- identify the selected method's assumptions and keep in mind that it is required to apply checks for them
- comprehend and interpret correctly the statistical significance
- draw conclusions about stochastic phenomena and experiments in the biological and agricultural sciences and interpret them correctly in terms of the physical problem and not necessarily using statistical terminology
- select and apply the appropriate statistical inference methods required to complete a research project
- comprehend the notion of uncertainty which is always contained in statistical inference
- critique data-based claims and evaluate data-based decisions comply to ethical issues

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/Team work	*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.)*
	…….

1) Retrieve, analyze and synthesize data and information, with the use of necessary technologies.
2) Adapt to new situations.
3) Make decisions.
4) Work autonomously.
5) Work in teams.
6) Create new research ideas.
7) Advance free, creative and inductive thinking.

3. COURSE CONTENT

1) The role and importance of Biostatistics in the biological and agricultural sciences.
2) Collection and summary presentation of biological and agricultural data (frequency table; numerical descriptive measures; barchart; piechart; box & whisker plot; histograms).
3) Useful counting rules (multiplication principle, permutations, k-permutations, combinations).
4) Practical notion of probability and basic probability tools. Conditional probability (multiplication rule; law of the total probability; Bayes theorem); Independence.
5) Random variables (cumulative distribution function; discrete and continuous random variables; probability function; probability density function; mean and variance).
6) Useful discrete distributions (Bernoulli; Binomial; Poisson).
7) Useful continuous distributions (Normal; χ^2; t and F).
8) Central limit theorem.
9) Sampling distributions.
10) Estimation; point estimation (properties of an estimator); interval estimation (confidence intervals for a (difference of) population mean (s) or proportion (s));
11) Testing hypotheses for a (difference of) population mean (s) or proportion (s));
12) Goodness-of-fit test; Chi-Square test of independence.
13) Analysis of variance (single-factor ANOVA; two-factor ANOVA).

4. TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD *Face-to-face, Distance learning, etc*	Direct (face-to-face).

USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT in teaching, Laboratory Education, Communication with students*	Educational material, updates and announcements available on the web
TEACHING ORGANISATION *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	52 h
Autonomous study	48 h
Total contact hours and Training ***(25 hours of student work load per ECTS)***	***100 h***

STUDENT EVALUATION *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.*	Written examination of different difficulty, based on the lectures offered, containing: - Problems and/or exercises. - Comprehension questions.

5. BIBLIOGRAPHY:

1. Παπαδόπουλος, Γ. Κ., *Εισαγωγή στις Πιθανότητες και τη Στατιστική, Εκδόσεις Gutenberg,* 2015.
2. Κουνιάς, Σ., Κολυβά-Μαχαίρα, Φ., Μπαγιάτης, Κ. και Μπόρα-Σέντα, Ε., *Εισαγωγή στη Στατιστική*, Εκδόσεις Χριστοδουλίδη, Θεσσαλονίκη.
3. Larsen, R. J. and Marx, M. R., An Introduction to Mathematical Statistics and its Applications, Pearson Prentice Hall, Fourth Edition, 2006.
4. Mendenhall, W. and Sincich, T., Statistics for Engineering and the Sciences, Pearson Prentice Hall, Fifth Edition, 2007.
5. Zar, J.H., Biostatistical Analysis, Prentice Hall, Fifth Edition, 2010.