COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Required]		
COURSE CODE	311	**SEMESTER**	3rd
COURSE TITLE	STATISTICS		

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 (ECTS)**
Lectures	3	3
Laboratory exercises	2	2
Total	**5**	**5**
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*	Background knowledge, Skills Development
PREREQUISITE COURSES:	-
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE 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 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*

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 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...*
	.....

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) SYLLABUS

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; ; 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 COMMUNICATIONS TECHNOLOGY	Educational material, updates and announcements available on the web.

Use of ICT in teaching, laboratory education, communication with students	

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*
Lectures	52
Independent study	48
Course total (25 h of workload per ECTS)	***100***

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 examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.

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

(5) ATTACHED 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.