COURSE OUTLINE

1. GENERAL

SCHOOL	**SCHOOL OF ENVIRONMENT & AGRICULTURAL ENGINEERING**		
ACADEMIC UNIT	**NATURAL RESOURCES MANAGEMENT & AGRICULTURAL ENGINEERING**		
LEVEL OF STUDIES	**BACHELOR OF SCIENCE**		
COURSE CODE	**311**	**SEMESTER**	3th (winter)
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
Lectures		4	4
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/ 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: • 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 • describe and summarize data • translate a research question into a statistical hypothesis when given a data group and the type of experimental design or sampling procedure

- apply estimation and testing methods in order to make data-based decisions
- 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
- interpret results correctly, effectively, and in context without relying on statistical jargon
- comprehend the notion of uncertainty which is always contained in statistical inference
- critique data-based claims and evaluate data-based decisions
- complete a research project that employs simple statistical inference
- 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) Statistical approach: a brief overview.
2) Useful counting rules (multiplication principle, permutations, k-permutations, combinations).
3) Practical notion of probability; basic probability tools.
4) 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) The role of probability in statistics.
10) Descriptive statistics (frequency table; numerical descriptive measures; barchart; piechart; box plot; histograms).
11) Sampling distributions.
12) Estimation; point estimation (properties of an estimator); interval estimation (confidence intervals for a (difference of) population mean (s) or proportion (s));
13) Testing hypotheses for a (difference of) population mean (s) or proportion (s));
14) Analysis of variance (single-factor ANOVA; two-factor ANOVA).
15) Goodness-of-fit test; Chi-Square test of independence.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Direct (face-to-face).</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Educational material, updates and announcements available on the web.</td></tr>
<tr><td>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</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures (direct)</td><td>52 hours</td></tr>
<tr><td>Autonomous study</td><td>48 hours</td></tr>
<tr><td>Total contact hours and training</td><td>100 hours
(4 ECTS)</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure
Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-</td><td>Written examination of different difficulty, based on the lectures offered, containing:
- Problems and/or exercises.
- Comprehension questions.</td></tr>
</table>

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.***	

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.