

Statistical Data Analysis using Statistical Packages {326}

COURSE OUTLINE

(1) GENERAL

SCHOOL	ANIMAL BIOSCIENCES		
ACADEMIC UNIT	DEPARTMENT OF ANIMAL SCIENCE		
LEVEL OF STUDIES	Undergraduate [Required]		
COURSE CODE	326	SEMESTER	4th
COURSE TITLE	STATISTICAL DATA ANALYSIS USING STATISTICAL PACKAGES		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS (ECTS)
Lectures		3	3
Total		3	3
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background/ Skills development.		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS:	No		
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, students will be able (according to Bloom) to: - Translate a research question into a statistical hypothesis or a regression model (Application / Synthesis). - Apply estimation and testing methods to make data-based decisions (Application / Analysis / Evaluation). - Model and investigate relationships between two or more variables within a regression framework (Application / Analysis). - Apply checks for the assumptions of statistical methods (Analysis / Evaluation). - Comprehend and correctly interpret statistical significance (Comprehension / Analysis). - Interpret results correctly, effectively, and in context without relying on statistical jargon (Analysis / Evaluation / Synthesis). - Comprehend the notion of uncertainty inherent in statistical inference, critique data-based claims, and evaluate data-driven decisions (Comprehension / Analysis / Evaluation). - Complete a research project employing simple statistical inference (Application / Synthesis). - Use statistical software to summarize data numerically and visually and to perform data analysis (Application / Analysis). - Apply ethical principles in the design, analysis, and interpretation of statistical data (Evaluation / Application).
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, Project planning and management

<i>with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
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 packages (how to use). 2) Brief overview of (a) the principles of statistical inference and (b) inference about means, proportions and variances (confidence intervals and hypothesis tests for a population mean, proportion or variance and for comparing two population means, proportions or variances; Goodness-of-fit test; Chi-Square test of independence). 3) Analysis of variance and multiple comparisons tests (LSD, Tukey, Dunn, Duncan). 4) Factorial Experiments, statistical analysis and interpretation of main effects and factor interactions. Analysis of variance for repeated measures. 5) How to apply checks for method's assumptions (tests for Normality, tests for comparing variances, normal probability plots, residuals plots, etc.). Non-parametric tests (Sign test, Mann-Whitney test, Wilcoxon test, Kruskal-Wallis test, Friedman test, etc.). 6) Regression analysis (simple linear regression and correlation; multiple regression; logistic regression). Non-linear models and data transformations. 7) Multivariate statistical analysis (Principal component analysis (PCA), Discriminant analysis).
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(4) TEACHING and LEARNING METHODS - EVALUATION

TEACHING METHOD <i>Face-to-face, Distance learning, etc.</i>	In-class lecturing and in computer lab.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Statistical packages usage. Educational material, updates and announcements available on the web and e-class.	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i>	Activity	Semester workload
	Lectures	39
	Autonomous study	36
	Course total (25 h of workload per ECTS)	75
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>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</i>	Written examination combined with Group or autonomous assignments.	

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	
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(5) ATTACHED BIBLIOGRAPHY

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| <ol style="list-style-type: none">1. Κούτρας, Μ. Β. και Ευαγγελάρας Χ., Ανάλυση Παλινδρόμησης-Θεωρία και Εφαρμογές, Εκδόσεις ΤΣΟΤΡΑΣ ΑΝ ΑΘΑΝΑΣΙΟΣ, 2018.2. Navidi, W., Statistics for Engineers and Scientists, McGraw Hill, 6th Edition, 2024.3. 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. |
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