COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6108**	**SEMESTER**	**8th**
COURSE TITLE	**Categorical Data Analysis**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	8
Workshops		
Labs		

COURSE TYPE	Elective – Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/categorical-data-analysis-7-ects

(2) LEARNING OUTCOMES

Learning outcomes
At the end of the course, students are expected to know how to quantify different dependency forms between two or more categorical data, to control which form of dependency appears to apply to a particular set of data, to fit logistic regression models and to interpret the results of their data fit.
General Competences
• Search, analysis and synthesis of data and information, using the necessary technologies • Decision making • Autonomous work • Teamwork

(3) SYLLABUS

Introduction to categorical data analysis, binary data, multinomial data, contingency tables, joint and conditional probability, comparison of conditional probabilities, frequencies and probabilities, multinomial distribution, hypothesis testing with one sample from the binomial distribution, estimation of a binomial proportion, hypothesis testing for the difference of two binomial proportions, estimation of the difference of two binomial proportions, Delta method, relative risk and risk ratio (RR), distribution of RR, hypothesis testing about the RR, interval estimation about the RR, odds, odds ratio (OR), properties and inference about the OR, hypothesis testing about the OR, odds for more than two events, OR in 2xJ tables, OR in IxJ tables, sampling for categorical data (Poisson, multinomial, product multinomial sampling), types of observational studies (prospective, retrospective, cross-sectional), independence in contingency tables, chi-squared test of independence, test of independence with the method of maximum likelihood (G2 statistic), residuals for cells in a contingency table, partitioning of G2 statistic in 2xJ and IxJ contingency tables, ordinal variables, linear trend of ordinal variables, linear correlation, concordant-discordant pairs in contingency tables, gamma measure of association, small sample inference- Fisher exact test, contingency tables for matched observations, inference, estimation and hypothesis testing for matched data (McNemar's test), multi-dimensional tables, Simpson's paradox, conditional and marginal OR, independence models, independence tests using X2 and G2 statistics, the Cochran-Mantel-Haenszel test, the Breslow-Day test, logistic regression: likelihood function, model interpretation, hypothesis testing, prediction, goodness-of-fit test, residuals, diagnostics, model selection.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>YES</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>45,5</td></tr>
<tr><td>Studying and Analyzing Bibliography</td><td>10,5</td></tr>
<tr><td>Assignment</td><td>59,5</td></tr>
<tr><td>Self Study</td><td>59,5</td></tr>
<tr><td>Course Total</td><td>175</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
.</td><td>Written examination at the end of the semester: 80%
Practical Exercises: 20%

Information is available at eclass</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Agresti A., (2013). Categorical data analysis, Wiley
- Agresti A., (2007). An Introduction to Categorical Data Analysis, Wiley.
- Hosmer, D., Lemeshow, S. and Sturdivant, R. (2013) Applied Logistic Regression, Wiley
- Kateri, M. (2014). Contingency Table Analysis, Springer.
- Fienberg, S. E. (2007). The Analysis of Cross-Classified Categorical Data (2nd ed.). Springer.