

## AUEB STATISTICS SEMINAR SERIES MAY 2017

### SHORT COURSE

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### A short Course on Categorical Data Analysis

		<b>Date</b>	<b>Time</b>	<b>Room</b>
Lecture 1	Contingency table analysis & Logistic Regression	Monday 22 May 2017	9.00-12.00	<b>Amphitheatre ANTONIADOY</b> <i>(Patision 76, Antoniadou Building)</i>
Lecture 2	Logistic regression model building and loglinear models	Tuesday 23 May 2017	9.00-12.00	<b>Amphitheatre ANTONIADOY</b> <i>(Patision 76, Antoniadou Building)</i>
Lecture 3	Logit models for multcategory responses	Wednesday 24 May 2017	9.00-12.00	<b>802</b> <i>(Evelpidon 47A &amp; Lefkados 33, 8<sup>th</sup> floor)</i>
Lecture 4	Marginal models for correlated discrete responses	Thursday 25 May 2017	9.00-12.00	<b>Amphitheatre ANTONIADOY</b> <i>(Patision 76, Antoniadou Building)</i>
Lecture 5	Random effects models for discrete responses	Friday 26 May 2017	9.00-12.00	<b>Amphitheatre ANTONIADOY</b> <i>(Patision 76, Antoniadou Building)</i>

### Detailed Structure of the Course

1. **Contingency table analysis** (odds ratios and other measures, chi-squared tests, Fisher's exact test and extensions, independence as a loglinear model)
2. **Logistic regression** (Latent variable motivation for binary regression, binary regression models as special cases of generalized linear models, parameter interpretation, maximum likelihood (ML) fitting using iterative methods, inference using Wald, likelihood-ratio, and score methods)
3. **Logistic regression model building** (Goodness of fit, comparing nested models, strategies for selecting explanatory variables, residuals, sample size determination, infinite ML estimates and possible alternatives)
4. **Loglinear models for contingency tables** (Poisson and multinomial models for counts in contingency tables, hierarchical models, connections with logit models, an extension for ordinal response variables)
5. **Loglinear models for count responses** (Poisson GLMs with offsets for rates, negative binomial GLMs, zero-inflated Poisson and negative binomial models)
6. **Logit models for multcategory responses** (baseline-category logit models for nominal variables, cumulative logit models for ordinal variables, proportional-odds and non-proportional odds structure, alternative link functions such as probit and complementary log-log).
7. **Marginal models for correlated discrete responses** (matched pairs for binary data, McNemar test, quasi-likelihood, GEE extension of QL to multivariate responses, binary and ordinal examples)
8. **Random effects models for discrete responses** (generalized linear mixed models for binary and ordinal responses, subject-specific vs. population-averaged effects, binary and ordinal examples and comparison with GEE results, multilevel models)