

ESM 244: Advanced Statistics & Data Analysis

Bren School of Environmental Science & Management (UCSB)

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Summary: This course will cover advanced topics in statistics (bootstrapping, transforming data, non-linear models, multivariate statistics, binary, ordinal and multinomial logistic regression, panel regression, path analysis, intro to time-series analysis, spatial data analysis and interpolation, principal components analysis, partition-based cluster analysis) and data analysis (organization, manipulation, analysis, interpretation, and communication). Weekly lab attendance is mandatory. Labs and course assignments will be completed in R.

Graded assignments will be assigned biweekly. There will be several tutorials posted to GauchoSpace that will not be graded, but should be completed individually. For group assignments, all members of the group are expected to contribute to, and understand, the entire assignment submitted. Assignments may involve oral presentations.

There will be a final exam (take-home) that you prepare over the course of the quarter. The final exam will be DUE on the last day of class.

Grading: Assignments (65%), Final (35%)

There is no reader or textbook for this course. All necessary materials will be posted on the course GauchoSpace site. Since the lab will be held in a Bren lecture room (1414), you **need to bring your charged laptop with R and RStudio to each lab.**

Topics (Tentative):

Week 1: Review + binomial logistic regression + multinomial logistic regression

Week 2: Bootstrapping + nonlinear models

Week 3: Structural equation models + path analysis

Week 4: Longitudinal data + panel regression

Week 5: Missing data + intro to time series

Week 6: Time series continued + intro to spatial data

Week 7 - 8: Spatial data analysis

Week 9: Cluster analysis + review