

Quantitative Methods - Syllabus

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1 Course description

In this course students will learn how to use and interpret regression-based methods for the study of politics and international affairs. After the course, the students should be able to be informed, and critical readers of quantitative research done in the field, and should also be able to design research projects and conduct analyses using linear and non-linear regression models.

2 Contents

1. Introduction: Causal inference in the social sciences. Experiments and observations
2. Basic concepts in statistical inference: Confidence intervals, hypothesis testing and statistical significance
3. Refresher on bivariate statistics: Cross-tabulations, correlations and mean comparisons across groups
4. Introduction to linear regression: Adjusting a line via OLS. Intercept and regression coefficient. R squared. Residuals.
5. Inference in linear regression: Statistical inference in regression: Standard Errors and statistical significance (p-values and confidence intervals).
6. Problems in linear regression: Assumptions and diagnostics.
7. Multivariate regression. Introduction to model building. The logics of statistical control.
8. Categorical variables in regression
9. Modeling heterogeneous effects: Using interaction terms
10. Advanced modeling in linear regression: Advanced modeling: Non-linear relationships, centering and standardizing variables.
11. Non-linear models: Dichotomous and nominal dependent variables. The logistic model. Interpretation of coefficients and odd-ratios. Model fit and predictive efficacy.
12. Logistic regression How to make sense of logistic regression results? Post-estimation, marginal effects and predicted probabilities

3 Methodology

The course will combine three types of in-class activities

1. Lectures on background concepts
2. Seminars of collective reading of quantitative research in politics and international relations
3. Sessions of practical work with R and *Deducer*

4 Evaluation

Assessment of students performance will be based on the following items

- In-class participation
- Assignments
- Final exam

5 Handbooks

- Philip H. Pollock 2005. *The Essentials of Political Analysis*. Congressional Quarterly, Inc.
- Andrew Gelman and Jennifer Hill 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge: Cambridge University Press
- Kellstedt, P.M. and Whitten, G.D., 2013. *The Fundamentals of Political Science Research*. Cambridge: Cambridge University Press.