

## Quantitative methods in social research

Duration: 12 hours/3 days

February 18-20	14:00-18:00
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### Course Description

This course is designed to introduce applied researchers to and help them become familiar with quantitative methodologies in empirical social research. The introductory methods course begins with key quantitative concepts, such as measures of central tendency, dispersion, distributions, hypothesis testing, test statistics, confidence intervals, and so on. The following topics cover the fundamentals of linear regression models, primarily focusing on model specifications and assumptions. The methods covered will be demonstrated using R and a variety of example datasets. By the end of the course, students should be able to understand introductory quantitative methods, apply them to their research questions and evaluate their use in published research. Students should also be able to acquire a working knowledge of performing such statistical analyses using R.

### Prerequisites

This course has no specific prerequisites. Nonetheless, students are strongly encouraged to attend the Introduction to R course beforehand if they are not familiar with the basics of R programming language.

### Course Content

#### Day 1

- Introduction to Quantitative Methodology: correlation and causation; research design and formulation; levels of measurement; measures of central tendency; sampling and distributions; and dispersion
- Hypothesis Testing and T-test for Difference in Means: comparing means across two groups; t-tests for independent samples; and t-tests for dependent samples.

#### Day 2

- Correlation and Bivariate Linear Regression Models: the idea of correlation; the Pearson correlation; scatterplots and lines of best fit; linear regression with one explanatory variable; regression equations; residuals; and accuracy of prediction.
- Multiple Linear Regression Models: linear regression with multiple explanatory variables; control variables; collinearity and multicollinearity; categorical and dummy variables in regression; comparing coefficients; and model specification and assumptions.

#### Day 3

- Understanding interaction effects; marginal effects; dimensionality reduction (Principal Component Analysis vs Exploratory Factor Analysis).

### References

There is no specific textbook in this course. Rather, there is a suggested list of various textbooks that will help advance your knowledge on the topics covered in this course.

- Fogarty, B. J. (2018). Quantitative Social Science data with R: An Introduction. Sage.
- Gelman, A., Hill, J., & Vehtari, A. (2020). Regression and Other Stories. Cambridge University Press.
- Gelman, A., & Hill, J. (2006). Data Analysis Using Regression and Multilevel/Hierarchical Models. Cambridge university press.
- Wooldridge, J. M. (2015). Introductory Econometrics: A Modern Approach. Cengage Learning.