Introduction to Quantitative Methods

European University Institute – SPS Department

1st term seminar, academic year 2025-26

Time:	Tuesday, 11.00 – 13.00
Room:	Seminar Room 2, Badia Fiesolana
Instructor:	Alejandro López Peceño (alejandro.lopezpeceno@eui.eu)
Office Hours:	Tuesday, 16.00 – 18.00 (by appointment)
Lab:	Friday, 9.00 – 11.00
Lab Assistant:	Nini Petriashvili (nini.petriashvili@eui.eu)

Course Description

This seminar is aimed at researchers who have little or no background in quantitative methods for political and social sciences. It offers an accessible introduction to the key statistical ideas and basic coding skills required to conduct and assess research in the social sciences, exploring topics such as descriptive analysis, linear regression, foundations of causal inference, and probability and inference. The course will be structured around lectures followed by lab sessions. The lab sessions are designed to consolidate the concepts learned in the lectures by applying them to practical cases using R, typically through the analysis of data from published studies. By the end of the seminar, participants should understand some core principles of statistics and be able to carry out and interpret the results of basic quantitative analyses.

Requirements

Attendance to at least 80% of the lectures is ***compulsory*** to pass the course. Additionally, there will be a take-home midterm exam in November and an in-class multiple-choice test at the end of the semester.

Readings

We will be following *Data Analysis for Social Science: A Friendly and Practical Introduction* by Elena Llaudet and Kosuke Imai (Amazon). Students are expected to complete the readings before each class. Doing so will help the session run more smoothly and will allow you to come prepared with questions and to leave with a deeper understanding of the material.

Additional readings that may support your learning include:

- Cunningham. 2021. Causal Inference: The Mixtape. Yale University Press.
- Angrist and Pischke. 2014. Mastering Metrics. Princeton University Press. (intro level)
- Angrist and Pischke. 2009. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton University Press. (harder)
- Kosuke Imai. 2017. Quantitative Social Science: An Introduction. Princeton University Press.

Course Schedule

Lecture 1 (30–Sep): Introduction.

General overview, description of assignments, software, and readings.

Readings: Syllabus. Llaudet and Imai, Chap. 1–1.4

Lecture 2 (07–Oct): Conceptual foundations.

Correlation, causation, establishing a common language.

Readings: Llaudet and Imai, Chap. 2–2.4

Lecture 3 (14–Oct): Inferring population characteristics.

Random sampling, mean, median, variance, correlation, data visualization (histograms and scatter plots).

Readings: Llaudet and Imai, Chap. 3–3.5

Lecture 4 (21–Oct): Linear Regression I.

Mechanics of OLS, assumptions of linear model, R^2.

Readings: Llaudet and Imai, Chap. 4

Lecture 5 (28–Oct): Linear Regression II.

Multiple linear regression, confounders, correlation vs causation.

Readings: Llaudet and Imai, Chap. 5

Lecture 6 (04–Nov): Linear Regression III.

Additional topics in linear regression, bad controls, review before midterm.

Readings: Cinelli, C., Forney, A., & Pearl, J. 2024. A Crash Course in Good and Bad Controls. Sociological Methods & Research, 53(3), 1071-1104.

Take-Home Midterm Exam

Lecture 7 (11–Nov): Probability and Inference I.

Probability fundamentals, normal and Bernoulli distributions, population parameter vs sample statistic.

Readings: Llaudet and Imai, Chap. 6

Lecture 8 (18–Nov): Probability and Inference II.

Standard errors and confidence intervals.

Readings: Llaudet and Imai, Chap. 7–7.2

Lecture 9 (25–Nov): Probability and Inference III.

Hypothesis testing for difference-in-means and linear regression estimators, statistical significance.

Readings: Llaudet and Imai, Chap. 7.3–7.4

Lecture 10 (02–Dec): Review.

Final Test