Research Design and Methods in Quantitative Research*

Masterseminar Fall 2025

Room 4.B55† Thursdays 14:15-18:00‡

1 Course description

Social science is increasingly adopting quantitative research tools, such as experimental, statistical and machine learning methods. Students without a strong mathematical background often struggle to keep up with these developments. Motivated by these facts, this seminar introduces students to quantitative social research with an intuition-based approach. The goal is twofold: first, to provide students with the basic toolset to elaborate the research designs that better fit their needs, and second, to enable them to gain a deeper understanding of specific methods autonomously by making quantitative research accessible. To meet these goals, the seminar will first delineate the fundamental elements of scientific inquiry in the social sciences. With a clear understanding of these elements, the students will be guided through the essential social science approaches for the analysis of quantitative data. Finally, the seminar will also train students to deal with applied quantitative research by providing basic statistical skills, such as producing descriptive statistics, reading regression tables, interpreting statistical tests,

*This version of the syllabus: 19 Oct 2025
†***Sessions 1 and 2 (25.09.25) and 9 and 10 (20.11.25) will take palce in Room 4.B51.***
‡Every two Thursdays.

and converting hypotheses into an appropriate regression model. Students will learn to identify their research goals and elaborate a theory-driven research design. Students are encouraged to think critically to detect and understand the strengths and limitations of specific quantitative analyses.

2 Seminar requirements

This introductory seminar does not require prior knowledge of statistics, though high-school level of mathematical concepts (like the mean of a variable or the idea of a function) will be assumed. The seminar is suitable for students with a qualitative background who want to start learning about quantitative research, as well as for those with some experience in quantitative methods who seek a deeper understanding. Experience in R programming is not required, but is an asset.

3 Course organization

The course is organized as a bi-weekly seminar during the Fall term of 2025. It will run every two Thursdays from 14:15 to 18:00, starting on September 25th. Each session is divided into two parts. In the first part, the lecturer will introduce the topic, after which we will discuss the basic reading(s) and expand on them. To support the discussion, students will answer a set of *seminar questions* related to the topic of the week, which must be uploaded to OLAT before each session. In the second part, one or more students will present an applied reading along with a short research proposal to complement it. Finally, during the second half of the course, students will complete three take-home exercises to apply and/or comment on statistical analyses of real-world data.

4 Learning outcomes

By the end of this course, students will be able to:

1. [**Knowledge**] understand the logic of quantitative social science, differentiate the main targets of scientific inference and identify appropriate methods to serve these goals.
2. [**Competence — reading research**] understand and critically assess quantitative research articles.
3. [**Competence — research design**] identify an appropriate and feasible research design for a given research problem, including an indication of the appropriate statistical tests (when applicable).
4. [**competence - communication**] communicate complex concepts effectively to a broad audience.
5. [**Competence — statistical analysis**] perform simple descriptive and inferential statistical analyses.

5 Textbooks

Each session will be accompanied by a set of basic and applied readings. Basic readings typically include an introductory text that covers the fundamental concepts related to the session topic. Applied readings usually consist of scientific articles that apply the session's topic or delve deeper into specific areas of interest. Students are encouraged to thoroughly study the basic readings and engage with the applied articles, focusing on understanding the main arguments or points presented.

All texts will be available in the OLAT folder. The basic readings are often based on the following textbooks:

- AJ: Angrist, J. D. (2014). Mastering' metrics: The path from cause to effect. Princeton University Press.
- BCH: Blair, G., Coppock, A., & Humphreys, M. (2023). [Research design in the social sciences: declaration, diagnosis, and r /) Princeton University Press.

- BF: Bueno de Mesquita, E. and Fowler A. (2021). Thinking Clearly with Data: A Guide to Quantitative Reasoning and Analysis. Princeton University Press.
- GG: Gerber, A. S., & Green, D. P. (2012). Field experiments: Design, analysis, and interpretation. (No Title).
- KKV: King, G., Keohane, R.O., and S. Verba (1994). Designing Social Inquiry. Princeton: Princeton University Press.
- KW: Kellstedt, P. M., and Whitten, G.D. (2013). The Fundamentals of Political Science Research. Third Edition. Cambridge: Cambridge University Press.

Additionally, here are some references that students may find useful to improve their critical reading skills:

- How to read a scientific article
- How to critique a scientific article

For the specific readings, see the section *Course schedule* below.

6 Teaching policy

This course is designed as a seminar rather than a traditional lecture. Students are expected to prepare the applied readings in advance. While the lecturer will facilitate the discussion, each session will follow a bottom-up approach, where students are encouraged to raise questions and engage in debates after the presentation. Therefore, active participation from everyone is essential to the success of the class.

7 Integration and interaction policy

Discrimination due to race, gender, ethnicity, or sexual orientation is strictly forbidden in this course. Students are encouraged to use inclusive language and to respect the sexual and gender identification of others. During each session, the lecturer will actively promote equal participation within the class. More generally, interventions must be carried out respectfully, integrating and engaging with different views and perspectives. Discouraging language or other bullying strategies are strictly forbidden, too.

8 Artificial intelligence (AI) policy

The use of ChatGPT and other generative AI tools for preparing class materials is allowed. However, these tools should augment, not replace, human effort (e.g., students should not copy and paste content directly from these tools). The primary concern is not grades but the quality of class discussions, which are central to evaluation. Relying on AI to substitute for human work will hinder meaningful discussion and, ultimately, not only the grade but the learning outcomes.

To help enforcing this policy, students are required to declare the use of AI and specify its scope in an appendix when submitting presentation slides, take-home exercises, and answers to the seminar questions.

9 Evaluation

Mandatory requirements (4 credits)

To receive the credits, students are expected to fulfill the following criteria:

1. Attend all the sessions

Attendance is mandatory. Students can miss a maximum of two sessions. Missing more sessions without a justified certificate of absence implies failing the course.

2. Study the basic reading(s) before each session

Studying = reading + critical thinking.

Students can find the texts in the materials folder in OLAT.

3. Participate actively

Active engagement involves intervening during the discussion with questions, comments and ideas, reflecting on the content of the readings. Students are always encouraged to raise original arguments and debates.

4. Answer the seminar questions of each session

The lecturer will upload a series of questions before each session about the topic of the week. Sometimes, these questions will be related to the basic reading(s). Students are expected to answer to these questions briefly (one paragraph per question is enough) before each class. Completing these questions is mandatory to pass the course, however, the answers to the questions will not be graded. The idea is to encourage critical thinking when preparing the readings and prepare material to discuss during class.

The **submission rules** are:

- Students must upload their responses to the *Students responses/Seminar questions* folder within the specific session folder (e.g., *02_session*) in OLAT.
- The deadline for submitting the responses is the day before the corresponding session, that is, the **previous Wednesday at noon (12:00)**.

- The file must be in Word. The title must always follow the structure *seminar_questions_sessionXX_YOURSURNAME*.

5. Present the applied reading of (at least) one of the sessions

Presentations will be conducted individually or in pairs and will last a maximum of **25 minutes**. They will focus on the applied reading of the day, which includes a research design related to the topic.

The presentation has two parts:

1. **Summary and critique (~10 minutes)**
   The presenter(s) must summarize the applied reading, with particular attention to the research design and how it connects to the stated goal of the paper (e.g., providing evidence for a theory, describing a phenomenon, etc.). Then, the presenter(s) should critically evaluate the research design:
   - What are the merits of the design?
   - How does it succeed in achieving the stated goal?
   - What are its problematic aspects, i.e., the main flaws or limitations (no paper is perfect!).
2. **Alternative research design (~15 minutes)**
   Building on their critique, the presenter(s) must propose a research design that addresses some of the paper's limitations. This may involve different data, different cases, a different empirical strategy, or testing different observational implications of the arguments. It is important that the presenter(s) imagine they have the resources to carry out the research, but within a realistic framework (e.g., you may assume access to research funds, but not that the world works differently—such as being able to decide when elections take place or inventing a hypothetical country).

After the presentation, we will open the floor for discussion, with the goal of further criticizing and improving the research proposal.

For further guidance, please refer to the *How to Make a Good Presentation* section of this syllabus.

Some additional information:

- The schedule of the presentations will be determined during the introductory session.
- Presentation slides must be uploaded to the *Students responses/Presentation slides* folder in OLAT at least one day before the session, i.e., by **Wednesday at noon (12:00)**.
- Slides may be submitted in PowerPoint or PDF format, but the file name must always follow the structure:
  presentation_slides_sessionXX_YOURSURNAME(S)
  (e.g., *presentation_slides_session02_CANALEJO*).

6. Complete three take-home exercises

The exercises will take place in the second half of the course. They will gradually build upon each other and involve solving a series of tasks with R and RStudio. Students are expected to learn R and RStudio autonomously. However, the lecturer will provide the necessary materials to make this possible and will be available to clarify doubts.

Because the exercises require autonomous learning, there will be two different tracks (i.e., sets of exercises) depending on the student's level of R programming and statistics: **beginner** and **advanced**.

- **Beginner:** For students without prior knowledge of R and statistics. Exercises will include installing R and RStudio and learning to perform basic statistical tests.
- **Advanced:** For students with previous experience in R and RStudio. Exercises will additionally involve more complex data analyses.

During the introductory session, students will complete a short assessment and receive a recommendation from the lecturer. However, they are free to decide which track to follow. Once a track is chosen, students will be evaluated according to the expectations for that track.

The responses to the exercises must be uploaded to the *Students responses/Take-home exercises (beginner/advanced)* folder within the corresponding take-home exercise sub-folder (e.g., *Take-home exercise I*).

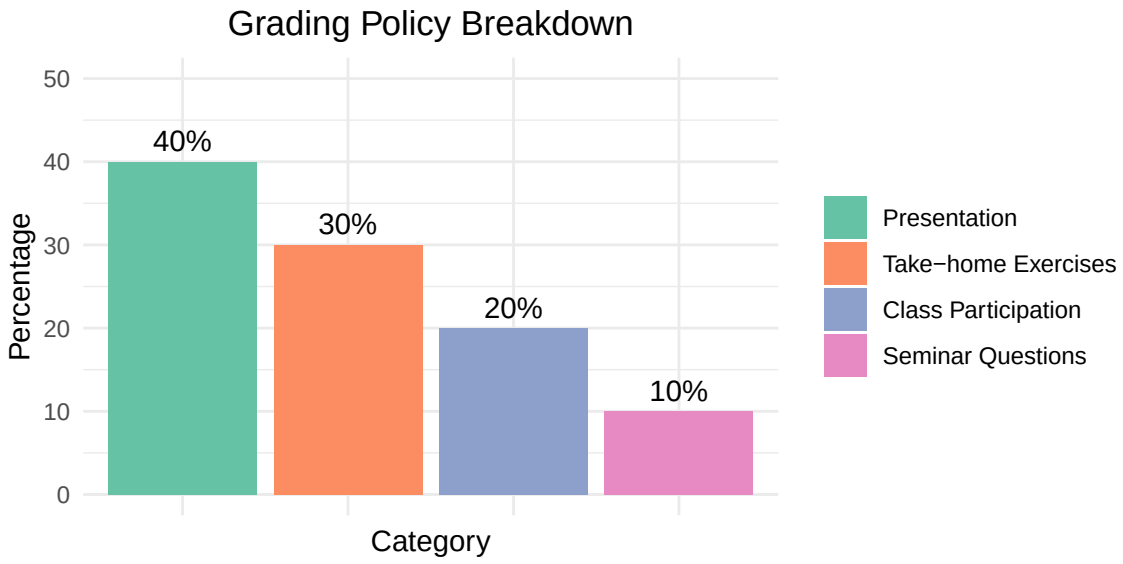
The name of the file must always follow the structure:

take-home_exercise_X_YOURSURNAME(S)

Grading policy

- 10% of the grade is determined by submitting the answers to the seminar questions.
- 20% of the grade is determined by the quality and quantity of the participation in class.
- 30% of the grade is determined by the the take-home exercises.
- 40% of the grade is determined by the presentation.

The grade will not only take differences between students into account but also within students' differences over time (i.e., their personal progress).



Masterseminar paper (6 credits)

Students can choose to write a master seminar paper to obtain six extra credits. The seminar paper must have between 7000 and 9000 words. The topic should be agreed upon between the instructor and the student. To this end, students are asked to write a paper outline of 1-2 pages consisting of the following elements:

- Introduction of the topic
- Research question
- Academic and societal relevance
- Theory and hypotheses
- Approach and structure of the paper (including a tentative empirical design)

The deadline for the submission of the paper outline is **December 1st 2025**.

An approximate deadline for the submission of the seminar paper is **April 1st 2025**.

Please refer to the Guidelines on How to Do Research of the Department of Political Science for more details.

10 Office hours

The lecturer has not fixed office hours. Instead, students can send an e-mail at alvaro.canalejo@unilu.ch to schedule a meeting within a one-week time period, either in person (office 3.B14) or virtually via Zoom.

11 How to Make a Good Presentation (Checklist)

Part I – Summary and Critique (~10 min)

- **Core ideas (1–2 slides, ~3 min):** Summarize the argument and main takeaways.
- **Research design (~4 min):** Present the research question, hypotheses, method, data type, unit of analysis, and key findings.
- **Critique (~3 min):** Identify strengths and main limitations of the research design (measures, validity, scope, etc.). Use clear communication: diagrams, step-by-step reasoning, examples, visual aids.

Part II – Proposal (~15 min)

- **Address one main limitation:** Focus on *one key issue* and justify why it matters.
- **Propose one solution or extension:** Suggest a feasible new design, replication, different data, or alternative method.
- **Be realistic:** Assume research funds are available, but do not "change the world" (e.g., deciding election dates).

- **Seek guidance if needed:** Contact the lecturer if unsure about preparation.

Additional Information

- **Evaluation criteria:** Clarity, understanding, critique quality, reasoning, feasibility, and ability to engage discussion.
- **Avoid pitfalls:**
  - Don't overcrowd slides.
  - Avoid superficial content.
  - Manage time (25 min total).
  - Prepare early, rehearse, and refine slides.
  - Practice in front of a friend and ask for feedback.

12 Course schedule

Session 1. Introduction (25.09.25 / 14:15–16:00)

Basic reading:

- Schwartz, M. A. (2008). The importance of stupidity in scientific research. *Journal of Cell Science*, 121(11), 1771-1771.

Session 2. The logic of scientific research (25.09.25 / 16:15–18:00)

Basic reading:

- KKV: pp. 3-33, Chapter 1. The Science in Social Science

Additional readings:

- BCH: Chapter 1. What is a research design? & Chapter 2. Research design principles

Applied reading:

Presentation by the lecturer.

- Canalejo-Molero, Á., & Le Corre Juratic, M. (2025). Blinded by Out-group Hatred. Why does Radical Party Entry Reduce its Voters' Satisfaction with Democracy? *Working paper*

Session 3. Theory and research design (09.10.25 / 14:15–16:00)

"All models are wrong, but some are useful" (George E. P. Box)

Basic reading:

- KW: pp. 25-52, Chapter 2. The Art of Theory Building

Applied reading:

- Turnbull-Dugarte, S. J., & Wagner, M. (2025). Heroes and villains: motivated projection of political identities. *Political Science Research and Methods*, 1-21.

Session 4. Data and measurement (09.10.25 / 16:15–18:00)

Basic reading:

- KW: pp. 104-124, Chapter 5. Measuring Concepts of Interest

Applied reading:

- Little, A. T., & Meng, A. (2023). Measuring democratic backsliding. *PS: Political Science & Politics*, 1-13.

Session 5. Descriptive inference (23.10.25 / 14:15–16:00)

Basic reading:

- KW: pp. 125-141, Chapter 6. Getting to Know Your Data

Additional readings:

- KKV: pp. 34-74, Chapter 2. Descriptive Inference
- Gerring, J. (2012). Mere Description. *British Journal of Political Science*, Vol. 42(4): 721-746.
- de Kadt, D., & Grzymala-Busse, A. (2025). Good Description. *Working paper*

Applied reading:

- Barnes, M. J., & Karim, S. M. (2025). The Manosphere and politics. *Comparative Political Studies*, 00104140241312095.

Session 6. Causal inference (23.10.25 / 14:15–16:00)

Basic readings:

- BF: pp. 11-52, Chapter 2. Correlation: What Is It and What Is It Good For? & Chapter 3. Causation: What Is It and What Is It Good For?

Additional reading:

- KKV: pp. 75-114, Chapter 3. Causality and Causal Inference

Applied reading:

- Marble, W., Mousa, S., & Siegel, A. A. (2021). Can exposure to celebrities reduce prejudice? The effect of Mohamed Salah on Islamophobic behaviors and attitudes. *American Political Science Review*, 115(4), 1111-1128.

Session 7. Predictive inference (06.11.25 / 16:15–18:00)

Publication of ***take-home exercise I*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***20.11.25*** .

Basic reading:

- Grimmer, J., Roberts, M. E., & Stewart, B. M. (2021). Machine learning for social science: An agnostic approach. *Annual Review of Political Science*, 24(1), 395-419.

Additional readings:

- Hofman, J. M., Watts, D. J., Athey, S., Garip, F., Griffiths, T. L., Kleinberg, J., ... & Yarkoni, T. (2021). Integrating explanation and prediction in computational social science. *Nature*, 595(7866), 181-188.
- Grimmer, J., Knox, D., & Westwood, S. (2024). Assessing the Reliability of Probabilistic US Presidential Election Forecasts May Take Decades. *Working Paper*.

Applied reading:

- Hewitt, L., Ashokkumar, A., Ghezae, I., & Willer, R. (2024). Predicting results of social science experiments using large language models. *Working paper*

Session 8. Experimental studies (06.11.25 / 16:15–18:00)

Basic reading:

- AJ: pp. 1-33. Chapter 1. Randomized trials

Additional reading:

- GG: pp. 1-17. Chapter 1. Introduction

Applied reading:

- Haas, V. I., Wappenhans, T., GeiSSler, F., Hartmann, F., Bischof, D., Giesecke, J., ... & Stoetzer, L. F. (2024). Does Protest Affect Bystanders? Field Experimental Evidence from Germany. *Working paper*

Session 9. Large-N observational studies (20.11.25 / 14:15–16:00)

Publication of ***take-home exercise II*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***04.12.25*** .

Basic reading:

- AJ: pp. 47-81. Chapter 2. Regression

Additional reading:

- KW: pp. 92-99. Chapter 4. Research Design, Section 4.3. Observational Studies (in two flavors)

Applied reading:

- Ziblatt, D., Hilbig, H., & Bischof, D. (2024). Wealth of tongues: Why peripheral regions vote for the radical right in Germany. *American Political Science Review*, 118(3), 1480-1496.

Session 10. Small-N observational studies (20.11.25 / 16:15–18:00)

Basic reading:

- KW: pp. 77-78. Chapter 4. Research Design, Section 4.1. Comparisons as Key to Establishing Causal Relationships
- Mahoney, J. (2000). Strategies of causal inference in small-N analysis. *Sociological methods & research*, 28(4), 387-424.

Additional readings:

- Hopkin, J. (2010). *The comparative method*. Theory and methods in political science, 3, 285-307.
- Collier, D. (2011). Understanding process tracing. *PS: political science & politics*, 44(4), 823-830.
- Mahoney, J., & Rodríguez-Caceres, A. (2023). *Causal Analysis in Comparative-Historical Analysis: A Pluralistic Approach*.

Applied reading:

- Thelen, K. (2018). Regulating Uber: The politics of the platform economy in Europe and the United States. *Perspectives on politics*, 16(4), 938-953.

Session 11. Statistical testing (04.12.25 / 14:15–16:00)

Publication of ***take-home exercise III*** *in OLAT. The* ***deadline*** *for delivery is in two weeks:* ***18.12.25*** *.*

Basic reading:

- KW: pp. 143-184. Chapter 7. Probability and Statistical Inference & Chapter 8. Bivariate Hypothesis Testing

Additional reading:

- BF: pp. 94-111. Chapter 6. Samples, Uncertainty, and Statistical Inference

Applied reading:

A different reading may be agreed with the lecturer upon request.

- Cremaschi, S., Bariletto, N., & De Vries, C. E. (2025). Without roots: The political consequences of collective economic shocks. *American Political Science Review*, 1-20.

Session 12. Introduction to regression I (04.12.25 / 16:15–18:00)

Basic reading:

- KW: pp. 188-213. Chapter 9. Two-Variable Regression Models

Applied reading:

A different reading may be agreed with the lecturer upon request.

- Nalewajko, K. (2024). Allies of the Weak: La Résistance and Jews in the Holocaust. *American Political Science Review*, 1-21.

Session 13. Introduction to regression II (18.12.25 / 14:15–16:00)

Basic reading:

- KW: pp. 215-245. Chapter 10. Multiple Regression: the Basics

Additional reading:

- KW: pp. 246-271. Chapter 11. Multiple Regression Model Specification

Applied reading:

A different reading may be agreed with the lecturer upon request.

- Pulejo, M., & Querubín, P. (2023). Plata y plomo: How higher wages expose politicians to criminal violence (No. w31586). *National Bureau of Economic Research.*

Session 14. Conclusion (18.12.25 / 16:15–18:00)

Basic reading:

- HuntingtonKlein, N., Arenas, A., Beam, E., Bertoni, M., Bloem, J. R., Burli, P., ... & Stopnitzky, Y. (2021). The influence of hidden researcher decisions in applied microeconomics. *Economic Inquiry*, 59(3), 944-960.

Additional reading:

- Cinelli, C., Forney, A., & Pearl, J. (2024). A crash course in good and bad controls. *Sociological Methods & Research*, 53(3), 1071-1104.