Course Syllabus
Methodology and Research Methods of Political Science

Adopted by the Academic Council

Head instructor and Author	E. Sedachov, PhD
Number of credits	4
Contact Hours	64
Self-study hours	88
Course	1
Educational format	Without online-courses

Course Description

Prerequisites: Prior exposure to linear algebra, probability and statistics, and statistical software is recommended.

Course Type: Compulsory

Learning Objectives: The analytical knowledge and empirical toolbox necessary for de- signing and implementing a multi-method political science inquiry

Learning Outcomes: Design and execution of the main modules of a political science inquiry: 1) data collection and basic processing 2) modeling strategic decision making 3) quantitative analysis of panel-structured data 4) policy evaluation and casual inference

Course Plan: Instruction in 17 lectures covering quantitative methods of research in political science: prerequisites, fundamentals of research methodology (regression analysis and game theory), research design and data collection methods–both qualitative and quantitative–methods of panel data, and policy impact evaluation. The goal is to encourage students to combine all the aforementioned components in their future work.

There will be presentation slides for each session. After each assignment, there will be a seminar for practicing the skills necessary – including those for working on the assignment objectives. In this course we cover research methods for political science in four distinct modules:

1) Prerequisites *(two lectures)*, including calculus, probability theory, linear algebra, and basics of working with a statistical software

2) Fundamentals of regression analysis *(five lectures)*: including regression analysis, diagnostics of inference, regressions with time series data, nonlinear regression methods and finally causal inference using regression

3) Fundamentals of game theory and rational choice *(five lectures)*: including pure and mixed equilibria in games of simultaneous and sequential moves, games of imperfect information, repeated games and bargaining models

4) Panel data analysis, hierarchical and multilevel models, fixed and random effects, and policy evaluation methods in political science *(five lectures):* including causal analysis methods, controlled experiments, field experiments, and natural and quasi-experiments of history covering differences-in-differences, matching, regression discontinuity, and instrumental variable methods

Each of the modules of the course is followed by an assignment for a total of four. Seminars are dedicated to the discussion of the techniques utilized in the assignments, as well as review of practical matters, such as software usage and data processing and analysis.

Weekly lectures outline the core theory and methodology of political science, and demonstrate the usage of these methods in the political science literature. There are required readings assigned for each lecture.

Seminars are scheduled to help students to develop their practical skills via working with theoretical examples, data processing exercises, and in-class discussions with the instructor.

Evaluation: The grade for this course is based on four assignments (total of 60%), attendance in lectures and seminars (10%), and a final exam (30%). The final exam is closed-notes. All exams are held in class.

Readings: Selected chapters from textbooks, and relevant papers are assigned each week. Students are expected to have read the material before attending the lecture. In case required readings are not available online or are not in the required texts, a scanned version will be provided on the course's website.

Main Literature List

1. (JG) Jeff Gill (2006) *Essential Mathematics for Political and Social Research* Cambridge University Press – URL: https://www.cambridge.org/core/books/essential-mathematics-for-political-and-social-research/168CF3363DE1A8CB35F7D782904FFA1A - ЭБС Cambridge University Press
2. Johnson, J. B. Political science research methods / J. B. Johnson, H. T. Reynolds, J. D. Mycoff. – 6th ed. – Washington: CQ Press, 2008. – 613 с. – На англ. яз. (или более поздние издания)

Additional Literature List

1. (KKV) Gary King, Robert Keohane and Sidney Verba (1997) Designing Social Inquiry: Scientific Inference in Qualitative Research Princeton University Press – URL: https://www.jstor.org/stable/j.ctt7sfxj - ЭБС JSTOR
2. Roland, G. Transition and economics: politics, markets, and firms / G. Roland. – Cambridge: The MIT Press, 2000. – 400 с.

Outline

Part 1: PREREQUISITES, Calculus, Probability, Linear Algebra

- **Lecture 1:** Overview of the Course–Basic mathematics of social science First a full overview of the course, outlining the elements of a political scientific inquiry– then we start with the fundamentals of linear algebra, vector operations and probability theory, as well as some essential calculus refreshers. A good understanding of vector operations and probability theory is key to research design and data management in political science.

- **Lecture 2: Social Science Data** Introduction to Data Processing

Part 2: FUNDAMENTALS, Regression Analysis

- **Lecture 3: Fundamentals of regression analysis, simple Ordinary Least Squares (OLS)**

- **Lecture 4: Multiple Regressions–Definition and Diagnostics of Inference**

- **Lecture 5: Multiple Regression-II**

- **Lecture 6: Nonlinear Regression: Logit and Probit, GLM, Poisson, Negative Binomial**

- **Lecture 7: Regression & Causal Inference, Instrumental Variable Analysis (IV) & Two Stage Least Squares (2SLS)**

Part 3: FUNDAMENTALS, Game Theory & Rational Choice

- **Lecture 8: Fundamentals–Nash Equilibrium in Simultaneous-Move games**

- **Lecture 9: Equilibria in Sequential Games**

- **Lecture 10: Mixed Strategy Equilibria**

- **Lecture 11: Games of Imperfect Information**

- **Lecture 12: Repeated Games and Game Theory Section Wrap-up**

Part 4: QUANTITATIVE METHODS, PANEL DATA, POLICY EVALUATION METHODS

- **Lecture 13: Instrumental Variable Designs and Causal Analysis**

- **Lecture 14: Econometrics of Panel Data Analysis- Fixed Effects, Ran- dom Effects,**

- **Lecture 15: Temporal and Cross Sectional Dependency-Hierarchical Models**

- **Lecture 16: Policy Evaluation and Causal Analysis**

- **Lecture 17: Controlled Experiments (Mathematics and Methods), Field Experiments, Natural and Quasi Experiments**