MA151: Introduction to Statistics

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Office Hours: By appointment

Course Description

This course offers an introduction to quantitative methods in economics and politics. The course covers the basics of descriptive and inferential statistics, including probability theory and hypothesis testing. At the end of the course, students will be able to understand and critically engage with these methods, which will also be explored through applied examples from social science research. Classes are complemented with exercises to build students' skills in applying the learned methods independently. Many of these exercises use data from public opinion surveys, which cover a wide range of social, economic, and political topics. This will enable students to read and engage with modern quantitative research and prepare them for more advanced quantitative courses in the field.

Learning Outcomes

- Obtain foundational knowledge of statistics in the social sciences.
- Understand and engage with methods of descriptive and inferential statistics.
- Conduct statistical analyses through exercises and examples relevant to social science research.

Requirements

Textbook
We will use the OpenSource Textbook "OpenIntro Statistics" by Diez/Cetinkaya-Rundel/Barr, 4th edition, 2019, (which can be freely downloaded via this link).

The book will occasionally be supplemented with topics from, "Making Sense of Data through Statistics: An Introduction", by Nevo, 2nd edition, 2017 (which can be freely downloaded via this link).

Academic Integrity
Bard College Berlin maintains the highest standards of academic integrity and expects students to adhere to these standards at all times. Instances in which students fail to meet the expected standards of academic integrity will be dealt with under the Code of Student Conduct, Section 14.3 (Academic Misconduct) in the Student Handbook.

Accessibility
Bard College Berlin is committed to inclusion and providing equal access to all students; we uphold and maintain all aspects of Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the ADA Amendments Act of 2008, and Section 3 of the German Disability Equality Act of April 27, 2002 (Federal Law Gazette I p. 1468). If you have a disability, or think you may have a disability, please contact the Disability

Accommodation Coordinator, Atticus Kleen, (accommodations@berlin.bard.edu) to request an official accommodation.
Requests for longer-term accommodations should be made as early as possible to ensure adequate time for coordination and planning. Please note that accommodations are not retroactive and may require advance notice to implement.

If you have already been approved for accommodations with the Disability Accommodation Coordinator, please arrange to meet with me outside of class so that we can develop an implementation plan.

Students may face extenuating circumstances related to various personal or external factors, which impact their academic performance. While these circumstances often do not fall within the legal framework of Disability Accommodations, Bard College Berlin is committed to supporting students experiencing such circumstances. A student needing a short extension or a replacement assignment because of an extenuating circumstance is encouraged to make arrangements directly with instructors if possible. If further support is needed, please visit the Bard College Berlin Accessibility page. Questions about this process can be directed to James Harker (j.harker@berlin.bard.edu) or Maria Anderson-Long (m.andersonlong@berlin.bard.edu).

Attendance
Attendance at all classes is a crucial part of the education offered by Bard College Berlin. To account for minor circumstances, two absences from twice-per-week courses or the equivalent (e.g. one absence from a once-per-week course) should not affect the participation grade or require documentation.

Bard College Berlin may not offer credit for any course in which a student has missed more than 30% of classes, regardless of the reasons for the absences. The full Bard College Berlin attendance policy can be found in the Student Handbook, Section 2.8.

Assessment
Assessment will be based on attendance, preparation for classes, regular and active participation, take-home assignments, as well as a midterm (60 minutes) and final examination (90 minutes).

Assignments
In addition to the midterm and final examination, four take-home assignments will be distributed over the course of the semester. The assignments are graded and should be submitted via Google Classroom. Consult the schedule below for the assignment deadlines.

Policy on Late Submission of Assignments
Assignments that are up to 24 hours late can be downgraded up to one full grade (from B+ to C+, for example). Instructors are not obliged to accept assignments that are more than 24 hours late. Where a professor agrees to accept a late assignment, it should be submitted by the new deadline agreed upon by both parties. Thereafter, the student will receive a failing grade for the assignment. Grades and comments will be returned to students in a timely fashion. Students are also entitled to make an appointment to discuss assignments and feedback during instructors' office hours.

Students receive mid- and end-of-semester grades for their seminar work. Students are

entitled to make an appointment with an instructor to discuss seminar participation, or may be asked to meet with the instructor at any stage in the semester regarding class progress.

Grade Breakdown

- Seminar preparation and participation: 20%
- Assignments: 20%
- Midterm examination: 30%
- Final examination: 30%

Schedule

The fall semester runs from Monday, September 2 and runs until Friday, December 20, with the fall break planned from Monday, October 21, - Sunday, October 27, 2024. Normal course sessions end on Friday, December 13. Completion week is from Monday, December 16 through Friday, December 20.

Students are required to be on campus during completion week and the final exam will be schedule during this week. Scheduled class times will be available online under the relevant course heading: https://berlin.bard.edu/academics/courses/search/

The schedule provided is provisional in order to allow for flexibility. It is the students' responsibility to keep themselves informed of any changes to the schedule provided here. An up-to-date schedule will be maintained by the course management online in Google classroom. The password to join Google classroom will be handed out in class.

Topics and schedule

Week 1-2: *Introducing data and measurement* (Diez et al. chapter 1)
- Motivation, data basics, levels of measurement
- Experiments and observational studies, sampling
- Confounding variables, measurement error

→ *Assignment 1 due Sept 20, 2024*

Week 3-4: *Describing data* (Diez et al. chapter 2)
- Describing numerical and categorical data
- Visualisations: Scatterplots, histograms, boxplots
- Measures of central tendency and dispersion, contingency tables

→ *Assignment 2 due Oct 4, 2024*

Week 5-6: *Probability* (Diez et al. chapter 3)
- Rules of probability
- Joint and conditional probability, tree diagrams
- Random variables, densities, continuous distributions
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Week 7: *Review and **midterm exam***

Fall break

Week 8: *Normal distribution and z-scores* (Diez et al. chapter 4.1)
- Calculating z-scores
- Finding tail areas, probabilities

Week 9-10: *Introducing statistical inference and confidence intervals* (Diez et al. chapter 5)
- t-distribution, standard errors, confidence intervals, sampling proportions
- Hypothesis testing, type I and type II errors

→ *Assignment 3 due Nov 15, 2024*

Week 11: *Statistical inference for categorical data* (Diez et al. chapter 6.1, 6.3, 6.4)
- Cross-tabs
- Chi-square tests

Week 12: *Statistical inference for numerical data* (Diez et al. chapter 7.1, 7.3)
- Single mean
- Differences in means, t-tests

→ *Assignment 4 due Dec 6, 2024*

Week 13: *(Optional) Introducing linear regressions* (optional Diez et al. chapter 8)
- OLS estimation, interpretation of coefficients, R-squared
- Model specification, comparing models

Week 14: *Review*

Completion week: ***Final exam***

→ The lecturer reserves the right to adjust the topics and timeline, ensuring the appropriate level and pace of the course.
→ Classes missed due to federal holidays will not be rescheduled.