IPS 206: Applied Statistics for Policy
Winter 2016
Wednesday, Friday 12:30-2:20pm, 320-106; section Monday, 4:30-5:30pm, Encina West 202

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IPS 206 provides an introduction to the use of statistical models and their application in quantitative policy analysis, with an emphasis on regression analysis, with the goal of enabling students to become intelligent and capable consumers and producers of regression analyses.

Evaluation
The course assessment will be based on four or five problem sets (30%), an in-class mid-term (15%), a mid-term replication assignment (15%), and a cumulative take-home final exam (40%).

Problem Sets During the quarter, students will be asked to complete four or five homework assignments. You are encouraged to work in groups to complete the assignments, though each student must write their own code and write up the assignment themselves.

As detailed in the computing section below, all coding assignments are to be completed in the R programming language and I strongly recommend writing up all assignments in \LaTeX. Later homeworks may make this recommendation a requirement.

Midterm There will be a midterm exam to assess students’ understanding of probability theory. This will be closed book and taken during regular class time. Practice exams will be made available on Coursework.

Replication Around the time of the midterm, students will be given an assignment asking them to summarize, critique, and replicate a piece of data analysis in one of a selection of published articles to be distributed a week or two prior to the due date.

Final Exam There will be a cumulative take-home, open-book and open-notes final exam, with an emphasis on applying theory to practical policy problems. No group work will be allowed on this exam. It will be due Thursday, December 10th.
Computing

This course will utilize R, a powerful and increasingly popular platform for data science. R is becoming a default language for data science work in industry, policy, and methodologically sophisticated academic analysis. See https://www.datacamp.com/ or the “R Cookbook” for extra resources.

Section

Section will provide another forum for discussing questions, presenting examples, and delivering course content. Sections will include applications of course material in R, and students are therefore encouraged to bring their laptops to section.

Readings

The following books are available for purchase or rent in the campus bookstore, though it may be more cost-effective to find them through an online retailer like Amazon.


Students with documented disabilities  Students who may need an academic accommodation based on the impact of a disability must initiate the request with the Student Disability Resource Center (SDRC) located within the Office of Accessible Education (OAE). SDRC staff will evaluate the request with required documentation, recommend reasonable accommodations, and prepare an Accommodation Letter for faculty dated in the current quarter in which the request is being made. Students should contact the SDRC as soon as possible since timely notice is needed to coordinate accommodations. The OAE is located at 563 Salvatierra Walk (phone: 723-1066, 723-1067 TTY).

Class Schedule

January 6: Introduction and review of simple linear regression
   - Fox: Ch. 1-5

January 8: Multivariate linear regression and inference
   - Fox: Ch. 6

January 13: Indicator variables and interactive hypotheses
   - Fox: Ch. 7

January 15: Linear algebra
   - Fox: Appendix B

January 20: Vector spaces
   - Fox: Appendix B

January 22: Statistical properties of linear models
   - Fox: Ch. 9
January 27: Linear algebra and regression
  - Fox: Ch. 10

January 29: Solving common problems with OLS
  - Selections to be uploaded to Coursework

February 3: Review/catching up

February 5: Midterm, replication assignment due

February 10: Influential data points
  - Fox: Ch. 11

February 12: Nonlinearity, Weighted Least Squares
  - Fox: Ch. 12

February 17: Collinearity and PCA
  - Fox: Ch. 13

February 19: Time-Series cross-sectional data
  - Jackman notes

February 24: Dichotomous dependent variables
  - Fox: Ch. 14

February 26: Logistic regression
  - Long notes

March 2: Generalized Linear Models
  - Fox: Ch. 15

March 4: Time-series models
  - Fox: Ch. 16

March 9: Review, final exam assigned

March 17: Final exam due