Experimental Research

Professor: Yamil R. Velez

Contact: yrv2004@columbia.edu

Class Time: Tuesdays and Thursdays (8:40am - 9:55am)

Class Location: TBD

Office Hours: Mondays, 3-4pm (appointment only – via Zoom)

Teaching Assistants:
Zara Riaz
Giulia Leila Travaglini

Course Overview: This course provides an introduction to experimental design in political science.[1] The main purpose of this course is to promote the understanding of statistical concepts and how they can be used to explain aspects of our political environment. These concepts will be illustrated through a semester-long collaborative research project where you will assist in the design, fielding, and analysis of an experiment as a class. If the research project is successful (in the eyes of reviewers), you will all be co-authors.

Course Structure and Expectations: This course will involve a mixture of applied lab exercises, discussion, and lecture. Lectures will introduce students to helpful concepts as they design and analyze a political science experiment. Students are expected to attend class, participate in discussions, complete assignments, and contribute to a group research project.

Course Objectives: By the end of the course, students should be able to:

- Interpret results from statistical models
- Describe uncertainty in quantifiable political outcomes
- Critically evaluate research designs
- Design and analyze social science experiments
- Summarize research findings and improve their capacity for scientific writing

Course Outline:

- **9/5** Introduction
- **9/7** Why Experiments?
  - Readings
    Sasha Issenberg. "Nudge the Vote." *New York Times Magazine.* October 29, 2010.
    Joshua Angrist and Jorn-Steffen Pischke. *Mastering 'Metrics: The Path from Cause to Effect* p. 1-12
  - Assignment
    Generate a potential outcomes table, randomly assign units to treatment and control, and calculate average treatment effect.

[1] This course is modeled after Brendan Nyhan's Experiments in Politics class.

    - Assignment Due Date
      9/11 (Midnight)

- **9/12** Thinking Causally
    - Readings
      Michael Sobel. 2000. "Causal Inference in the Social Sciences." Introduction to the Potential Outcomes Framework
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 1)

- **9/14** Alternative Frameworks
    - Readings
      Judea Pearl and Dana Mackenzie. 2018. "The Book of Why." (Chapter 1)
    - Assignment Description
      Identify a social process for which you have a causal hypothesis. Draw a directed acyclic graph (DAG) representing the hypothesized causal path and other relevant paths
    - Assignment Due Date
      9/18 (Midnight)

- **9/19** Estimation
    - Readings
      Andrew Gelman and Jennifer Hill. 2007. "Data Analysis Using Regression and Multilevel/Hierarchical Models." Excerpts from Chapter 9.
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 2, pgs. 1-13)
      "Estimating Program Effects on Program Participants."

- **9/21** Covariates and Sampling Distributions
    - Readings
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 2, pgs. 13-23)
    - Assignment
      Complete "Your First Experiment" Exercise
    - Assignment Due Date
      9/25 (Midnight)

- **9/26** Analyzing your First Experiment
    - Readings
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 3)

- **9/28** Statistical Programming
    - Readings
      Free Introduction to R
    - Assignment
      Load and analyze data in R
    - Assignment Due Date
      10/2 (Midnight)

- **10/3** Design Considerations
    - Readings
      Declare Design (Chapter 17)
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 4)

    * Assignment
      Complete IRB training
      Post IRB training certificate to Courseworks
    * Assignment Due Date
      10/13 (Midnight)
- **10/5** Substantive Readings (TBD)
    * Readings
      Jeffrey Knopf. "Doing a Literature Review."
    * Assignment
      Complete a brief 3-5 page literature review and write a two paragraph summary of your proposed intervention.
    * Assignment Due Date
      10/13 (Midnight)
- **10/10** Refining Interventions
    * Readings
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 6)
    * Assignment
      Develop intervention for class project
        1. Describe intervention
        2. Justify your intervention
        3. State hypotheses
    * Assignment Due Date
      10/16 (Midnight)
- **10/12** Refining Interventions
    * Lightning Talks
      Present your intervention and expectations
    * Discussion
      How could interventions be improved?
- **10/17** Measurement
    * Readings
      Sean Gailmard. 2013. "Statistical Modeling and Inference for Social Science." Excerpts from Chapter 2
      Don Dillman. 2009. "Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method." Excerpts from Chapter 4.
      5 Survey Writing Mistakes
- **10/19** Measurement (Continued)
- **10/24** Research Ethics
    * Ethical Questions and Considerations
      Donald Green. "Social Science Experiments: A Hands-On Introduction." (Chapter 5)
- **10/26** Research Ethics (Continued)
- **10/31** Data Visualization and Analysis
    * Small Groups
      In-class assignment
      Commented R code of descriptive statistics, statistical results, and graphs
- **11/2** Data Visualization and Analysis

- **11/9** Analyzing Pilot Data
  - Small Groups
    In-class assignment
    Commented R code of descriptive statistics, statistical results, and graphs
- **11/14** Data Analysis
  - In-class assignment
    Pre-analysis plan
- **11/16** Data Analysis
  - Assignment
    Write first draft of flash report.
  - Assignment Date
    11/20 at midnight
- **11/21** Research criticism workshop
  - In-class assignment
- **11/28** Peer review
  - In-class
    Write at least three specific and constructive questions for the author that could help them think about how best to revise the report.
    Submit to Courseworks
- **11/30** Revise flash report
  - Assignment Date
    Due 12/4 at midnight
- **12/5** Extensions
- **12/7** Course wrap-up

- **Flex Topics**

  Heterogeneous Treatment Effects

  Do treatments differ across sub-groups?

  Weighting

  Can we improve the generalizability of our findings?

  Text Analysis

  How can we analyze open-ended responses in surveys?

  GIS

  Do treatment effects vary by geography?

Grade Breakdown:

1. Weekly assignments (15%): Throughout the semester, students will be asked to contribute to the design of an experiment by summarizing, critiquing, and extending other experiments. Your contributions will be evaluated based on creativity, insight, and attention to detail. You will also be asked to complete assignments related to the readings. Each weekly assignment will receive the same weight.

2. Non-human subjects experiment (15%): You will be running your own non-human subjects experiment. The purpose of this assignment will be to walk through all of the necessary steps involved in conducting and analyzing an experiment. This experiment will not involve recruiting any people, given that this would require approval from the Columbia University institutional review board.

3. Proposed intervention (15%): Each of you will develop an intervention. You will write a 1000-1500 word paper summarizing the literature and proposing a novel experiment that addresses an important issue. This assignment will involve the following:

   A. You will be asked to provide a short but precise summary of the most important (i.e. new/prestigious or influential/highly cited) articles related to your intervention. You can't possibly cover all of the research, so you should make sure to focus on the key aspects of the most important and novel studies (research questions, methodologies, findings, etc.). The idea is to give us an overview of the most relevant work (i.e., the foundational research and the most recent/relevant studies) and to build from there.

   B. Justify why your intervention is consistent with this research and why you expect it to "work."

   C. Provide a version of the intervention that can be implemented on a single page in survey software (e.g., in text, audio, or visual format).

4. Flash report (25%): You will be asked to write a short 2-3 page paper discussing what you learned from the class-wide experiment.

   Original report (5%)

   Revised report (20%)

5. Revision memo (15%): You will be asked to provide feedback on other students' proposals and critique your own work. You will also be expected to respond to critiques and incorporate feedback.

   Memo to peers (7.5%)

   Response to reviewer memo (7.5%)

6. Participation (15%): Participation will be determined by your engagement in class and outside of it. Please come prepared to every class session by completing the assigned readings, and contribute to class discussions. Below, I provide a set of examples of how grades correspond to participation levels:

   94-100 - Attends every lecture and section; regularly participates in class discussions; prepared to answer questions about the material.

   90-93 - Attends every lecture and section; participates in class discussions every few classes; prepared to answer questions about the material.

   80-89 - Attends almost every lecture and section; participates in class discussions every few classes; prepared to answer questions about the material.

   70-79 - Attends almost every lecture and section; participates in class discussions once or twice in the entire semester; not always prepared to answer questions about the material.

   70 and below - Rarely attends class; never participates in class discussions; never prepared.

Numeric grade to letter grade conversion: 94-99.99 (A); 90-93.99 (A-); 87-89.99 (B+); 84-86.99 (B); 80-83.99 (B-); 77-79.99 (C+); 74-76.99 (C); 70-73.99 (C-); 67-69.99 (D+); 64-66 (D); 60-63.99 (D-); 60 or below (F)

Readings: All of the readings will be posted on CourseWorks or through clickable links on this syllabus, unless otherwise noted.

Extra Help: Students are expected to hand in their own work.

Late Work: Late assignments will lose 2/3 of a letter grade (e.g., a B+ becomes B-) for each day they are late. An assignment is considered one day late if it is submitted more than 10 minutes after the stated deadline. The assignment becomes two days late 24 hours after the deadline, 3 days late after 48 hours, 4 days late after 72 hours, and 5 days late after 96 hours. Assignments over five days late will not be accepted for credit.

Contacting the Instructor: Please contact the teaching assistants (TAs) before contacting me with questions and concerns about the course content and assignments. In general, if you have a clarification question you can reach them over e-mail. Questions about more advanced assignments are best dealt with in TA office hours and disucssion sections. In the event that the TAs encounter an issue that only I can address, we can schedule an appointment to meet during office hours. I cannot guarantee that if you e-mail the TAs shortly before an assignment is due that they will be able to answer your questions, so please e-mail them early if you have a time-specific question.

Contested Grades: If you wish to contest a grade you must submit a written explanation to the TAs of why you believe the grade is inaccurate within two weeks of getting the assignment back. You must wait 24 hours from the time the assignment is returned before you submit the written explanation. We will not discuss grades until 24 hours after the assignment is passed back. If you ask for a reevaluation of your grade then I reserve the right to either raise or lower your grade based on my reevaluation. This policy is meant to address disagreements with our assessment of your work. It does not pertain to calculation errors. If you believe I have made a mistake adding up points, converting your points to a percentage, etc. you can let me know immediately, and I will be happy to correct any mistakes. Grades will not be reconsidered after they have been submitted to the registrar.

Accommodations for Students with Disabilities: In order to receive disability-related academic accommodations for this course, students must first be registered with their school Disability Services (DS) office. Detailed information is available online for both the Columbia and Barnard registration processes. Refer to the appropriate website for information regarding deadlines, disability documentation requirements, and drop-in hours (Columbia)/intake session (Barnard).

For this course, students are not required to have testing forms or accommodation letters signed by faculty.

The Instructor section of the form has already been completed and does not need to be signed by the professor. The student must complete the Student section of the form and submit the form to Disability Services. Master forms are available in the Disability Services office or online:
https://health.columbia.edu/services/testing-accommodations

Technology in the Classroom: You may use laptops or tablets in class for note taking purposes only. Refrain from using these devices for checking on social media, instant messenger, e-mail checking, or anything else that may distract you, your fellow students, or me. It is obvious when someone is using their laptop for non-class related activities, and I reserve the right to discontinue the use of laptops (unless you contact me about an exception) if they become a distraction. Texting is not permitted during class.

Academic Integrity: Columbia's intellectual community relies on academic integrity and responsibility as the cornerstone of its work. Undergraduate students are expected to exhibit the highest level of personal and academic honesty as they engage in scholarly discourse and research. In practical terms, you must be responsible for the full and accurate attribution of the ideas of others in all of your research papers and projects; you must be honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet source. Undergraduate students are responsible for knowing and correctly utilizing

referencing and bibliographical guidelines. When in doubt, consult your professor. Citation and plagiarism-prevention resources can be found at the GSAS page on Academic Integrity and Responsible Conduct of Research.

Failure to observe these rules of conduct will have serious academic consequences, up to and including dismissal from the university. If a faculty member suspects a breach of academic honesty, appropriate investigative and disciplinary action will be taken following Dean's Discipline procedures.

Syllabus: Note that this syllabus is a rough guide and subject to change.