

Syllabus for PADM 596
Independent Study: Causal Inference and Multivariate Analysis
Spring 2023

Professor: Dr. Daniel J. Mallinson

Office: W-160K
Office Hours: By appointment
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Course Description: This course is an independent study co-designed by the student and instructor. The student will gain an understanding of the principles of causal inference and develop a toolbox of multivariate statistical analysis methods. The study will also prepare the student to develop her dissertation research. She will integrate what she is learning about methodology with her research interests to produce a research design. The instructor will mentor and meet with the student on a weekly basis to discuss the material and development of the final project.

Learning Objectives:

- Quantitative Reasoning
 - The student will understand causal inference and how statistical methods vary in their causal claims
- Quantitative Analysis
 - The student will identify the appropriate statistical test for research hypotheses
 - The student will implement and interpret these tests correctly
- Information Literacy and Research Skills
 - The student will develop a research project that builds on existing scholarly literature
- Program Competence
 - The student will gain research skills necessary for completing their course of study

Methods for Learning and Teaching: This independent study will require substantial self-paced work on the part of the student. We will meet once a week to discuss how the study is progressing and to tackle any questions about the material.

Reaching Our Goals

E-mail Policy: I will work to respond to e-mails within 24 hours during the week and 48 hours on the weekend.

Readings

The following book is required for the course:

Huntington-Klein, Nick. (2022). *The Effect: An Introduction to Research Design and Causality*. CRC Press. <https://theeffectbook.net>

Assessing Progress Towards Our Goals

The following assessments will be used to track your progress towards meeting our course goals: practical example assignments and final research design. Each component represents the following percentage of your final grade:

Practical Example Assignments	40%
Brief Research Proposal	15%
Design Rough Draft	15%
Final Design Paper	30%

We will use the following grade scale:

Letter	Percent
A	94 to 100
A-	90 to 93
B+	87 to 89
B	84 to 86
B-	80 to 83
C+	77 to 79
C	70 to 76
D	60 to 69
F	Below 60

Practical Example Assignments: Starting in Chapter 4 of *The Effect* the author provides example R code for methods discussed in the text. For each chapter you will be expected to work through that code on your own in R and to produce a brief memo showing and interpreting the results of those analyses.

Research Design: The final product of this independent study is a robust and executable research design for one of the chapters of your dissertation. You will use the methods learned in this course in your design. You will need to develop the research question, review appropriate literature, present your theory and hypotheses, discuss the data that you will use, and discuss the statistical approach you will use. You are not expected to actually collect and analyze the data, but this course will prepare you to do so as you work on your dissertation. The design should have the following structure:

1. Introduction
2. Literature review and theory
3. Data
4. Methods
5. Brief conclusion

Academic Integrity Academic dishonesty is not limited to simply cheating on an exam or assignment. The following is quoted directly from the *PSU Faculty Senate Policies for Students* regarding academic integrity and academic dishonesty: “Academic integrity is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.”

All University and Penn State Harrisburg policies regarding academic integrity/academic dishonesty apply to this course and the students enrolled in this course. Refer to the following URL for further details on the academic integrity policy of Penn State Harrisburg: <https://harrisburg.psu.edu/academics/academic-guidelines-and-policies>. Each student in this course is expected to work entirely on her/his own while taking any exam, to complete assignments on her/his own effort without the assistance of others unless directed otherwise by the instructor, and to abide by University and Penn State Harrisburg policies about academic integrity and academic dishonesty. Academic dishonesty can result in an assignment of “F” or “XF” as the final grade for the student.

Disability Access

Penn State welcomes students with disabilities into the University’s educational programs. Penn State values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create environments that are usable, equitable, inclusive,

and welcoming. Every Penn State campus has a Student Disability Resources office. Student Disability Resources at Penn State Harrisburg is located in the Student Enrichment Center Room 205. Student Disability Resources can be contacted via email at hbgdr@psu.edu or phone 717-948-6025.

To receive consideration for accommodations, please contact Student Disability Resources (SDR), participate in an intake interview, provide documentation of your disability, and complete an online Introductory Questionnaire. Please know that you are not required to already have documentation to begin the process with SDR, as SDR can assist with the process of requesting accommodations. Additional information is available on the (<https://harrisburg.psu.edu/student-disability-resources>). If the documentation supports requests for reasonable accommodations, SDR will provide you with an accommodations letter, which you can then give to your professors. Please know that requests for accommodations and support must be initiated by the student and communication with professors regarding the approved accommodations must be initiated by the student. You will receive accommodations after you give your accommodations letter to your professors. It is recommended that you share your accommodations letters with your professors as early in the semester as possible. Professors do not provide accommodations retroactively.

Counseling Services

Success in college depends heavily on your personal health and wellbeing. Please recognize that some stress and anxiety is a normal part of life and the college experience, and it can be compounded by unexpected setbacks or life changes outside the classroom. Penn State Harrisburg has a number of support options listed in this syllabus.

If you are experiencing issues that feel unmanageable, you reach the point that you have difficulty concentrating and/or feeling motivated, or have anxiety or feelings of depression that interfere with your ability to take care of yourself or your daily responsibilities, please consider talking with someone in CAPS (Counseling and Psychological Services). We have a range of services to help you navigate issues that are impacting your ability to be healthy, well, and productive at college.

You can learn more about the confidential mental health services available on campus by visiting the [Counseling and Psychological Services website](#) or by calling (717) 948-6025 Monday through Friday 8am to 5pm. CAPS is located on the 2nd floor of the Student Enrichment Center, Suite 205. You can access crisis services 24/7/365 by calling 1-877-229-6400 or by texting “LIONS” to 741741. Find us on Instagram or on [Facebook](#).

Educational Equity

Penn State takes great pride to foster a diverse and inclusive environment for students,

faculty, and staff. Acts of intolerance, discrimination, harassment, and/or incivility due to age, ancestry, color, disability, gender, national origin, race, religious belief, sexual orientation, or veteran status are not tolerated and can be reported through Educational Equity at the Report Bias site: <https://equity.psu.edu/reportbias>. Penn State's Code of Conduct can be found at the following link: <https://studentaffairs.psu.edu/support-safety-conduct/student-conduct/code-conduct>.

Direct all inquiries regarding the nondiscrimination policy to The Office of Diversity, Equity, and Inclusion at Penn State Harrisburg at 717-948-6016, and to Student Diversity, Equity, and Inclusion at 717-948-4381 or in person in Olmsted E125.

Mandated Reporting

Penn State is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, or physical or mental disability, gender, perceived gender, gender identity, gender expression, genetic information or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University's educational mission, and will not be tolerated. Gender-based and sexual harassment, including sexual violence, are forms of gender discrimination in that they deny or limit an individual's ability to participate in or benefit from University programs or activities. For reporting resources, and support, please visit titleix.psu.edu.

Penn State strongly encourages all members of the campus community to take appropriate action by providing support and encouraging those impacted by such incidents to submit a report to the Equity & Compliance Specialist/Sexual Misconduct Resource Person, Nicholas Paesano (information below). You may also submit a report online by using the Incident Report Form found here: Office of Sexual Misconduct Prevention & Response Incident Report Form. If the University Title IX staff receives information about an incident, they will reach out to offer information about resources, rights, and procedural options available to you.

At Penn State Harrisburg, your point of contact is:

Nicholas Paesano Sexual Misconduct Resource Person Penn State Harrisburg E-126 Olmsted Building 717-948-4385

Penn State's Title IX Coordinator is: Suzanne Adair, Interim Title IX Coordinator 222 Boucke Building University Park, PA 16802 814-867-0099 titleix@psu.edu

Other resources that are available include:

- Penn State Harrisburg Counseling and Psychological Services, SEC 205 - 717-948-6025
- Department of Safety & Police
 - Campus Police: 717-979-7976
 - Local Police: 717-543-2200 or 911
- YWCA Confidential Domestic Violence & Sexual Assault Services: 1-800-654-1221 (available 24/7)
- Contact Helpline: 800-932-4616 (24-hour community crisis hotline)
- Pinnacle Health Harrisburg: 717-782-3131
- Penn State Harrisburg Student Health Services, 220 Capital Union Building: 717-948-61015
- Penn State Hotline: 800-560-1637 (Anonymous reporting)

In Case of Emergency In the event of a University-wide emergency, course requirements, classes, deadlines, and grading schemes are subject to changes that may include alternative delivery methods, alternative methods of interaction with the instructor, class materials, and/or classmates, and a revised semester calendar and/or grading scheme.

For more general information about the emergency situation, please refer to:

- Penn State Harrisburg's home page at <http://harrisburg.psu.edu/>
- PSUAlert (<http://psualert.psu.edu/psualert/>). This is a service designed to alert the Penn State community via text messages to cell phones when situations arise on campus that affect the ability of the campus - students, faculty and staff - to function normally. Everyone is encouraged to sign up to receive the text alerts.
- Messages will be placed at the 717-948-6000 campus phone number

In the case of a University-wide emergency, please refer to the following about changes in this course:

- Canvas: <https://psu.instructure.com/courses/2116052>
- Instructor's email: mallinson@psu.edu

Basic Needs Statement

Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Office of Student Affairs (syw10@psu.edu, 717-948-6180) for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable him to provide any resources that he may possess.

Writing Tutoring and Other Academic Support

The Russell E. Horn Sr. Learning Center may have a tutor who can assist you with this course. An appointment is recommended. Appointments are available in-person or on Zoom, depending on your preference.

To make an appointment:

Visit: Student Enrichment Center Room 201 Or go to: starfish.psu.edu and click on “My Success Network” Or call: 717-948-6475 Or email: PSHLearningCtr@psu.edu

The Learning Center can help you in a variety of ways:

Academic Success Coaches Get help with time management, organization, test-taking, study skills, as well as speech and presentation preparation and delivery.

Subject Area Tutoring Courses including accounting, biological and behavioral science, computer science, economics, finance, mathematics, physical sciences, statistics, engineering, and some world languages are supported by peer and professional tutoring.

Writing Get help with the development of essays, papers, resumes, cover letters, scholarship applications and much more. We can help at any stage from brainstorming ideas to citing sources to polishing your final product.

The Lambert Undergraduate Advising Center can assist you with exploring majors and minors, understanding academic policies, and planning courses for future semesters.

Drop-in Quick Question Advising is available during the semester both in-person and online (no appointment necessary!). See dates, times, and locations at: bit.ly/whatsnextbgs

To contact the Advising Center:

Visit: Student Enrichment Center Room 204 Or call: 717-948-6604 Or email: HBGAdvisingCenter@psu.edu

Course Schedule

Week 1: Research Design (1/8-14)

- [Huntington-Klein](#) Chapters 1-2

Week 2: Description (1/15-21)

- [Huntington-Klein](#) Chapters 3-4

Week 3: Identification (1/22-28)

- [Huntington-Klein](#) Chapter 5
- **Brief Research Proposal Due**

Week 4: Causal Diagrams (1/20-2/4)

- [Huntington-Klein](#) Chapters 6-8

Week 5: The Rest of Causality (2/5-2/11)

- [Huntington-Klein](#) Chapters 9-11

Week 6: Regression and Matching (2/12-18)

- [Huntington-Klein](#) Chapters 12-14

Week 7: Simulation and Fixed Effects (2/19-25)

- [Huntington-Klein](#) Chapters 15-16

Week 8: Event Studies (2/26-3/3)

- [Huntington-Klein](#) Chapter 17

Week 9: Spring Break (3/5-11)

- No class

Week 10: Difference-in-Differences (3/12-18)

- [Huntington-Klein](#) Chapter 18

Week 11: Instrumental Variables (3/19-25)

- [Huntington-Klein](#) Chapter 19

Week 12: Regression Discontinuity (3/26-4/1)

- [Huntington-Klein](#) Chapter 20

Week 13: The Rest (4/2-8)

- [Huntington-Klein](#) Chapters 21-22

Week 14: Design Rough Draft (4/9-15)

- Design Rough Draft Due

Week 15: GLMs (4/16-22)

- [Jenkins-Smith et al.](#) Chapter 16.

Week 16: Writing Week (4/23-29)

- Check in meeting

Week 18: Finals Week

- **Final Research Design Due Thursday May 4 by 5:00 pm**