LINEAR STATISTICAL MODELS
& ASSOCIATED TECHNIQUES (PADP 8130)

Course Instructor: **Course Information:**

Dr. George A. Krause   **Time: Wednesday: 4:10pm-6:55pm**
280G Baldwin Hall (Office)   **Where: 302 Baldwin Hall**
gkrause@uga.edu (E-mail)   **Office Hours: Wednesday: 1:30pm-3:30pm**
                                                          by Appointment

NOTE: The best way to contact me is via e-mail (gkrause@uga.edu) directly from your own UGA student e-mail account (and NOT via the e-mail function within eLC since I am unable to send a reply message to you from my Outlook e-mail account). In addition, I am very willing to have Zoom appointments (both scheduled office hours and non-scheduled office hours by mutual instructor consent) with students who seek 'dialogue-based' assistance. Students can normally expect me to respond to e-mails within 24 hours. If I do not respond within the time frame, please do send me a polite e-mail reminder.

COURSE DESCRIPTION

This course provides an introduction to linear regression analysis and associated statistical techniques for Ph.D. students in the Department of Public Administration and Policy. Specifically, this course provides an intensive introduction to elementary linear regression analysis (OLS estimation), followed by nonparametric regression alternatives to overcome the limitations of linear regression analysis, and concludes with an introduction to modern statistical methods commonly employed to address issues of causal identification with observational data. The aim is to enhance each student's quantitative data analysis toolkit with the methods covered in this course as they develop original research projects during their time in the Ph.D. program, and beyond.

The prerequisites for this course are PADP 8120: *Data Analysis and Statistical Inference* (**Each student is expected to have a working knowledge of this material upon entering this course**). Although the course focuses on data applications using Stata statistical software, it will be preceded by the theoretical basis of the statistical models and methods covered in this course. To make learning the material easier, students should have read and feel comfortable with the assigned readings ahead of its coverage in a given class session. When applicable, students should read any assigned journal article materials that contain applications of any statistical methods covered in the course, with special attention to the statistical methodology and its application to the substantive problem at hand.

The course will involve performing applied data analysis using **Stata (version 17)** statistical software during the semester. I strongly encourage students to purchase a copy of Stata for their own purposes (i.e., computer). Stata can also be used via the UGA virtual lab (http://vlab.uga.edu). Although I will often point students to the necessary Stata program commands to execute problem set assignments & their own research projects, students are ultimately responsible for becoming proficient in using Stata by learning it on their own outside of class. Stata is very easy to use from a programming-syntax orientation and has a terrific set of online tutorials, help menus, manuals, and user-created (*.ado*) program files that should be able to assist you in most instances. However, I will be glad to assist students with computer–related questions outside of class sessions. These times can include office hours, a scheduled appointment, or by sending an e–mail message. Please feel free to contact me in such instances.

The following course text materials are required for each student taking this course:

REQUIRED TEXTBOOKS

Jeffrey M. Wooldridge. 2019. *Introductory Econometrics: A Modern Approach*. Seventh Edition. Boston, MA: Cengage Learning.

Christopher F. Baum. 2006. *An Introduction to Modern Econometrics Using Stata*. College Station, TX: Stata Press.

Michael N. Mitchell. 2021. *Interpreting and Visualizing Regression Models Using Stata*. College Station, TX: Stata Press.

Scott Ashworth, Christopher R. Berry, and Ethan Bueno De Mesquita. 2021 *Theory and Credibility: Integrating Theoretical and Empirical Social Science*. Princeton, NJ: Princeton University Press (Paperback Version).

Additional supplementary readings are offered for topics covered in this course. These items can be obtained through electronic links provided by the instructor at the end of the course syllabus.

COURSE OBJECTIVES

1. *Understand the concepts underlying linear and related statistical models covered in this course and be able to competently execute these techniques, including diagnostic tests, substantive interpretation of relationships and effects, and sensitivity analyses. This includes both written and oral presentation of these models and the statistical results produced by them.*

2. *Advancing a promising original scholarly research project that is well-thought out, theoretically informed, and empirically crafted in an appropriate manner.*

3. *Provide effective, constructive feedback on a classmate's research that will facilitate the development of the next stage of their research project.*

The attainment of these course objectives will primarily occur through assigned readings, class session lectures, problem sets, research projects, and consultation with the instructor.

CLASS STRUCTURE

- **SESSION A: 4:10pm – 5:25pm (75 minutes): Approximate – May Vary**

- **BREAK: 5:25pm–5:40pm (10–15 minutes): Approximate – May Vary**

- **SESSION B: 5:40pm – 6:55pm (75 minutes): Approximate – May Vary**

CLASSROOM RESPECT & ATTENDANCE POLICIES

It is essential to maintain a healthy learning environment so that everyone can feel free to participate. All members of the class are expected to behave in both a respectful and civil manner towards one another. To ensure that we get through the material of the course, I encourage students to ask questions, but as instructor I reserve the right to meet up with students outside of class sessions who are in need of additional assistance beyond what can be offered during the allotted class time. **My scheduled office hours will be held on Wednesday afternoons from 1:30pm–3:30pm & by Scheduled Appointment**. When seeking my assistance during office hours, please either stop by my office or send me a Zoom meeting room link and Outlook invitation for a specific time to meet. If I decline the invitation, I will propose an alternative time in the event I have already scheduled a meeting with one of your classmates or someone in my other course this semester. I encourage each of you to reach out to me during scheduled office hours on a regular basis to discuss the course content that we are covering, as well as the development of your original scholarly research projects for this course.

Students seeking to miss a class for health, professional, or emergency reasons are required to obtain an excused absence by notifying the instructor sufficiently in advance and supplying *verifiable documentation* of the class absence in a timely manner. The instructor reserves the right to approve or deny excused absences based on the circumstances of each request. Students will be penalized by 3.33% (i.e., 0.033) of their final course total weighted points for each unexcused absence.

<u>STUDENTS WITH DISABILITIES</u>

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Disability Resource Center, Clark Howell Hall at UGA Athens campus (https://drc.uga.edu/) within the first two weeks of the term so that accommodations can be investigated on your behalf. Disability Resource Center will verify your disability and determine reasonable accommodations for this course.

<u>ACADEMIC HONESTY</u>

Cheating, plagiarism, and unauthorized assistance will not be tolerated. Students suspected of violating the University of Georgia's *Academic Honesty Policy:* https://honesty.uga.edu/Academic-Honesty-Policy/) will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score (F grade) for any given assignment, and possibly an F course grade, will be imposed.

Violations of this policy relating to unauthorized assistance includes, but is not limited to, the unauthorized use of artificial intelligence or word mixing software to execute any aspect of any assignment (e.g., compose your paper, perform data analysis, or disguise plagiarized work).

<u>MENTAL HEALTH AND WELLNESS REOUSRCES</u>

If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu/. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services. UGA has several resources for a student seeking mental health services (https://www.uhs.uga.edu/bewelluga/bewelluga) or crisis support (https://www.uhs.uga.edu/info/emergencies). If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (https://www.uhs.uga.edu/bewelluga/bewelluga) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center. Additional resources can be accessed through the UGA App. In addition, more resources are offered to student seeking assistance

- Counseling and Psychiatric Services (CAPS) is your go-to, on-campus resource for emotional, social and behavioral-health support: https://caps.uga.edu/

- TAO Online Support (https://caps.uga.edu/tao/), 24/7 support at 706-542-2273. For crisis support: https://healthcenter.uga.edu/emergencies/.

- The University Health Center also offers FREE workshops, classes, mentoring and health coaching led by licensed clinicians or health educators: https://healthcenter.uga.edu/bewelluga/.

PREFERRED NAME AND PRONOUNS

Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Class rosters are provided to the instructor with the student's legal name. I am eager to address you by your preferred name and/or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. As in the case of learning both first names and surnames for an entire class, I request your patience, as well as to kindly remind me if I accidently make a mistake in the use of preferred names and/or or gender pronouns when I am addressing you.

PROHIBITION ON BOTH VIDEO AND AUDIO RECORDING OF LECTURES

In the absence of written authorization from the UGA Disability Resource Center (https://drc.uga.edu/), students may not make a visual or audio recording of any aspect of this course. Students who have a recording accommodation agree in writing that they:

- Will use the records only for personal academic use during the specific course.

- Understand that faculty members have copyright interest in their class lectures and that they agree not to infringe on this right in any way.

- Understand that the faculty member and students in the class have privacy rights and agree not to violate those rights by using recordings for any reason other than their own personal study.

- Will not release, digitally upload, broadcast, transcribe, or otherwise share all or any part of the recordings. They also agree that they will not profit financially and will not allow others to benefit personally or financially from lecture recordings or other course materials.

- Will erase/delete all recordings at the end of the semester.

- Understand that violation of these terms may subject them to discipline under the Student Code of Conduct or subject them to liability under copyright laws.

CORONAVIRUS INFORMATION FOR CLASS AND STUDENTS

[Please note, terms/conditions below may change based upon guidance from GDPH and UGA]

Pursuant to state and University System of Georgia (USG) rules, we cannot ask our students or fellow employees for proof of their vaccination status, and we should not treat vaccinated and un-vaccinated individuals differently unless dictated by law or applicable guidance. Students should not be segregated in a classroom or from other instructor-student interactions (e.g., office hours, group work, field trips, labs, etc.) based on their vaccination status. However, students may be required by off campus partnering organizations to wear masks and/or be vaccinated as a condition of participation in experiential learning opportunities such as study abroad programs, externships and delivery of medical services.

Face coverings are recommended for all individuals, whether vaccinated or not, while inside campus facilities. Faculty may encourage, but not require, students to wear face coverings to help limit the spread of COVID-19 amongst fellow students, faculty, staff and the local community. Use of face coverings will help ensure students' own health and safety.

The UGA class attendance policy has not changed. Instructors still have the flexibility to adapt and enforce an attendance policy that best suits their classes. It is strongly encouraged that instructors clearly describe their attendance policy on their syllabus to make students aware of the classroom expectations as early as possible. UGA is a residential campus where classroom attendance always has been an important part of the educational experience.

UGA continues to follow Georgia Department of Public Health (GDPH) guidance on COVID. Self-isolation is the expectation for faculty, staff, and students who test positive for COVID-19, i.e.,

- · Isolate for 5 days.
- · If you have no symptoms or your symptoms are resolving after 5 days, you can leave isolation.
- · Continue to wear a mask around others for 5 additional days.

If you have been in close contact with someone who is COVID-positive, but you are not sick, GDPH and [CDC](#) urge you "…to monitor your health for symptoms of COVID-19 during the 10 days following the last time you were in close contact with a sick person with COVID-19."

While the [University Health Center](#) continues to stock COVID-19 vaccines, surveillance testing and Dawg Check have been suspended. Mask-wearing is not mandatory on campus (and we cannot require students to wear masks nor ask about vaccination status). We will continue to post signs in our building that read: "You are encouraged to wear a face covering based on your preference and assessment of personal risk." These signs, authorized by UGA, were first posted in early spring 2022.

REQUIRED ASSIGNMENTS

(1) Three Problem Sets: Stata Applications: 40% (UNIT 1: 20%; UNIT 2: 10%; UNIT 3: 10%)

Students will be graded on problem sets covering material from each of the three units of the course (*Principles of Linear Regression [1 assignment]*; *Nonparametric Methods [1 Assignment]*; *& Modern Identification Strategies [1 assignment]*). These problem sets will entail Stata software applications (graphical and/or statistical) and written analyses of statistical findings and results from the various techniques, models, and tests covered during class sessions. These problem set assignments are due at the time assigned by the instructor [this information will appear on each assignment problem set] – without obtaining formal consent from the instructor, late work will be penalized by 50% for each regular day that it is late. The first problem set covering **UNIT 1** will constitute 20% of the final course grade, while the remaining two assignments covering **UNITS 2** and **3** will each count 10% towards the final course grade. Submitted problems sets must consist of a written analysis of the work, plus Stata program output **.smcl* files (and Stata program **.do* files) embedded within the corresponding output file. **Although student interaction is encouraged on these problem set assignments, each student is required to perform their own work when completing assignments.**

(2) An Original Scholarly Research Paper: 40% (15% Draft Version; 25% Final Version)

Each student will be required to develop a suitable original scholarly empirical-oriented research paper of 30-40 pages in length (double-spaced, 12 point font) using quantitative data during the semester, subject to the instructor's approval. All formatting requirements should conform to current *American Journal of Political Science* guidelines (American Political Science Association's *Style Manual for Political Science* (revised August, 2006)). ***Students are fully responsible for choosing their own research projects and the resulting product that is the outcome of this process. Students are required to discuss their topic(s) with the instructor to assess suitability for this course, and is also subject to instructor approval.*** Students need not be limited to statistical material covered by the time of this deadline (nor the course syllabus) – as long as it is broadly related to the content covered by this course. This is an important element of the course since it encourages the practice of developing and executing their own research projects, with the possibility that it can be further developed into an eventual scholarly publication at some later date.

- o **Approval of Written Research Proposal**: **Must be Approved by the Instructor (and not merely submitted) by <u>no later</u> than Friday January 27, 2023 at 4:00pm**. *Failure to obtain instructor approval by this deadline results in 10% of one's final course grade being set equal to zero (0%).* Students are strongly encouraged to get their paper projects approved *<u>prior</u>* to this date. Student research papers can overlap with research papers being written for other seminars, as long as they are substantively distinct from one another (e.g., pose a different question, use different data to answer the question, employ different methods). This determination will be made by the instructor on a case-by-case basis after consulting with both the student and other affected instructor(s). The written research proposal should be 4-5 single-spaced pages and outline the research question that the paper seeks to answer, its significance/importance, theory and resulting hypotheses used to explain/answer the research question, and empirical strategy (i.e., research design, measurement & statistical models/procedures). ***This proposal is viewed as commitment on the part of the student pursuing this project during the course for their research paper project – so please be sure that all loose ends are completed (including data acquisition needed to complete the study) before seeking instructor approval***.

- o **Research Paper Completed Draft Version (15%): Due by no later than Monday April 17, 2023 at 12:00pm**. Electronic file copy submitted to the instructor (either MS-WORD [preferred option] or LaTex-generated PDF file). *Failure to obtain instructor approval by this deadline results in a 50% penalty per day of one's final course grade derived from this assignment (i.e., 0 points for 2 days late).*

- o **Research Paper Final Version (25%): Due by no later than Friday April 28, 2023 at 5:00pm (submit an electronic file format copy to both the instructor and your assigned classmate discussant)**. Copy submitted to the instructor. *Failure to obtain instructor approval by this deadline results in a 50% penalty per day of one's final course grade derived from this assignment (i.e., 0 points for being 2 days late).*

(3) Presentation of Final Version of Research Paper & Discussant on a Classmate's Research Paper: 20% (10% Per Each Assignment)

The final portion of each student's course grade will be determined by a presentation of their own research, as well as their ability to provide constructive feedback to a classmate's research paper. The instructor will be responsible for matching paper authors and discussants. **The paper presentations and**

discussant remarks will be shared in our final class session on Wednesday May 3, 2023. We will try to simulate a professional scholarly panel (e.g., PMRC, APSA) where a paper will be presented by its author (12 minute time limit range), followed by an audience Q&A discussion of the paper (7-8 minutes). This format will be replicated by the number of students taking this course who have completed a research paper.

The discussant is expected to produce constructive type-written feedback patterned after a quality manuscript review at an academic journal that is intended to improve the author's research project moving forward.

o **<u>Oral & Research Presentation Slides of Final Research Paper (10%)</u>: Due by no later than Wednesday May 3, 2023 at beginning of the class session (submit a copy of your presentation slides to the instructor)**. Copy submitted to the instructor. *Failure to obtain instructor approval by this deadline results in a 50% penalty per day of one's final course grade derived from this assignment (i.e., 0 points for being 2 days late).*

o **<u>Discussant of a Classmate's Final Research Paper (10%)</u>: Due by no later than Wednesday May 3, 2023 at the beginning of class session (submit a file copy to both your assigned classmate discussant and the instructor)**. Copy submitted to the instructor. *Failure to obtain instructor approval by this deadline results in a 50% penalty per day of one's final course grade derived from this assignment (i.e., 0 points for being 2 days late).*

Final Research Paper Presentation Symposium
(Tentative Date/Time: Wednesday May 3, 2023: 3:30pm–7:00pm)

GRADING SCALE

I will grade individual assignments on the following letter/point system, and each item will be weighted by the stated proportions for each assignment noted above:

ASSIGNMENT GRADE DISTIRBUTION

Letter Grade	Points	Letter Grade	Points
A+	4.25	B− −/C+	2.625
A+/A	4.125	B−/C+	2.50
A	4.00	B−/C++	2.375
A/A−	3.875	C+	2.25
A−	3.75	C+/C	2.125
A− −/B+	3.625	C	2.00
A−/B+	3.50	C/C−	1.875
B++	3.375	C−	1.75
B+	3.25	C− −/D+	1.625
B+/B	3.125	C−/D+	1.50
B	3.00	C−/D++	1.375
B/B−	2.875	D+	1.25
B−	2.75	D+/D	1.125
		D	1.00
		F	0.00

The "in-between" grades on individual assignments are intended to minimize rounding effects regarding performance on individual assignments.

Because the final grade distribution is based on a series of assignments (as opposed to a single item), the final course grade distribution based on your weighted course average from all assignments is given below as follows (*__with no rounding up__*):

FINAL WEIGHTED COURSE GRADE DISTIRBUTION

Letter Grade	Points	Letter Grade	Points
A+	4.00 – 4.25	C	2.25 – 2.49
A	3.75 – 3.99	C−	2.00 – 2.24
A−	3.50 – 3.74	D+	1.75 – 1.99
B+	3.25 – 3.49	D	1.50 – 1.74
B	3.00 – 3.24	D−	1.25 – 1.49
B−	2.75 – 2.99	F	0.00 – 1.24
C+	2.50 – 2.74		

COURSE OUTLINE & TIMETABLE

NOTE: *The tempo may vary throughout the semester, subject to the Instructor's discretion.*

Session	Date	Course Topics/Subject Material	Required Readings
		UNIT 1: PRINCIPLES OF LINEAR REGRESSION	
1	1/11/2023	**GENERAL LINEAR REGRESSION, I:** **(Assumptions & Solutions/Estimates)**	*Wooldridge (Chapters 1-2)* *Baum (Chapters 1-3)* *Mitchell (Chaps 1-2, Append A)*
2	1/18/2023	**GENERAL LINEAR REGRESSION, II:** **(Interpretation and Functional Form)**	*Wooldridge (Chapters 3-5, 7)* *Baum (Chapter 4, 7.1-7.2)* *Mitchell (Chs 3,5, 8-9, App.B&C)*
3	1/25/2023	**GENERAL LINEAR REGRESSION, III:** **(Diagnostics, I)**	*Wooldridge (Chapter 6)* *Baum (Chapter 5)*
4	2/1/2023	**GENERAL LINEAR REGRESSION, IV:** **(Diagnostics, II & Heteroskedastic Regression)**	*Wooldridge (Chapters 8-9, 12)* *Baum (Chapter 6)*
		UNIT 2: RELAXING LINEARITY: **NONPARAMETRIC METHODS**	
5 & 6	2/8/2023 & 2/15/2023	**NONPARAMETRIC METHODS:** **(Odd Cases, Functional Form, Local Linear Regression, Quantile Regression, & Kernel Regularized Least Squares)** *[PROBLEM SET # 1 DUE ON 2/8/2023: WEEKS 1 – 4]*	*Wooldridge (Chapters 13-14)* *Baum (Chapter 9.1 & 9.4)* *Assigned Readings*
7	2/22/2023	*RESEARCH PAPER WORKSHOP # 1*	
	3/8/2023	**UGA SPRING BREAK HOLIDAY (NO CLASS)**	
		UNIT 3: MODERN IDENTIFICATION STRATEGIES	*Ashworth, et al. (Read Sequentially During Course Unit)*
[6]* 8 & 9	[2/15/2023]* 3/1/2023 3/15/2023	**CAUSAL INFERENCE, I: Panel Designs** **(Pooling, Random Effects, Fixed Effects, Semi-Parametric Fixed Effects, Hybrid Effects, & Diagnostics)**	*Wooldridge (Chapters 13-14)* *Baum (Chapter 9.1 & 9.4)*
10	3/22/2023	**CAUSAL INFERENCE, II:** **Potential Outcomes Framework & Treatment Effects Models** *[PROBLEM SET # 2 DUE ON 3/22/2023: WEEKS 5 –9]*	*Wooldridge (Chapter 2.7)* *Baum (Chapter 8)* *Assigned Readings*
11	3/29/2023	**CAUSAL INFERENCE, III: "*Treatment*" Interventions, I** **Elementary Topics: Difference-in-Differences Models** **(Basics & Heterogeneous Treatment Effects)**	*Wooldridge (Chapter 13.2 –13.5)* *Assigned Readings*
12	4/5/2023	**CAUSAL INFERENCE, IV: "*Treatment*" Interventions, II** **Advanced Topics: Difference-in-Differences Models** **(Heterogenous & Dynamic Timing of Treatments)**	*Assigned Readings*
13	4/10/2023 – 4/11/2023	*NO SCHEDULED CLASS SESSION IN LIEU OF STUDENT-INSTRUCTOR INDIVIDUAL MEETINGS:* **[DRAFT RESEARCH PAPER DUE ON 4/17/2023]**	
14	4/19/2023	*RESEARCH PAPER WORKSHOP # 2* *[PROBLEM SET # 3 DUE ON 4/19/2023: WEEKS 10 – 12]*	
15	4/26/2023	*'SLACK' INSTRUCTIONAL WEEK IF NEEDED* *[OTHERWISE, ONE-ON-ONE MEETINGS]* **[FINAL *RESEARCH PAPER DUE: 4/28/2023 @ 5:00pm*]**	
	5/03/2023	**RESEARCH SYMPOSIUM [1st DAY OF FINAL EXAMS)** *[DISCUSSANT COMMENTS & RESEARCH PRESENTATIONS DUE ON 5/03/2023]*	

ASSIGNED READINGS (Not Covered in Assigned Textbooks)

UNIT 2

- *Local Linear Regression:*
  - o *https://blog.stata.com/2017/06/27/nonparametric-regression-like-parametric-regression-but-not/*
  - o *http://cameron.econ.ucdavis.edu/nhh2017/norway04_nonparametric.pdf*

- *Quantile Regression:*
  - o *https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.15.4.143*
  - o *http://fmwww.bc.edu/EC-C/S2013/823/EC823.S2013.nn04.slides.pdf*
  - o *Budgeting Policy Application: Breunig & Koski (2020, Policy Studies Journal):* https://onlinelibrary.wiley.com/doi/abs/10.1111/psj.12247

- *Kernel Regularized Least Squares:*
  - o *https://web.stanford.edu/~jhain/Paper/PA2014a.pdf*
  - o *https://www.jstatsoft.org/article/view/v079i03*
  - o *https://web.stanford.edu/~jhain/Paper/JSS2015_RR.pdf*
  - o *Stata Program Code: net describe krls, from (http://fmwww.bc.edu/RePEc/bocode/k).*

UNIT 3

- *Panel Models Covered in PADP 8130 (NOT Covered in Textbooks):*

  - o *Hybrid Effects Models (Joint Modeling Between/Within/Random Effects):*
    Bell and Jones (2015 Political Science Research and Methods):
    https://doi.org/10.1017/psrm.2014.7
    Bell, Fairbrother, and Jones (2019: Quality & Quantity):
    https://link.springer.com/article/10.1007/s11135-018-0802-x
    Schunck and Perales (2017 Stata Journal) Stata Journal Application & Program Code Execution: https://journals.sagepub.com/doi/pdf/10.1177/1536867X1701700106 & net sj 18-4 st0468_1.

  - o *Semi-Parametric Fixed Effects Estimation via Baltagi and Li (2002): Estimation of Nonlinear Covariate of Primary Interest using B−Splines (Nonparametric Estimate*

Based on Piecewise Linear Functions): Baltagi and Li (2002) article:
http://www.aeconf.com/Articles/May2002/aef030106.pdf.
Libois & Verardi (2013) Stata Journal Application and Program Code Execution:
https://journals.sagepub.com/doi/pdf/10.1177/1536867X1301300207 & net sj 13-2
st0296.

- *Differences-in-Differences Designs ("Treatment" Interventions, I):*

    o *The Most Basic Set-Up: http://www.princeton.edu/~otorres/DID101.pdf.*

    o *Stata 17 DiD Modeling Capabilities Slides from Pinzon/Stata Corp (August 2021):*
    https://www.stata.com/meeting/us21/slides/US21_Pinzon.pdf

    o *A Practical Guide from Bacon-Goodman (2019 Typescript): http://goodman-*
    bacon.com/pdfs/so_youve_been_told_dd_10_9_2019.pdf.

    o *A more sophisticated example that relaxes the parallel trend assumption using unit-*
    specific trends and matching on observables between treatment and non-treatment
    groups: https://www.cambridge.org/core/services/aop-cambridge-
    core/content/view/1A366C3B5FBD35A4CDAEC8EC453FA353/S1537592716000050a.
    pdf/deterring_wage_theft_altlabor_state_politics_and_the_policy_determinants_of_mini
    mum_wage_compliance.pdf

    o *Abadie's (2005) Semiparametric Differences-in-Differences Estimation when Parallel*
    Trends Assumption is Violated and Propensity Score Balancing on Observed Covariates:
    https://academic.oup.com/restud/article-
    abstract/72/1/1/1581053?redirectedFrom=fulltext.
    Kenneth Houngbedji (2016) Stata Journal Article & Program Code:
    https://journals.sagepub.com/doi/pdf/10.1177/1536867X1601600213 & net sj 16-2
    st0442.
    Application: Administrative Reforms Differential Effects on Organizational Designs:
    Evaluation of Budgetary Performance by Krause and Jin (2020: Governance):
    https://onlinelibrary.wiley.com/doi/abs/10.1111/gove.12435

- *Differences-in-Differences Designs ("Treatment" Interventions, II):*

    o *Decomposition of Treatment Effects Under Differential Treatment Timing:*
    Goodman-Bacon (2021 Journal of Econometrics article):
    https://doi.org/10.1016/j.jeconom.2021.03.014.

Goodman-Bacon (2019 Stata Conference Presentation Slides):
https://www.stata.com/meeting/chicago19/slides/chicago19_Goodman-Bacon.pdf.
Goodman-Bacon, et al. 2019 Stata Program Code: net describe bacondecomp, from
(http://fmwww.bc.edu/RePEc/bocode/b).

- o *Callaway & Sant'Anna Method for Modeling Heterogenous & Dynamic Treatments within a DiD Framework: Calloway & Sant'Anna 2021 Journal of Econometrics Article: https://doi.org/10.1016/j.jeconom.2020.12.001.*
  Rios-Avila, Callaway, and Sant'Anna 2021 Stata Conference Presentation Slides on "csdid" Program Code:
  https://www.stata.com/meeting/us21/slides/US21_SantAnna.pdf.
  Stata Program Code: net describe csdid, from (http://fmwww.bc.edu/RePEc/bocode/c)

FOLLOWING CONTENT FOR INFORMATIONAL PURPOSES
[NOT SUFFICIENT TIME TO COVER IN COURSE]

- *Regression Discontinuity Designs ("Threshold Interventions" – Supplementary Resource to the Material **NOT** Covered in Class):*
  - o *http://faculty.chicagobooth.edu/max.farrell/research/Calonico-Cattaneo-Farrell-Titiunik2017_Stata.pdf*
  - o *https://www.mdrc.org/sites/default/files/regression_discontinuity_full.pdf*
  - o *https://www.stata.com/meeting/chicago16/slides/chicago16_cerulli.pdf (TED)*
  - o *https://scholar.princeton.edu/sites/default/files/jmummolo/files/sqf_jop.pdf*
  - o *https://cattaneo.princeton.edu/papers/Cattaneo-Jansson-Ma_2018_Stata.pdf*
  - o *https://www.tandfonline.com/doi/abs/10.1080/01621459.2019.1635480*

- *Synthetic Control Designs (Supplementary Resource to the Material **NOT** Covered in Class):*
  - o *http://students.olin.wustl.edu/~sovichd/ECF/Synthetic_Control.pdf*
  - o *https://www.tandfonline.com/doi/full/10.1080/10967494.2015.1121178?scroll=top&needAccess=true*
  - o *https://www.urban.org/sites/default/files/publication/89246/the_synthetic_control_method_as_a_tool_0.pdf*