POLS 309: Polimetrics	**Spring 2022**
All sections (HECC 110)	Mon. & Wed. 3-3:50pm
Section 901 (LASB 170)	Friday 1:15-2:05pm
Section 902 (LASB 170)	Friday 2:25-3:15pm
Section 903 (LASB 172)	Friday 2:25-3:15pm
Section 904 (LASB 172)	Friday 3:35-4:25pm

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Purpose and objectives

Data analysis, numeric literacy, and programming are increasingly in-demand and necessary skills. They requires analytic thinking and a level of precision that make you both more marketable in the workplace and a more well-rounded human being. This course builds on POLS 209 (a prerequisite) to provide more sophisticated tools for working with, analyzing, and presenting data. Our main focus will be on data analysis, but we will also consider statistical programming and technical writing. Throughout, we will focus on **clearly** and **concisely** building arguments supported by data.

By the end of the semester you should be able to:

1. define and understand important statistical concepts and method;
2. use the R programming language to complete homework and a research project;
3. interpret and evaluate statistical output;
4. complete a well-written research paper that uses data to build an argument.

This is a challenging course on **math**, **programming**, and **writing**. Many of you will find one or more of those things difficult. You need to be prepared to devote significant time outside of class to mastering this material (I can't stress this enough). I caution anyone who is here just to fill a writing requirement — this will not be easy. It is very easy to fall behind in this class, please don't let it happen.

Special Course Designation

As mentioned, this course is a **writing intensive (W)** course. As such, you must pass the writing components to earn a grade in the course (i.e., you need to pass **both** written reports). To qualify as a writing class, a large part of your grade needs to be based on writing assignments (totally about 8 double spaced pages). We will meet this by having two 4-5 page reports that are part of your exam process. In order for these to count, you need to draft, receive feedback, and revise. This process is built into the reports, below.

Prerequisites

POLS 209 or an equivalent.

Text book

Buy or rent the following book:

- Bailey, Michael A. 2019. "Real Econometrics: The Right Tools to Answer Important Questions." 2nd Edition. Oxford University Press.

Additionally, find this book online (free):

- Diez, David, Mine Cetinkaya-Rundel, and Christopher Barr. 2019. "OpenIntro Statistics." 4th Edition. Available from: `https://www.openintro.org/book/os/`.

It may behoove you to find a simple book (or online resource) for R programming. Some will be provided on Canvas
Additional readings will be posted to canvas.

Software

We will make frequent use of the R programming language this semester. Reasons we like R:

1. it's the primary tool for applied statistics — it enjoys wide use in private, public, and academic settings;
2. it's free to download for any computer (Mac, Windows, or Linux) from `https://cloud.r-project.org/`;
3. it's more powerful and versatile than other statistics-specific software.

Friday sessions will include lessons on developing and applying R skills. This is an important part of the course and it will be very difficult to do well in the course if you do not attend lab (either in person or virtually).

Course Requirements

Evaluation is based on

- Homeworks (30%): Five equally weighted problem sets will be distributed throughout the semester. Answers to problem set questions will be typed and written in complete sentences. Handwritten problem sets will not be accepted. Answers that do not show and describe work (step-by-step math or R code and 1 or more sentences describing your process) will be marked as zero. The lowest scoring problem set will be dropped for each student. Students will be taught how to write their problem sets using the R markdown language during the lab sessions. **All problem sets must be submitted in pdf or word format using R markdown.**
- Written report/exams (35% each): You will be given two exams that unfold over the course of 4 weeks. These exams take the form a written report and are designed to give you practice at analyzing and presenting data to a client or other decision maker. Each report will be out of 100 points and is worth 35% of your final grade. Within each exam the points are distributed by week. By the end of the first week, you will complete and submit the baseline data analysis portion of your report (40 pts). This portion will be graded like a problem set with the caveat that you are expected to work alone on it. By the end of the second week, you will submit a rough draft (5-8 pages including tables

and figures) to both your TA and 1 classmate (5 pt). By the end of the third week, your TA and classmate will provide you with written feedback on your report (5 pt). By the end of the fourth week, you will submit a final draft (5-8 pages including tables and figures) that incorporates the feedback from your TA and classmate along with a short (1-2 page) memo describing how you incorporated the TA and classmate feedback (50 pts). Note that if you don't do the draft or provide feedback then you can't do this part and will be hard pressed to pass this portion of the class. A rubric for the reports will be uploaded to Canvas.

All components of the project should be written using a standard 12pt font (e.g., Calibri or Times New Roman) and 1 inch margins. Use the APSA style guide for all references and citation, link: `https://mk0apsaconnectbvy6p6.kinstacdn.com/wp-content/uploads/sites/43/2018/11/Style-Manual-for-Political-Science-2018.pdf`.

All assignments are due by 5pm on the assigned due date unless stated otherwise. For now we will have all assignments uploaded to Canvas. If this turns out to be a disaster we'll change to something else. In recognition of the times we live in, there will be generous flexibility on due dates on a case by case basis, but it is not almost never in your interest to miss deadlines for this class. Please do not abuse our flexibility.

Disability statement

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit `http://disability.tamu.edu`. Disabilities may include, but are not limited, to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Attendance and makeup work

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete

all assignments. Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor. Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines. Some particularly relevant points

- "Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the time frame for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).
- "The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).
- Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

It will be very difficult (nearly impossible) to do well if you don't actively attend, listen, and participate in all class sesions. Slides will be posted online, please study them frequently and carefully. Ask us all the questions you have as you have them and we will do our best to get you through a tough course.

Extra Credit

The only extra credit available this semester is Problem Set 0. If completed on time, I will add 2 points to your final grade.

Grading

All grading is done by the Teaching Assistant. If an arithmetical error is discovered, you should inform your TA. However, if you wish to challenge a grade on anything, the following steps must be taken:

1. Email me (the professor) within 1 week of assignment being returned;

2. For each disputed element, the student must explain in complete, detailed sentences why the grade should be adjusted;

3. If I deem that there is enough ground for the challenge, I will re-grade the entire thing. Your grade may go up, down, or remain unchanged.

Final grades will be based on the above course requirements. The grading scale is based on 15 point blocks as follows:

$85 \leq x$	A
$70 \leq x < 85$	B
$55 \leq x < 70$	C
$40 \leq x < 55$	D
$x < 40$	F

Academic Integrity

"An Aggie does not lie, cheat or steal, or tolerate those who do."

From the Student Rules: "Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities on the website `https://aggiehonor.tamu.edu/`. Please be familiar with the University's academic honesty policies. Violations will be handled with the utmost seriousness.

Writing Center

This is a writing-intensive course. As such, you are required to submit written work that correctly uses statistical tools **and** follows good writing practices. These rules apply to both homeworks and reports

If you want help or feedback with your writing (hint: you do) you are encouraged to reach out to the University Writing Center (UWC). UWC can help you with any part in writing process (e.g., brainstorming, drafting,

documenting, revising, proofreading, and more). I *highly recommended* you schedule a meeting with them at least once this semester. For more information visit `https://writingcenter.tamu.edu/`.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, you will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS). Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in proper self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at `suicidepreventionlifeline.org`.

COVID-19

To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students to be vaccinated and to wear masks in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.

Diversity Statement

The Department of Political Science supports the Texas A&M University's commitment to diversity, and welcomes individuals of any race, ethnicity, religious identity, age, gender, sexual orientation, class, disability, and nationality. (See `http://diversity.tamu.edu/`). In the spirit of this vital commitment, in this course each voice in the classroom has something of value to contribute to all discussions. Everyone is expected to respect the different experiences, beliefs and values expressed by fellow students and the instructor, and will engage in reasoned discussion that refrains from derogatory comments about other people, cultures, groups, or viewpoints.

Course Schedule

Individual topics and dates may shift depending on our progress and understanding.

19 January: Course Introduction and Syllabus Review
21 January: LAB

- Zuhlke "How to Write Like a Mathematician"
- R Markdown Cookbook Ch. 1-3
- Crisman-Cox "R Introduction." Chapter 1 (Skip 1.6, 1.7, and 1.10)

Unit 1: Review of statistical theory and concepts. Intro to R

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24 January: Probability Review

- OpenIntro Ch. 2

26 January: Random variables

- OpenIntro Ch. 2
- Problem sets 0 & 1 assigned

28 January: LAB DAY
31 January: Normal distribution

- OpenIntro Ch. 3

2 February: Data and data visualization part 1

- OpenIntro Ch. 1
- Kenkel Ch. 3-4
- Crisman-Cox Ch. 4

5 February: LAB DAY
7 February: Data and data visualization part 2

- OpenIntro Ch. 1
- Kenkel Ch. 3-4
- Crisman-Cox Ch. 4

9 February: Estimation and the CLT

- OpenIntro Ch. 3-4
- Problem sets 0 & 1 due
- Problem set 2 assigned

11 February: LAB DAY
14-16 February: Estimation and hypothesis testing

- OpenIntro Ch. 4-5

18 February: LAB DAY
21 February: More hypothesis testing

- OpenIntro Ch. 4-5

23 February: Technical writing and presenting results

- `https://jgscott.github.io/teaching/writeups/write_ups/`
- `https://www.indeed.com/career-advice/career-development/formal-business-report-example`
- `https://www.unr.edu/writing-speaking-center/student-resources/writing-speaking-resources/how-to-write-a-business-report`
- Problem Set 2 Due
- First exam assigned

25 February: LAB DAY

Unit 2: The simple linear model

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28 February: Correlation and Causation

- Bailey Ch. 1; Berry & Sanders Ch. 1

2 March: The Linear Model part 1

- Bailey Ch. 3-4
- Berry & Sanders Ch. 2

- Technical exam component due
- Problem set 3 assigned

4 March: LAB DAY
7-9 March: Properties of OLS, Model fit, prediction

- Bailey Ch. 3-4; Berry & Sanders Ch. 2-3
- Exam 1 rough draft due (3/9)

11 March: LAB DAY
14-18 March: Spring Break (No Class)
21 March: Finish simple regression

Unit 3: Linear model with multiple covariates

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23 March: Multiple regression, control variables, omitted variables

- Bailey Ch. 5; Berry & Sanders Ch. 3-4
- Exam 1 Peer feedback due (3/23)
- Problem set 3 due (3/23)
- Problem set 4 assigned (3/23)

25 March: LAB DAY

- Berry and Sanders Ch. 5

28 March: Writing day (NO CLASS, EXTRA OFFICE HOURS)
30 March: Multiple regression and specification

- Bailey Ch. 5
- Exam 1 final draft due

1 April: LAB DAY
4 April: Model fit revisited

- Bailey Ch. 5

6 April: Logged variables

- Bailey Ch. 7
- Problem set 4 due

8 April: LAB DAY
11 April: Dummy variables

- Bailey Ch. 6
- Exam 2 assigned

13 April: Multiple hypothesis testing

- Bailey Ch. 7

15 April: NO CLASS (Reading day)
18 April: Multiple hypothesis testing continued

- Bailey Ch. 7
- Technical portion of exam 2 due
- Problem set 5 assigned

20 April:Interactions with Dummy Variables

Unit 4: Advanced topics

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22 April: LAB DAY
25 April: Polynomials & Interactions

- Rough draft of exam 2 due

27 April: Heteroscedasticity
29 April: LAB DAY
2 May: Linear probability model

- Problem set 5 due
- Exam 2 peer feedback due

3 May: LAB DAY (Redefined day)
9 May: Final exam period

- Final draft of exam 2 is due by 12:30pm (subject to change if the Registrar changes our final exam day/time).

Final Disclaimer

The schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.