PAI721

Fall 2025

Jack Reilly

2025-09-10

1 Course Packet

This course packet is an automatically generated document from the main course website (https://jacklreilly.github.io/pai721-f25), and contains the core course documents - the syllabus, the topic schedule, and course/university policies. Certain formatting may look better on the web, some hyperlinks may not work in the downloaded document, and the website is always the most current source of information.

2 Introduction to Statistics

2.0.1 Quick Links

- **Office:** Eggers 225F

- **Phone:** 315-443-2687

- **E-mail:** jlreilly@syr.edu

2.0.2

- **Blackboard:** blackboard.syr.edu

- **Course Drive:** onedrive link

- **Syllabus & Materials:** right here

3 Course Information

3.1 Class

Location: Eggers Hall 113

Time: Tuesday and Thursday, 9:30 AM - 10:50 AM

3.2 Instructor

Prof. Jack Reilly

Office Hours: Tuesday and Thursday, 11 AM - 12 Noon (drop in)

Zoom Hours: Friday, 1 PM - 3 PM schedule a meeting

Email Professor Schedule a Meeting

3.3 Description

Public policy and administration decisions are often difficult and risky because decisions must be made with incomplete and imperfect information. The primary purpose of this course is to introduce the basics of modeling and analyzing problems that involve decision-making under uncertainty. A high priority will be placed on learning how to choose the appropriate statistics to examine a particular problem, and how to avoid being misled by statistics presented by others that do not appropriately reflect available information.

3.4 Objectives

Students will learn how to use quantitative data and statistical tools to understand problems, how to become smart consumers of statistical reports and quantitative information, and how to communicate statistical findings to a variety of audiences.

3.5 Prerequisites

A thorough understanding of high school algebra and geometry.

4 Materials

4.1 Books

Required: You will need a core statistics textbook for the class, and there are a few options:

- *Classic Statistics*: Moore, David S., George P. McCabe, Bruce A. Craig. *Introduction to the Practice of Statistics*. W.H. Freeman and Company. *Any edition 6th or newer is sufficient.*
- *For Public Admin*: Meier, Kenneth, Jeffery Brudney, and John Bohte. *Applied Statistics for Public and Nonprofit Administration*. Cengage. *Any recent edition is fine*
- *Web Option*: Favero, Nathan. *Statistics Minus the Math: An Introduction for Social Sciences* (https://minusthemath.com)

You may find one of these books suits you better than the other. *(I recommend trying each!)* Each book has a slightly different focus. Favero is more focused on a math-light presentation, preferring conceptual explanations, but is light in detail (especially in probability). Moore et al. is a more traditional statistics book (although still applied). Meier et al. is very clearly targeted at Public Administration, but the content itself jumps around a bit relative to the order our presentation of material. If you have strong opinions about any book at the end of the semester, let me know!

Recommended: A resource to assist you with Stata usage and coding.

- *Traditional*: Acock, Alan. *Stata: A Gentle Introduction.* Stata Press. Any edition 4th or newer is sufficient.
- *Web Resources*: UCLA Statistical Methods and Data Analytics Stata Learning Modules: https://stats.oarc.ucla.edu/stata/modules/

4.2 Software

Stata (any version after 13; the most basic is fine). You can also purchase a student license, which is available for 6- or 12-month intervals, or perpetually. See the Stata website for pricing: https://www.stata.com/order/new/edu/profplus/student-pricing/. If you will be taking PAI 722 in the Spring, I recommend a 12-month license ($94). Otherwise, a 6-month subscription is also available ($48). For those of you who do not wish to purchase your own version, copies are located on the computers in the student clusters in the basement of Eggers. You can also access Stata via Syracuse's remote desktop: http://rds.syr.edu. Information on how to log in to the remote desktop is available **here**.

4.3 Hardware

The department will provide a simple scientific calculator on exams for you to use. Graphing calculators are not allowed in exams.

You will need to use a computer to complete assignments in this class. If you do not have one of your own, you may use one on campus. The student clusters in the basement of Eggers are likely the most convenient.

4.4 Online Class Resources

This website hosts the official course syllabus as well as course assignments, problems, and readings. In addition, Blackboard is Syracuse University's course platform. In it, you will find occaisional course announcements, a submission portal for your assignments, and additional materials. In addition, during the semester, solutions to the problem sets and lecture slides will be posted.

Please note, however, that this is primarily an in-person, not online, class, and as such, class is the primary source of course-related announcements and material.

5 Course Requirements

5.1 Overview

Satisfactory completion of the course requires completion of the following:

1. Regular course participation and attendance (10%)
2. Weekly Assignments (20%)
3. Practicum 1 (15%)
4. Midterm (20%)
5. Practicum 2 (15%)
6. Final (20%)

5.2 Attendance

One of the guiding principles of my class is that you are adults, and thus, capable of managing your own time. I have little interest in policing your lives. Attendance is kept for each day of class, but you will lose no points on attendance if you miss a couple days: everyone has things that occasionally come up in life that need to be dealt with, and I fully realize that some of those things are things you — very understandably — may not want to discuss with your professor. *That's OK!*

That said, attendance in class is an important element to doing well in the course. If you miss more than a couple days, it's advisable to check in. (That way, I also won't mark your attendance grade off for chronic absenteeism.) The easiest way to do this is just email me with a brief reason when something comes up and you have to miss class (which will also allow me to tell you if you're missing anything particularly important).

If you must miss class, the way to make up what you've missed is straightforward: make sure to look over the posted slides, do the reading for the day, get notes from a friend, and still complete the assignment if you are able (or, if it is a day we are going over the assignment, make sure to look over the assignment solutions). If you do these things and still feel like you're missing something, please feel free to come into my office hours and we can talk it through.

> **i** Participation
>
> There is no formal grade for "participation". However, I reserve the right to dock a couple points here if you do ridiculous/unprofessional things in class (like answering your cell phone, always coming in late and regularly distracting others, spontaneously breaking out into ribald song in the middle of class, etc).

5.3   Weekly Assignments

There is an assignment each week in class, **due Friday at midnight**.[1] Assignments will vary in nature: some will be one-off problem sets, some may build on problem sets from a prior week. All material needed for an assignment will be covered by the Tuesday before the assignment is due, and the assignment itself will be posted no later than Tuesday of the week in question. There is **no penalty** for turning in an assignment up until the Tuesday of the following week. However, **no assignment work is accepted after class Tuesday of the following week**, as we will go over answers for assignments together in class. There will typically be no assignments on weeks when other significant work (practicums, tests) are due, and students may miss up to two assignments without penalty. Students may also work together on assignments, although each student is ultimately responsible for their own work.

> **i** Assignment Evaluation
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> Assignments are evaluated based upon effort and a check completion system. Students who answer every problem will earn a check, with each check worth one point toward their final assignment grade.

> **⚠** Computing
>
> Most homework assignments will be done on a computer using Stata. Do not simply hand in output from Stata. Instead, paste the relevant results into a word processor adding text to explain these results. You must also hand in reproducible script (.do) files with your analysis. (Don't worry, we'll cover what this means.)

5.4   Practicums

The practicums are, essentially, large assignments that are worth more and graded on a scale.[2] They are untimed, take-home, cumulative, and will be completed on your own time (and computer). Unlike the weekly assignments, you are also not allowed to work together on them. Their timing corresponds (roughly) with the midterm and final - you may wish to think of them as the "take-home" midterm and "take-home" final, if you prefer.

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[1]Although, I should note, I very much hope you aren't working on my assignments on Friday at 11 PM! I suggest you work on assignments starting on Tuesday of the week in question and finish them early enough so your Friday afternoon and evening isn't overcome with them.

[2]While regular weekly assignments are check/no-check credit, on practicums, you'll receive a certain number of points out of the total.

5.5 Midterm and Final

The midterm and final are traditional timed exams given in class on pen and paper. No computer will be available to you, although you will have access to a calculator. Both exams are cumulative across the course.

6 Course Expectations & Guidelines

6.1 Etiquette & Decorum

This is a graduate course: I take it for granted that you have a basic interest in the material, an enthusiastic attitude toward participation, and a respectful attitude to everyone in the room. A university classroom is fundamentally a learning community: be courteous to fellow students and the professor, don't let yourself be distracted by your cell phone in class, and don't let what is on your computer screen distract fellow students in the class, either.

6.2 Office & Consultation Hours, Appointments

I encourage you to chat with me at any point if you have questions about the course. You can schedule a meeting with me by going to my website here: http://jacklreilly.github.io/ and sign up for time at your convenience. You can also always just drop in during my regularly scheduled drop-in office hours without appointment, or stop by to see if my door is open: if it's open, come on in. (Don't feel like you're intruding! I'll tell you if it's not a good time.)

6.3 E-mail

Email is the best way to contact me. I'm usually pretty responsive, but as a baseline, I always aim to get back to you in a modified 24-hour fashion: by the end of the business day the day after you email. So if you email me at 2 PM Tuesday, I'll get back to you by 6 PM Wednesday; if 10 PM Thursday, by 6 PM Friday; if you email me at 3 PM on Friday, by 6 PM Monday, etc.[3]

> **ⓘ Note**
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> If your email requires a long response, expect me to encourage you to schedule an appointment with me so that we can more effectively discuss your questions.

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[3]Again: usually I'm much faster! But if you don't hear from me by this baseline, feel free to bump a reminder.

7 Acknowledgments

This course, and this syllabus, consists in large parts of material developed by other professors in the PAI 721 rotation, including, but not limited to, Jun Li, Tomas Olivier, and Ying Shi. I am grateful for their support and permission to use their materials.

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9 Course Topics

9.1 Schedule

Unit	Topic	**STA**	**PNA**	**MtM**
I	Descriptive statistics	1.2; 1.3; 1.4	1, 4, 5, 6	1, 2
II	Statistical relationships	2.1–2.7	14, 15	3
III	Producing data	3.1–3.4	2, 3	4
IV	Probability	4.1–4.5	7, 8	5
	Midterm Exam (Thu Oct 16)			
V	Sampling distributions	5.1–5.3	7,8	6
VI	Inference	6.1–6.4	10	7
VII	Inference for distributions	7.1–7.2	11	8, 9
VIII	Simple linear regression	10.1	17	10
IX*	Less simple regression	11.1–11.2	20	11, 12
	Final Exam			

* If time allows.

> 💡 Book Abbreviations
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> You can use any book you wish (although I encourage you to make sure its style suits you):
> - **STA** Moore, David S., George P. McCabe, Bruce A. Craig. *Introduction to the Practice of Statistics*. W.H. Freeman and Company. *Any edition 6th or newer is sufficient.*
> - **PNA** Meier, Kenneth, Jeffery Brudney, and John Bohte. *Applied Statistics for Public and Nonprofit Administration*. Cengage. *Any recent edition is fine*
> - **MtM** Favero, Nathan. *Statistics Minus the Math: An Introduction for Social Sciences* (https://minusthemath.com)

9.2 A Word on Reading

Reading in a statistics class is different from a substantive class. You should generally keep up with readings, but you are not expected to thoroughly digest them by the day we cover them in class. The textbooks serve as an additional resource to lectures and help you understand the material more effectively. They may also cover detail we don't emphasize in class (and vice versa).

Each book has its strengths:

- **STA** *Introduction to the Practice of Statistics*: traditional, more math-heavy, detailed.
- **PNA** *Applied Statistics for Public and Nonprofit Administration*: focused on applied public administration, still detailed. Sequenced differently.
- **MtM** *Minus the Math*: conceptual, common-language, intuition-focused, but light on probability and detail.

You may use any as your primary reference. If you need more depth, consult **STA** or **PNA**. If you want lighter or more intuitive explanations, lean on **MtM**. **STA** is the "default" text for the class - the one the syllabus was built around. **PNA** has lots of good examples from Public Administration, but the content sequencing is more intuitive in **STA**, so we follow that order.

We will cover the above material in sequence, with particular readings recommended for each day announced in class (and in slides) ahead of time where appropriate. In general, if you need to prioritize, make sure to focus on your weekly assignment first, and readings second.

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11 Campus Academic Resources & Policies

The following reflects the approved campus-wide academic policies of Syracuse University. For more information and detail, please consult the full documentation of University policies here.

11.1 Academic Drop Deadline

As part of our efforts to track satisfactory academic progress, the Academic Drop Deadline and the Financial Drop deadline will both occur on September 15, 2025, for the fall semester and February 2, 2026, for the spring semester. Students may still withdraw from courses after these deadlines; this would place a 'WD' grade on their transcripts. Students enrolled in "flex" classes (Flexibly formatted classes) have different deadlines and will need to check MySlice for the Academic and Financial Drop deadlines that pertains to their class.

11.2 Academic Integrity

As a pre-eminent and inclusive student-focused research institution, Syracuse University considers academic integrity at the forefront of learning, serving as a core value and guiding pillar of education. Syracuse University's Academic Integrity Policy provides students with the necessary guidelines to complete academic work with integrity throughout their studies. Students are required to uphold both course-specific and university-wide academic integrity expectations such as crediting your sources, doing your own work, communicating honestly, and supporting academic integrity. The full Syracuse University Academic Integrity Policy can be viewed by visiting the Syracuse University Policies website.

Upholding Academic Integrity includes the protection of faculty's intellectual property. Students should not upload, distribute, or share instructors' course materials, including presentations, assignments, exams, or other evaluative materials without permission. Using websites that charge fees or require uploading of course material (e.g., Chegg, Course Hero) to obtain exam solutions or assignments completed by others, which are then presented as your own violates academic integrity expectations in this course and may be classified as a Level 3 violation. All academic integrity expectations that apply to in-person assignments, quizzes, and exams also apply online.

Students found in violation of the policy are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered. Students may not drop or withdraw from courses in which they face a suspected violation. Any established violation in this course may result in course failure regardless of violation level.

11.3 Artificial Intelligence

Based on the specific learning outcomes and assignments in this course, artificial intelligence is permitted on the following: all weekly assignments. Artificial intelligence is *not* permitted in tests and practicums. See each assignment, quiz, or exam instructions for more information about what artificial intelligence tools are permitted and to what extent, as well as citation requirements. If no instructions are provided for a specific assignment, then no use of any artificial intelligence tool is permitted. Any AI use beyond that which is detailed in course assignments is explicitly prohibited except when documented permission is granted.

Please also see Syracuse University's general campus AI policies here.

11.4 Academic Integrity Online

All academic integrity expectations that apply to in-person quizzes and exams also apply to online quizzes and exams. In this course, all work submitted for quizzes and exams must be yours alone. Discussing quiz or exam questions with

anyone during the quiz or exam period violates academic integrity expectations for this course.

Using websites that charge fees or require uploading of course material (e.g., Chegg, Course Hero) to obtain exam solutions or assignments completed by others and present the work as your own violates academic integrity expectations in this course and may be classified as a Level 3 violation, resulting in suspension or expulsion from Syracuse University.

11.5 Attendance Policy

Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that faculty promptly notify the university of students who do not attend or cease to attend any class. Faculty will use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office on non-attendance. For more information visit:

Faculty: Information for Faculty: Non-attendance or Stopped Attending Students: Information for Students: Non-attendance or Stopped Attending

If a student is unable to participate in-person or virtually for an extended period of time (48 hours or more), the student may request an absence notification from their home school/college Dean's Office or through Student Outreach and Support office. Instructors will be notified via the "Absence Notification" flag in Orange SUccess.

Barnes Center at the Arch (Health, Counseling, etc.) staff will not provide medical excuse notes for students. When Barnes Center staff determine it is medically necessary to remove a student from classes, they will coordinate with Student Outreach and Support case management staff to provide appropriate notification to faculty through Orange Success. For absences lasting less than 48 hours, students are encouraged to discuss academic arrangements directly with their faculty.

Additional information may be found at Student Outreach and Support: Absence Notifications.

11.6 Blackboard

This class will use the Blackboard Learning Management to house the syllabus, course content, links to external course materials, assignments, quizzes, exams, feedback, and grades. Due dates and times in Blackboard are stored in Coordinated Universal Time (UTC) and displayed for each user based on the time zone setting of their computer and data from their internet browser. The system will always display the time zone being used. If an instructor sets a due date of 11pm Eastern time, a student in the Pacific time zone will see a due date of 8pm."

Information about Blackboard is available on Answers Blackboard; alternatively, you can contact Information Technology Services by sending an email to help@syr.edu, calling 315.443.2677, or in-person at the ITS Service Center, located at 1-227 CST in the Life Sciences Complex. Business hours for the Service Center can be found on the ITS website.

11.7   Discrimination and Harassment

The University does not discriminate and prohibits harassment or discrimination related to any protected category including creed, ethnicity, citizenship, sexual orientation, national origin, sex, gender, pregnancy, reproductive health decisions, disability, marital status, political or social affiliation, age, race, color, veteran status, military status, religion, sexual orientation, domestic violence status, genetic information, gender identity, gender expression or perceived gender.

Any complaint of discrimination or harassment related to any of these protected bases should be reported to Sheila Johnson-Willis, the University's Chief Equal Opportunity & Title IX Officer for Faculty and Staff. She is responsible for coordinating compliance efforts under the various laws including Titles VI, VII, IX and Section 504 of the Rehabilitation Act. She can be contacted at Equal Opportunity, Inclusion, and Resolution Services, 621 Skytop Road, Suite 1001, Syracuse University, Syracuse, NY 13244-1120; or by email: equalopp@syr.edu; or by telephone: 315-443-4018.

11.8   Diversity

It is the intent of this course for students from all diverse backgrounds and perspectives to be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is also critical to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let your instructor know ways to improve the effectiveness of the course for you personally or for other students or student groups.

11.9   Inclusion

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the **Center for Disability Resources (CDR)** in this process.

If you would like to discuss disability accommodations or register with CDR, please visit the Center for Disability Resources. Call (315) 443-4498 or email disabilityresources@syr.edu for more information.

The CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible.

11.10 Faith and Religious Accommodations

Syracuse University's Religious Observances Policy recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their traditions. Under the policy, students are given an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance, provided they notify their instructors no later than the academic drop deadline. For observances occurring before the drop deadline, notification is required at least two academic days in advance. Students may enter their observances in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

11.11 Health and Wellness

Well-being and mental health are significant predictors of academic success. It is critical to take care of yourself physically and emotionally and to effectively navigate stress, anxiety, and depression. Please familiarize yourself with the range of resources the Barnes Center provides https://ese.syr.edu/bewell/ and seek out support for mental health concerns as needed. Counseling services are available 24/7, 365 days, at 315-443-8000.