

# MA 2611 – Applied Statistics I

## D-term, 2025

**Class Time:** M/T/R/F 1:00 PM – 1:50 PM

**Class Location:** Fuller Labs PHU

**Instructor:** Dr. Charly Fowler (she/her)

**Email:** [cfowler@wpi.edu](mailto:cfowler@wpi.edu)

**Office:** Stratton Hall 417

**Office Hours:** Monday 2-3 PM, Thursday 11:30 AM-12:30 PM, and by appointment

### TA/PLAs:

Name	Email	Office Hours Location	Office Hours
Haofan Zheng (he/his)	<a href="mailto:hzheng4@wpi.edu">hzheng4@wpi.edu</a>	SL 412	Wednesday 10-11 AM; Friday 10-11 AM
Karen Pan (she/her)	<a href="mailto:kpan1@wpi.edu">kpan1@wpi.edu</a>	UH 443	Tuesday 2-4PM

### Catalog Course Description

This course is designed to introduce the student to data analytic and applied statistical methods commonly used in industrial and scientific applications as well as in course and project work at WPI. Emphasis will be on the practical aspects of statistics with students analyzing real data sets on an interactive computer package. Topics covered include analytic and graphical representation of data, exploratory data analysis, basic issues in the design and conduct of experimental and observational studies, the central limit theorem, one and two sample point and interval estimation and tests of hypotheses.

Recommended background: MA 1022.

### Course Goals

- Construct data into descriptive statistics and distinguish between different types of data.
- Develop the ideal graphical tools for summarizing numerical and categorical data.
- Understand sources of variation and bias and define data sampling terminology.
- Distinguish the property differences between discrete and continuous distributions; calculate probabilities for discrete and continuous distributions.
- Execute and appropriately interpret confidence intervals for mean and proportion in one sample scenarios.
- Explain how to conduct a hypothesis test and appropriately interpret the results for mean and proportion in one sample cases; define and identify the two types of statistical errors.
- Recognize how to apply learned statistical methods to a variety of realistic scenarios.

### Textbook and Resources

Supplementary introductory statistics resources:

- *OpenIntro Statistics* 4th edition, David Diez, Mine Cetinkaya-Rundel, and Christopher D Barr. <https://leanpub.com/os>
- [CourseKata](#)

Supplementary R resources:

- *R for Data Science*, G. Grolemund and H. Wickham. <https://r4ds.had.co.nz/>
- *Exploratory Data Analysis with R*, R Peng. <https://bookdown.org/rdpeng/exdata/>
- *R Cookbook: Proven Recipes for Data Analysis, Statistics, & Graphics*, J.D. Long & Paul Teetor. <https://rc2e.com/>
- *The Book of R: A First Course in Programming and Statistics*, Tilman M. Davies

## Labs

Labs will give you an opportunity to analyze data using the techniques we learn in lectures. They will also teach you to use R and RStudio, free and open-source statistical software. Each lab will have an activity which is purely for your own practice, and does not need to be turned in. There will additionally be an assignment, which must be submitted and will be graded for completion within one week of the lab date.

## Concept Checks

There will be 5 concept checks over the course of the term to evaluate basic understanding of definitions and concepts from class. They will be administered via Canvas and allow 3 attempts each. Once available, you will have one week to complete the concept check, but I would encourage you to complete or at least attempt the concept check early.

## Homework Assignments

There will be 4 homework assignments over the course of the term to evaluate deeper understanding of concepts from class. Assignments will be graded for correctness with partial credit so please show your work. You will have approximately one week to complete each assignment once it has been assigned.

## Exams

Midterm: Thursday April 10<sup>th</sup>, 1 PM to 1:50 PM

Final: Wednesday May 7<sup>th</sup>, 1 PM to 1:50 PM

Please let me know as soon as possible if these dates pose a problem.

Both exams are cumulative, although the final will focus more on the second half of course topics. Exams are closed book and closed notes; however, you are allowed a regular letter-sized double-sided cheat sheet. Your cheat sheet should be prepared by you. Ahead of each exam, practice problems will be posted. For the midterm exam, there will be an optional opportunity to revise and redo the exam to recover up to 50% of missed points. More details will be provided in class after the midterm is returned.

## Grading

Lab Assignments	20%
Concept Checks	15%
Homework Assignments	30%
Midterm	15%
Final	20%
Total	100%

## Late Passes

To allow a bit of flexibility, you are granted 5 late passes at the beginning of the term, which can allow you a no questions asked 24-hour extension for a given lab assignment, homework

assignment, or concept check. The request for an extension must be submitted **before** the assignment is due. Late pass requests must be submitted via the Google form found [here](#). The last day to use a late pass for an extension is May 4<sup>th</sup>.

If you have a larger concern that is affecting your ability to submit work on time or succeed in the course, please contact me directly.

### **Tentative Course Outline**

	<b>Dates</b>	<b>Topics</b>
Week 1	3/17-3/21	Variable types
Week 2	3/24-3/28	Summarizing data
Week 3	3/31-4/4	Probability
Week 4	4/7-4/11	Discrete random variables
Week 5	4/14-4/18	Continuous random variables
Week 6	4/21-4/25	Confidence intervals
Week 7	4/28-5/2	Hypothesis testing
Week 8	5/5-5/7	Review and Exam

Note I reserve the right to alter the above course schedule at any point in the term as needed.

### **Statement of Respect**

As your professor, I expect you to treat your peers with respect and engage in considerate communication. Everybody comes to the table with different strengths, and weaknesses, so I encourage you to focus not only on your own strengths but also those of your peers. To ensure you feel respected and part of a safe and inclusive learning environment, please do not hesitate to reach out to me if any of the following are relevant to you:

- If you have a name and/or pronouns that differ from those in your official WPI records.
- If something was said in class (by anybody, including me) that made you feel uncomfortable.
- If you feel like your performance is being negatively impacted by experiences outside of the course.

### **Academic Honesty**

Working together is permissible except during exams. When working together you must show individual thought and writing in each problem assigned. Direct copying (and allowing someone to copy directly from you) is not acceptable.

You are expected to be familiar with WPI's Academic Honesty policies. All acts of fabrication, plagiarism, cheating, and facilitation can be prosecuted according to the WPI's policies. If you are ever unsure as to whether your intended actions are considered academically honest, please contact me directly.

## Artificial Intelligence

It is a violation of WPI policy to misrepresent work that you submit or exchange with your instructor by characterizing it as your own, such as submitting responses to assignments that do not acknowledge the use of generative AI tools. Please feel free to reach out to me with any questions you may have about the use of generative AI tools before submitting any content that has been substantially informed by these tools. The use of AI to complete assignments or concept checks in this course is not permitted unless otherwise specified.

## Email Policy

When possible, please email both me and the TAs with your concern or question to ensure a faster response. If you do not hear back from me within 2 business days, please follow up and/or ask me after class. Note that if your question cannot be answered within a few sentences, I will likely encourage you to come see us during office hours.

## Student Resources

### Mental Health & Physical Wellbeing

Your mental health and physical wellbeing are of utmost importance. If you are struggling with your health or wellbeing, please reach out to the Wellness Center or Student Development & Counseling Center (SDCC). Resources can be found [here](#).

### Math Tutoring Center (MTC)

In-person math tutoring will be offered in Stratton Hall 206. Please use [wpi.edu/+mtc](http://wpi.edu/+mtc) to sign up for individual tutoring appointments and check MTC hours of operation.

### Academic Resources Center (ARC) Tutoring

The Academic Resources Center (ARC) offers individual tutoring and Math and Science Help (MASH, group drop-in tutoring) in person on the 5th floor of Unity Hall for undergraduate students. Some MASH sessions that occur after 6pm may take place in the Exam Proctoring Center (EPC, UH 505). Tutoring sessions are 50 minutes long and are facilitated by peer undergraduate students. Tutoring availability is dependent on tutor's schedules within the ARC hours of operation. Students should use [Tutortrac](#) to sign up for 1-on-1 tutoring appointments that fit their schedule. Students are encouraged to schedule 1-on-1 appointments in advance. No appointments are needed for MASH group drop-in sessions.

D Term 2025 tutoring will begin on Wednesday March 19, 2025 and will end on Monday May 5, 2025. **There will be no tutoring in D term 2025 on: March 31, 2025 ; April 21, 2025; April 25, 2025.** Information about MASH and tutoring offered by the ARC is located on the [Academic Resources Center Canvas Page](#) and on the [Academic Resources Center WPI Webpage](#)

## Accessibility

Your success in this course is important to me! If there are aspects of this course that prevent you from learning or exclude you, please let me know as soon as possible. We'll work together to develop strategies to meet both your needs and the course requirements. The principles of accessibility and inclusion apply to all students, not only those with documented (or documentable) disabilities.

Students with approved academic accommodations should plan to submit their accommodation letters through the Office of Accessibility Services (OAS) Student Portal. If you have any questions about how accommodations can be implemented in this particular course, please contact me as soon as possible.

If you're not currently registered with OAS and want more info about requesting accommodations and what that entails, contact them via email: [AccessibilityServices@wpi.edu](mailto:AccessibilityServices@wpi.edu), phone: (508) 831-4908, or stop by the Unity Hall office (5<sup>th</sup> floor).