

# APPLIED STATISTICS I MA2611-C05-8

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**Instructor:** Adam Sales ([asales@wpi.edu](mailto:asales@wpi.edu))

**Class/Lecture Time:** MTRF 12:00-12:50 Via zoom, synchronized, recorded

**Zoom Info** (for Lecture & Labs & Prof. Office Hours):

**Office Hours:** Monday 5-6; Thursday 1-2 on Zoom

**Labs:**

<b>Section</b>	<b>Conference meetings Tuesday</b>	<b>TA/PLA/GLA</b>	<b>Email</b>	<b>Office hours</b>	<b>Tutoring Center hours</b>
C05	8:00-9:50am	Lyric Liu		MT 2-3 (see link below)	F 10-12 (see link below)
C06	10:00 am - 11:50	Lyric Liu		MT 2-3	F 10-12
C07	1:00 pm - 2:50 pm	Rahul Kumar		F 1-3 (Same as class Zoom)	W 4-6 R 5-6 (see link below)
C08	3:00 pm - 4:50 pm	Rahul Kumar		F 1-3	W 4-6 R 5-6

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 data sets. 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: MA1022.

**Course Web Site:** Canvas (<https://canvas.wpi.edu/>) The web site contains, among other things, the syllabus and the outline, lecture notes if any, online homework assignments, powerpoint slides, online Quizzes, Labs, and more. You are responsible for checking it for any updates/changes regularly.

### **Main Textbook:**

Berenson, Mark L., David M. Levine, and Kathryn Szabat, Basic Business Statistics: Concepts and Applications (with MyStatLab), 14th Edition. Please Register to have access to E-text and online Homework and other amazing resources by going over the direction posted in the file called Student registration Handout Instruction under Pages.

**Course Outline:** Chapters 1-10 covering: Defining and collecting data, Organizing and visualizing variables, Descriptive statistics, Basic Probability, Discrete probability, Normal distribution and other continuous distributions, Sampling Distribution, confidence interval estimation, Fundamentals of Hypothesis testing: one-sample and two-sample tests. If time allows we will cover introduction to simple linear regression chapter 13.

**Recommended Reference Book:** Petrucci, Nandram and Chen, Applied Statistics for Engineers and Scientists. Hard copy at bookstore. A free pdf of the text is available. Course Outline: Chapters 1-3, 5-6 covering: Introduction to data analysis, Summarizing data, Designing studies and obtaining data, Estimation, Hypothesis tests.

*Note that some of the material presented in lecture might differ in presentation or content from what is presented in the texts. Where there is a difference of content, you are to use the material presented in lecture.*

### **Homework**

Homework assignments are via MyLab Statistics and all are online and will be graded automatically, and will be used as part of your final grade. Working with other members of the class is allowed and encouraged while keeping social distancing and being in a safe. Electronic homework may be discussed with other members of the class but should be done individually. Problem sets will typically be due by the end of the day (11:59pm) on Mondays, but please pay close attention to the due date on the posted assignment. Late homework without *prior* authorization will subject to an *automatic* 25% grade reduction. If there is some reason you cannot turn an assignment on time, please let me (Prof. Sales) know ASAP. Each student's lowest-scoring homework will be dropped from the final grade.

### **Quizzes**

There will be weekly online quizzes which will be on Fridays at the last 10 minutes of class and during the class or lecture meetings (Quiz every week on Fridays 12:40-12:50pm during the lecture time with video on). This might change depending on the

feedback from the students and the COVID-19 situation. I will inform you if any changes. Quizzes are given to test your understanding of what has been covered in class. They will also help motivate you to keep on top of the readings and help the instructor monitor your progress in the class.

## **Exams**

Exams will be in-class and open book. Please let me know ASAP if either date poses a problem for you.

Midterm: February 19

Final: March 18

## **Labs**

Labs will give you an opportunity to analyze data using the techniques we learn in lectures--they may actually be the most important part of the class. The labs will use the free, open-source statistical software R and RStudio, which we will teach you how to use. You will turn in your lab work at the end of each session, and it will be graded for completion.

## **Course Goals**

1. To become familiar with useful, efficient, and proper as well as improper methodologies for summarizing and communicating quantitative and qualitative data.
2. To learn to identify and understand sources of random and systematic variation in data, along with basic techniques for modeling that variation.
3. To develop skills in the assessment of the probability of uncertain events, and to exhibit how these skills relate to the process of managerial decision making.
4. To understand the role of probability in modeling data, and be able to use that understanding to critique a statistical model.
5. To understand the process and goals of statistical estimation, and to implement, communicate, and evaluate the assumptions underlying simple statistical estimators.
6. To survey the fundamental theory and methods of statistical inference-- confidence intervals and hypothesis tests-- to construct them in simple situations, and to interpret and critique their use in general.
7. To provide hands on experience using the computer as an essential tool in assisting with the performance both statistical and deterministic analytical techniques.
8. To summarize data with appropriate numerical, graphical, algebraic, and verbal representations.

## **Calculating the final grade**

Homework assignments	20%
Quizzes	10%
Lab work	25%
Midterm	20%
Final	25%
	100%

### Tentative Course Outline:

On this schedule, the exam dates are fixed. I reserve the right to change the order and content of lectures to improve the learning experience. I will ensure that the homework and exams match the covered material. This course outline will be used as a guide to where we plan to be at any given time during the semester. Occasionally, material may be modified, added, delayed or deleted.

Week	Dates	Chapters
Week 1	1/28-1/29	1
Week 2	2/1-2/5	2-3
Week 3	2/8-2/12	3-5
Week 4	2/15-2/19	5-7
Week 5	2/22-2/25 (no class on 2/26)	7-8
Week 6	3/1-3/5	9-10
Week 7	3/8-3/12	9-10
Week 8	3/15-3/18	10 (maybe briefly 13)

## POLICIES

### Weekly Zoom Classes:

- Classes will be interactive—have a computer with RStudio ready to use
- Class attendance will not be factored into the grade, but is highly encouraged.
- I plan on trying to record class meetings and post them on Canvas, if feasible
- Zoom etiquette:
  - Please ensure that your display name is the name you wish me to use
  - Putting video on is strongly encouraged, but I understand that it's not always possible or a good idea.
  - Participants will be muted except when asking a question, etc.
  - Please feel free to ask questions whenever you want, by unmuting and asking or using the chat feature
  - I plan to use polls and other features—please participate!

## Late Work Policy

Late work is eligible for 75% of original points. I must receive completed assignment before solutions are posted for the assignment. Please start assignments early and communicate with me to discuss questions. If you need more time for an assignment, please email me and tell me what's up. We can probably figure things out. My concern will always be for your progress and well-being.

**Diversity:** I would like to create a learning environment that supports a diversity of identities, thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, (dis)ability) To help accomplish this:

- If you have a name and/or set of pronouns that differ from those that appear in your official WPI records, please let me know!
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me, submit anonymous feedback (via "Quizzes" on Canvas), and/or contacting [Diversity and Inclusion. Links to an external site.](#)
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option).

**Academic Integrity:** See school's policy: [www.wpi.edu/offices/policies/honesty/studentguide.html](http://www.wpi.edu/offices/policies/honesty/studentguide.html)

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.

Consequences for violating the Academic Honest Policy range from earning a zero on the assignment, failing the course, or being suspended or expulsion from WPI. The Dean of Students Office maintains judicial records for any act of academic dishonesty.

**Academic Accommodations:** We strive to create an inclusive environment where all students are valued members of the class community. If you need course adaptations or accommodations because of a disability, or if you have medical information to share with us that may affect your performance or participation in this course, please make an appointment with us as soon as possible. *Students with approved academic accommodations should plan to submit their accommodation letters through the [Office of Accessibility Services Student Portal \(Links to an external site.\)](#).* Should you have any

*questions about how accommodations can be implemented in this particular course, please contact me as soon as possible. Students who are not currently registered with the Office of Accessibility Services (OAS) but who would like to find out more information regarding requesting accommodations and what that entails should plan to contact them via*

*email: [AccessibilityServices@wpi.edu](mailto:AccessibilityServices@wpi.edu) and/or via*

*phone: (508) 831-4908.*

**Take Care of Yourself:** Your overall well-being is important to us, and should be to you too. If you would like to talk to me about personal struggles I will do my best to support you. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, I strongly encourage you to seek support. [Student Development and Counseling Center \(SDCC\)](#)[Links to an external site.](#) is here to help.

Phone: 508-831-5540

Email: [sdcc@wpi.edu](mailto:sdcc@wpi.edu).

Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

Please know it is important to me that you feel you are in the best position to succeed in the course. If you need accommodations and there is anything I can do to help, I will be happy to assist to the best of my abilities.