

Rutgers University
The State University of New Jersey
Department of Statistics - CCAS
Summer 2024

Class Information

Course Title: Introduction to Statistics I (index#03071)
Statistics **50:960:283**/Section **D6**

Instructor: Dr. I-Ming Chiu

My Web Site <http://economics.camden.rutgers.edu/faculty/i-ming-chiu/>

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Class Meeting: Monday/Tuesday/Thursday, 6/24-7/18

Teaching Mode: Remote Teaching vs. Zoom (6:00-9:40 PM)

[Note: Virtual meeting participation is mandatory, and I strongly encourage you to attend all meetings to get the most out of your education. However, I understand that occasional schedule conflicts may arise that prevent you from attending a meeting. If you cannot attend a meeting due to a schedule conflict, please inform me in advance]

Office Hours: 4:30-5:30 PM (remote), Tuesday & Thursday or by appointment

Course Description: Statistics is a process that transforms raw data into decision-making information. This class focuses on the fundamentals of Statistics and aims to equip students with computational skills. Class begins with a concise review of the mathematical requirements, which are essential before introducing probability theory, inferential statistics and their applications. Besides explaining theories, all the essential statistical concepts are presented using simulation methods (i.e., Seeing is Believing). Students will learn how to use statistical software to manage, explore and analyze data. Functional programming is also covered to help students understand how to implement statistical algorithms in practice.

Readings: Babak Shahbaba, Biostatistics with R: An Introduction to Statistics through Biological Data (BIOR), Springer, 2012.

Ronald M. Weiers, Introduction to Business Statistics, 7th ed. (IBS), Cengage Learning, 2011.

Amy S. Wagaman and Robert P. Dobrow, Probability: With Applications and R, 2nd ed. (PWAR), Wiley, 2021.

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Rafael Irizarry, Introduction to Data Science (IDS), 2022 on Github.
<https://rafalab.github.io/dsbook/>

Gary Oehlert, A First Course in Design and Analysis of Experiments,
W. H. Freeman, 2000.
(Download site: <http://users.stat.umn.edu/~gary/book/fcdae.pdf>)

Computing: All the computations will be done using statistical software **R**. The R programming language is free for download at <http://www.r-project.org>. There is an integrated development environment (IDE; like a text editor with many features) for R called RStudio and is also free for download at:
<https://www.rstudio.com/products/rstudio/download/>

Install R & RStudio: https://www.youtube.com/watch?v=Y20P3u3c_1c (for Mac)
<https://www.youtube.com/watch?v=VLWaED9jTiA> (for PC)

Class Material: Handouts, additional readings, data, and homework assignments will be posted on **Canvas** website.

Online Learning: <https://www.datacamp.com/> (supplemental to course learning)

Useful Websites: <http://www.statmethods.net/>

(For learning R) <https://r4ds.had.co.nz/index.html> (R for Data Science)

<https://bookdown.org/rdpeng/rprogdatscience/> (R Programming for Data Science)

Grading: Contribution to Final Grade

- Class Participation	5%
- Homework (30%) & DataCamp Courses (10%)	40%
- Midterm Exam	25%
- Final Exam	30%
- Attendance (extra credit)	5%

Grading Policy: Term grades will be based on the final distribution of the above grading weights.

Exam Preparation: The exam questions will be drawn from three sources: (i) homework assignments, (ii) course lectures, and (iii) reading material.

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Class Participation: Class attendance is essential for learning achievement. When missing a class, it would cost you more time to learn on your own. I strongly recommend the following steps for your successful learning: (1) attend every class and take notes; (2) review everything you learn from the class immediately, never put it off; (3) ask questions and participate in class discussions.

Academic conduct: Make up exams will be given **only upon prior notice**. I request prior knowledge of any expected absence from an exam. If this is not feasible, you can document a valid reason for missing the exam. Unexcused absence on any exam will result in a grade of zero. Dishonesty in seeking an excused absence or in the examination process will result in a grade of zero on the exam involved and in university discipline. More detailed information can be found at the following site: <https://academicintegrity.rutgers.edu>.

Disability Services: Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form at <https://webapps.rutgers.edu/student-ods/forms/registration>.

Here is the link to the Office of Disability Service:
<https://success.camden.rutgers.edu/disability-services>

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Course Outline:

Topic 1	A World of Data Science using Statistics
Topic 2	Introduction to R Programming Language
R lab	There are R lab sessions for each topic listed in the outline
Topic 3	Math Fundamentals & Probability Theory
Topic 4	Discrete Random Variables and Probability Mass Functions
Topic 5	Continuous Random Variables and Probability Density Functions
Midterm Exam	Date: TBA in the class
Topic 6	Sampling Distributions, Law of Large Numbers and Central Limit Theorem
Topic 7	Statistical Inferences: Point Estimation, Confidence Interval, and Hypothesis Testing (part I)
Topic 8	Topic 7 (part II)
Topic 9	Design of Experiments & ANOVA
Topic 10	Linear Regression Model
Additional Topic	What is Machine Learning? (a brief introduction)
Final Exam	Thursday, July 18.