

Rutgers University
The State University of New Jersey
Department of Statistics - CCAS
Summer 2022

Class Information

- Course Title:** Introduction to Statistics I (index#04203)
Statistics 50:960:283/Section D6
- Instructor:** Dr. I-Ming Chiu
- My Web Site** <http://economics.camden.rutgers.edu/faculty/i-ming-chiu/>
- Office:** ARMITAGE HALL #435/436
Phone (856) 225 6012
- E-mail address:** ichiu@camden.rutgers.edu
- Class Meeting:** Monday/Tuesday/Thursday, 6/27-7/21
- Teaching Mode:** Remote Teaching vs. Zoom (6:00-9:40 PM)
- Office Hours:** 4:30-5:30 PM, 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 on 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. 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 basic statistical algorithms.
- Readings:** Ronald M. Weiers, Introduction to Business Statistics, 7th ed., Cengage Learning, 2011.
- Rafael Irizarry, Introduction to Data Science (IDS), 2022 on Github.
<https://rafalab.github.io/dsbook/>
- Babak Shahbaba, Biostatistics with R: An Introduction to Statistics through Biological Data (BIOR), Springer, 2012.
- 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->

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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) <http://applied-r.com/>

<http://www.ats.ucla.edu/stat/>

Grading: Contribution to Final Grade

- Attendance	5%
- Homework (35%) & DataCamp Courses (10%)	45%
- Midterm Exam	20%
- Final Exam	30%
- Participation (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.

Class Participation: Class attendance is essential for learning achievement. We will meet three times at night per week. You are strongly encouraged to ask questions during the Zoom meetings.

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.

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Course Outline:

Topic 1	Introduction: Statistics vs. Data Science
Topic 2	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
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 and Diagnostic Checks
Additional Topic	What is Data Mining and Machine Learning? (a brief introduction)
Final Exam	Thursday, July 21.