

Statistics
Course Number: 26:960:575
Course Title: Introduction to Probability

COURSE DESCRIPTION

This is a first course in probability that does not assume any prior knowledge on the subject. It will provide an introduction to mathematical concepts and methods that find extensive use in many fields of modern Data Science and Operations Research. The course will have a theoretical focus, but theory will be motivated and illustrated with examples from areas such as business and engineering. The course will broadly follow Ross's *A First Course in Probability*.

Learning Management System: Canvas.

COURSE MATERIALS

Text: Ross, S.M. 2019. *A First Course in Probability*, 10th Edition.

Recommended: Feller, W. 1967. *An Introduction to Probability Theory and Its Applications*, 3rd Edition.

LEARNING GOALS AND OBJECTIVES

This course will introduce students to some of the important probability concepts. These include random variables, independence, sums of independent random variables, laws of large numbers, central limit problem, conditional probability and expectation.

PREREQUISITES

Graduate students who have finished a basic course in calculus are allowed to take the course. In particular, students are expected to know:

- Basic differentiation and partial differentiation of standard functions and how to use the chain rule and product rule
 - Definite and indefinite integrals using integration by parts and substitution
 - How to evaluate a basic double integral
 - L'Hôpital's rule
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ACADEMIC INTEGRITY

I do NOT tolerate cheating. Students are responsible for understanding the RU Academic Integrity Policy <http://academicintegrity.rutgers.edu/>

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. See business.rutgers.edu/ai for more details.

ATTENDANCE AND PREPARATION POLICY

Expect me to attend all class sessions. I expect the same of you. If I am to be absent, my department chair or I will send you notice via email and Canvas as far in advance as possible. If you are to be absent, report your absence in advance at <https://sims.rutgers.edu/ssra/>. If your absence is due to religious observance, a Rutgers-approved activity, illness, or family emergency/death and you seek makeup work, also send me an email with full details and supporting documentation one week ahead of the occurrence.

For weather emergencies, consult the campus home page. If the campus is open, class will be held. Expect me to arrive on time for each class session. I expect the same of you. Expect me to remain for the entirety of each class session. I expect the same of you. Expect me to prepare properly for each class session. I expect the same of you. Complete all background reading and assignments. You cannot learn if you are not prepared. Expect me to participate fully in each class session. I expect the same of you. Stay focused and involved. You cannot learn if you are not paying attention.

CLASSROOM CONDUCT

Cell phones or any other course-unrelated electronic devices are banned from class.

EXAM DATES AND POLICIES

There are two exams. During exams, the following rules apply:

- You are allowed a one-page cram sheet (letter size, front and back) of your own handwriting.
 - If you have a disability that influences testing procedures, provide me an official letter from the Office of Disability Services at the start of the semester.
 - No cell phones or other electronics are allowed in the testing room.
 - Alternate seating; do not sit next to another student or in your usual seat.
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GRADING POLICY

Two homework assignments at 20 points each (40 points in total)

Two exams at 30 points each (60 points in total)

The proposed letter grade assignment is as follows:

F	0—29.999
D	30—49.999
C	50—64.999
C⁺	65—69.999
B	70—84.999
B⁺	85—89.999
A	90—100

Late assignments will be penalized 20 points (on the 100 point scale) if turned in up to ONE week late. Assignments in excess of ONE week late will not be accepted. There will be no makeup exam, nor extra credit. Your final grade is not subject to negotiation.

COURSE SCHEDULE (Tentative Course Progress)

Coverage
1. Chap1: Combinatorial Analysis
2. Chap2: Axioms of Probability
3. Chap3: Conditional Probability and Independence
4. Chap4a: Random Variable and Expectation
5. Chap4b: Various Discrete Random Variables
6. Chap5: Various Continuous Random Variables
Review and HW1 due
MID-TERM EXAM
7. Chap6: Jointly Distributed Random Variables
8. Chap7a: Properties of Expectation
9. Chap7b: Conditional Expectation and Prediction
10. Chap8: Limit Theorems
<i>No class</i>
11. Chap9: Additional Topics
12: Review and HW2 due
FINAL EXAM

SUPPORT SERVICES

If you need accommodation for a *disability*, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at ods.rutgers.edu.

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email dsoffice@echo.rutgers.edu]

[Rutgers University-Newark ODS phone (973)353-5375 or email ods@newark.rutgers.edu]

If you are *pregnant*, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email jackie.moran@rutgers.edu]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email TitleIX@newark.rutgers.edu]

If you seek *religious accommodations*, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email deanofstudents@echo.rutgers.edu]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email DeanofStudents@newark.rutgers.edu]

If you have experienced any form of *gender or sex-based discrimination or harassment*, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7. You may also contact the Office

of Title IX and ADA Compliance at (973)353-1906 or email at TitleIX@newark.rutgers.edu. If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email run.vpva@rutgers.edu]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.rutgers.edu>.

If you are a military *veteran* or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of *mental health* services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of *physical health* services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of *legal* services, please use our readily available services: <http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to *English as a second language (ESL)* should contact the Program in American Language Studies for supports.

[Rutgers–Newark: PALS@newark.rutgers.edu]

[Rutgers–New Brunswick: eslpals@english.rutgers.edu]

If you are in need of additional *academic assistance*, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rlc>

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]