

MATH 477 - Mathematical Theory of Probability
MW 3:20 - 4:40 PM, Room: SEC-211

Instructor: Triet Pham, Office: Hill Center Room 207, Email: trietpham@math.rutgers.edu

Office Hours: T 5:00 - 6:30 pm, Th 3:30 - 5:00 pm and by appointment.

Course Website: <http://math.rutgers.edu/tmp140/courses/Fall2014/M477/F14-M477.html>

Textbook: A first course in probability by Sheldon Ross, 9th edition.

Prerequisite: Third semester calculus (640:251 or equivalent) is an unwaivable prerequisite: a working knowledge of multiple integrals is essential. Also, please be aware that a student can receive credit for at most one of the courses 01:640:477, 01:198:206, 01:960:381, and 14:330:321.

Course Outline:

Please note that this is a tentative outline. As the course progresses, we may adjust the pace and / or the material if necessary. It may be that we do not cover the last few topics. There will also be additional notes posted on the course website.

WEEK 1: Sept - 03 Sections 1.1 to 1.5 Combinatorics

WEEK 2: Sept - 8 Sections 1.6 to 2.3 Indistinguishable objects; axioms of probability
Sept - 10 Sections 2.4, 2.5 Inclusion/exclusion formula; equally likely outcomes

WEEK 3: Sept - 15 Section 2.5 More examples; Stirling's approximation
Sept - 17 Sections 3.1 to 3.3 Conditional probability and Bayes' formula

WEEK 4: Sept - 22 Section 3.4 Independent events
Sept - 24 Sections 3.4, 3.5 Repeated independent trials

WEEK 5: Sept - 29 Sections 4.1 to 4.2 Random variables and distribution functions
Oct - 01 Sections 4.3 to 4.5 Expectation and variance of discrete random variables

WEEK 6: Oct - 6 Sections 4.6, 4.8.1 Bernoulli, binomial, and geometric random variables
Oct - 8 Sections 4.7, 4.9.2, 4.9.3 Poisson, negative binomial, and hypergeometric random variables

WEEK 7: Oct - 13 EXAM 1 (Subject to schedule change - To be taken 1 week before warning grade is issued)
Oct - 15 Sections 5.1, 5.2 Continuous random variables; expectation, variance

WEEK 8: Oct - 20 Sections 5.3 to 5.5 Uniform, exponential, and normal random variables

Oct - 22 Section 5.4.1 Normal approximation to binomial random variables

WEEK 9: Oct - 27 Sections 5.6.1, 5.7 Gamma random variable; functions of a random variable
Oct - 29 Section 6.1 Joint distributions of several random variables

WEEK10: Nov - 3 Section 6.2 Independent random variables
Nov - 5 Section 6.3 Sums of independent random variables

WEEK11: Nov - 10 Sections 7.17.3 Linearity of expectation
Nov - 12 Sections 7.4 Covariance and correlation

WEEK12: Nov - 17 EXAM 2
Nov - 19 Sections 6.4, 6.5 Conditional distributions

WEEK13: Nov - 24 Section 7.5 Conditional expectation
Nov - 26: Thanks Giving Break

WEEK14: Dec - 1 Section 7.7 Moment generating functions
Nov Sections 8.18.2 Markov and Chebyshev inequalities; weak law of large numbers

WEEK15: Dec - 8 8.3 The central limit theorem
Dec - 10 8.3 Proof of the central limit theorem; examples.

Grade Breakdown:

Homework: 15 %
Midterm 1: 25 %
Midterm 2: 25 %
Final: 35 %

Academic Honesty: As a Rutgers University student, you have agreed to abide by the University's academic honesty policy, as stated in <http://academicintegrity.rutgers.edu>. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor.

Extra help: All students are strongly encouraged to come to my office hours to discuss homework problems or any aspect of the course. I am also available by appointments if the office hours do not fit into your schedule. Sending me emails regarding your questions is also an excellent way to get a prompt response.

University Attendance Policy: Students are expected to attend classes regularly, according to what is stated in <http://sasundergrad.rutgers.edu/academics/courses/registration-and-course-policies/attendance-and-cancellation-of-class>

Important Dates:

Last Day to Withdraw (without a "W" grade)Sept. 11, 2014
Last Day to AddSept. 12, 2014
First midterm Oct. 13, 2014 (Subject to change - To be taken 1 week
before the early warning grade is issued)
Second midtermNov. 17, 2014
Last Day to Withdraw (with a "W" grade) Oct. 27, 2014
Final Exam Dec 19, 2014: 12:00 PM - 3:00 PM