

Mathematics 1550H – Probability I: Introduction to Probability

TRENT UNIVERSITY, Summer 2023 (S62)

[In Peterborough!]

Instructor

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Department of Mathematics

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Prerequisite

MATH 1005H or MATH 1110H, or permission of the instructor.

Text

Introduction to Probability (2nd Edition), by C.M. Grinstead and J. Laurie Snell, American Mathematical Society, 2003. Available for free at:

www.math.dartmouth.edu/~prob/prob/prob.pdf

Various additional resources for this text can be found at:

www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/book.html

Meetings

Lectures: Mondays & Wednesdays 09:00-11:50 in ENW 103.

Marking Scheme

There will be ten quizzes (which will be 24-hour online mini-assignments), six weekly assignments, an in-person midterm test, and an in-person final examination, weighed as follows in the final mark:

Best 9 quizzes (2.5% each)	22.5%	Best 5 assignments (6.5% each)	22.5%
Midterm test	12%	Final examination	33%

Please note that work worth at least 25% of the course should be completed, marked, and returned by the final date (Thursday, 13 July) to withdraw from the course. Students who miss a quiz or assignment for reasons beyond their control should contact the instructor as soon as possible. Note that the weekly assignments may involve the use of **Sagemath** or equivalent mathematics software.

This scheme may be modified for individual students in *exceptional* circumstances, such as a lengthy absence due to illness. Any such modification will require the agreement of both the student and the instructor.

Content & Learning Outcomes

MATH 1550H is an introduction to probability theory, covering basic concepts and results about probability, random variables, discrete and continuous distributions, expected value, and variance. Upon successful completion of this course, a student should be able to have knowledge of some counting techniques, understand the concepts of independence of random variables and events, conditional probability, distinguish between discrete and continuous random variables, and understand the content of probability and density functions; recognize various discrete and continuous random variables, compute their expectations and variance, and apply their knowledge to simple modelling problems; have some elementary knowledge of bivariate distributions and joint probability distributions; and understand the statements of the Laws of Large Numbers, Chebyshev's Inequality, and the Central Limit Theorem.

Schedule

In terms of content, this schedule should be taken with a grain of salt: no lesson plan survives contact with students unchanged. We will speed up or slow down, and perhaps rearrange some material, depending on how things go. Please note that while we will not fully cover the content of every chapter, we will from time to time cover bits of material that are not in the textbook.

Week 1. (19-23 June) Chapters 1 & 3: Discrete probability distributions and combinatorics. Quiz #1 on Thursday, 22 June; Assignment #1 due on Friday, 23 June. *Classes begin on Monday, 19 June.*

Week 2. (26-30 June) Chapters 2 & 4: Continuous probability distributions, conditional probability. Quiz #2 on Tuesday, 27 June; Quiz #3 on Thursday, 29 June; Assignment #2 due on Friday, 30 June.

Week 3. (3-7 July) Chapter 5: Examples of discrete and continuous distributions. Quiz #4 on Tuesday, 4 July; Quiz #5 on Thursday, 6 July; Assignment #3 due on Friday, 7 July.

Week 4. (10-14 July) Chapters 6 & 7: Expected values and variance, sums of random variables. Midterm test in class on Monday, 10 July. Quiz #6 on Tuesday, 11 July; Quiz #7 on Thursday, 13 July; Assignment #4 due on Friday, 14 July. *The last date to withdraw is Thursday, 13 July.*

Week 5. (17-21 July) Chapters 7 & 8: Sums of random variables, Chebyshev's Inequality, Laws of Large Numbers. Quiz #8 on Tuesday, 18 July; Quiz #9 on Thursday, 20 July; Assignment #5 due on Friday, 21 July.

Week 6. (24-28 July) Chapter 9: Independent trials, Central Limit Theorem. Quiz #10 on Tuesday, 25 July; Quiz #11 on Thursday, 27 July; Assignment #6 due on Friday, 28 July. *Classes end on Friday, 28 July.*

Examination period. (29 July – 1 August) Exam schedule to be determined.

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's Academic Integrity Policy. You have a responsibility to educate yourself unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: www.trentu.ca/academicintegrity .

For clarity, the following guidelines will apply in MATH 1550H:

YStudents are permitted and encouraged to work with others and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions on the quizzes and assignments, and to consult whatever sources they wish. However, all work submitted for credit must be written up entirely by the student, giving due credit to all relevant sources of help and information. For the test and final exam, students are permitted to use a calculator and an aid sheet (one letter- or A4-size sheet with whatever they want written on all sides), but may not use any other sources or aids, nor give or receive any help, except to ask the instructor to clarify questions, without the instructor's express permission.

Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and documentation from a regulated health care practitioner and feels that he/she may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible.

MATH 1550H Archive Page

A web page at euclid.trentu.ca/math/sb/1550H/ has links to various materials from past iterations of MATH 1550H taught by your instructor.

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