

Mathematics 1550H – Introduction to probability

TRENT UNIVERSITY, Winter 2016

[In Peterborough!]

MATH 1550H is an introductory probability course, with an emphasis on the foundations required to understand probability models and statistical methods.

Instructor

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Office hours: Tuesday–Friday 11:00–11:50,

or by appointment, or just drop by!

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Prerequisite

MATH 1005H, or MATH 1100Y/1101Y, or MATH 1120H, or permission of the instructor. MATH 1100Y or MATH 1120H may be taken as a co-requisite.

Text

Introduction to Probability (2nd Edition), by C.M. Grinstead and J. Laurie Snell, American Mathematical Society, 2003. It is 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: Monday 11:00–11:50 in SC 137 and Friday 09:00–10:50 in SC 137.

Workshops: Monday 18:00–18:50 in CCN M2, Tuesday 18:00–18:50 in SC 115, and Wednesday 18:00–18:50 in CCN M2. [Students normally attend one workshop each week.]

Marking Scheme

There will be at least nine quizzes, at least four assignments, a test, and a final examination. Quizzes will normally be written in the Friday lectures and last between ten and fifteen minutes apiece. The assignments will usually be handed out and collected every third Friday. The test will last fifty minutes and will probably be written during the lecture period on Monday, 22 February. The final examination will last three hours and will be written as scheduled by the Registrar's Office during the examination period (8–22 April). These will weigh as follows in the final mark:

Best 8 quizzes (3% each)	24%
Best 3 assignments (8% each)	24%
Test	15%
Final Examination	37%

At least 25% of the course marks will be obtained by the final date (Thursday, 3 March) to withdraw from Winter half-courses without academic penalty. Students who miss the test, or more than one quiz, or are unable to hand in their assignments on time for reasons beyond their control should contact the instructor as soon as possible.

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.

Readings & Schedule

Please note that where the material covered is concerned this schedule is a polite fiction: no lesson plan survives contact with actual students unchanged! Additional material, including some not in the text, may be covered on assignments and in class, and other sources may be used to augment the text.

Week 0. (6–8 January, 2016.) Classes begin on Wednesday, 6 January. [Chapter 1] Discrete probability distributions. No workshops this week.

Week 1. (11–15 January, 2016.) [Chapters 1 & 2] Discrete probability distributions and continuous probability densities. Quiz #1 written on Friday, 15 January.

Week 2. (18–22 January, 2016.) [Chapter 3] Counting discrete outcomes, permutations and combinations. Quiz #2 written and Assignment #1 due on Friday, 22 January.

Week 3. (25–29 January, 2016.) [Chapter 4] Discrete and continuous conditional probability. Quiz #3 written on Friday, 29 January.

Week 4. (1–5 February, 2016.) [Chapter 5] Important discrete distributions. Quiz #4 written on Friday, 5 February.

Week 5. (8–12 February, 2016.) [Chapter 5] Important continuous densities. Quiz #5 written and Assignment #2 due on Friday, 12 February.

Winter Reading Week. (15–19 February, 2016.) Enjoy!

Week 6. (22–26 February, 2016.) [Chapter 6] Expected value and variance. Test written on Monday, 22 February.

Week 7. (29 February – 4 March, 2016.) [Chapters 6 & 7] More on expected values and variance, random variables, sums of random variables. Quiz #6 written on on Friday, 4 March. *The last date to withdraw from Winter half-courses without academic penalty is Thursday, 3 March.*

Week 8. (7–11 March, 2016.) [Chapters 7 & 8] More on sums of random variables, Laws of Large Numbers. Quiz #7 written and Assignment #3 due on Friday, 11 March.

Week 9. (14–18 March, 2016.) [Chapter 8] Laws of Large Numbers, Chebyshev's Inequality. Quiz #8 written on Friday, 18 March.

Week 10. (21–25 March, 2016.) No class on Good Friday, 25 March. [Chapter 9] Independent trials of discrete and continuous random variables.

Week 11. (28 March – 1 April, 2016.) [Chapter 9] Central Limit Theorem. Quiz #9 written and Assignment #4 due on Friday, 1 April.

Week 12. (4–5 March, 2016.) Tuesday, 7 April, is the last day of classes. Clean-up and review.

Winter final examination period. (8–22 April, 2016.) Watch for the exam schedule to find out when and where the MATH 1550H final will be written.

Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from a 0 grade 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:

You are permitted and encouraged to work with others and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions on the assignments, and to consult whatever sources you wish. However, **all work submitted for credit must be written up entirely by yourself, giving due credit to all relevant sources of help and information. For the quizzes, test, and final exam, you may not give or receive any help**, nor use any aids except for a calculator (any that you like) and one letter- or A4-sized aid sheet with whatever you want on (all sides!) of it, except with 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/or health consideration and feels that he/she may need accommodations to succeed in this course, the student should contact the Student Accessibility Services Office (SAS), Blackburn Hall Suite 132, 705 748-1281, sas@trentu.ca. For Trent University in Oshawa Student Accessibility Services Office contact 905 435-5102, ext. 5024. Complete text can be found under Access to Instruction in the Academic Calendar.

Web page

This course will make at most minimal use of Blackboard, and perhaps none at all. A web page at euclid.trentu.ca/math/sb/1550H/ will have hopefully-up-to-date information and all handouts.