

# Mathematics 1550H – Introduction to probability

TRENT UNIVERSITY, Summer 2015

[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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## Department of Mathematics

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## Prerequisite

MATH 1005H, or MATH 1100Y/1101Y, or MATH 1110H, or permission of the instructor. MATH 1100Y or MATH 1110H 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:

<http://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](http://www.dartmouth.edu/~chance/teaching_aids/books_articles/probability_book/book.html)

## Meetings

The course will run during the second six-week summer session (S62: 223 June – 30 July), 09:00-12:00 on Mondays and Wednesdays in GCS 110. Normally, the first half-hour or so of each three-hour period will be used as a seminar, followed by a quiz on the material in the previous lecture, and the rest will be used as lecture time.

## Marking Scheme

There will be at least nine quizzes, at least five assignments, a test, and a final examination. Quizzes will normally be written in the lectures and last between ten and twenty minutes apiece. The assignments will usually be handed out and collected on Mondays. The test will last fifty minutes and will probably be written during the lecture period on Monday, 13 July. The final examination will last three hours and will be written as scheduled by the Registrar's Office during the examination period (4–5 August). These will weigh as follows in the final mark:

Best 8 quizzes (4% each)	32%
Best 4 assignments (5% each)	20%
Test	15%
Final Examination	33%

Students who miss the test or more than one quiz for reasons beyond their control should contact the instructor as soon as possible to arrange to write a make-up. Assignments will not normally be accepted after the due date; students unable to hand in the assignments in time for reasons beyond their control should contact the instructor as soon as possible. Note that there is no attendance requirement *per se*, but the consequences of missing classes are ultimately the students' responsibility to deal with.

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, & Schedule

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.

We will cover at least portions of each of Chapters 1–9 of the text.

- Week 1.* [22-26 June] Chapters 1 & 2: Discrete probability distributions and continuous probability densities. Quiz #1 on Wednesday, 24 June.
- Week 2.* [29 June - 3 July] Chapters 3 & 4: Combinatorics, conditional probability. Quiz #2 written and Assignment #1 due on Monday, 29 June; Quiz #3 written on Wednesday, 1 July.
- Week 3.* [6-10 July] Chapter 5: Examples of discrete and continuous distributions. Quiz #4 written and Assignment #2 due on Monday, 6 July; Quiz #5 written on Wednesday, 8 July.
- Week 4.* [13-17 July] Chapter 6: Expected values and variance. Test written on Monday, 13 July; Quiz #6 written and Assignment #3 due on Wednesday, 15 July. *The last date to drop this course without academic penalty is Thursday, 16 July.*
- Week 5.* [20-24 July] Chapters 7 & 8: Sums of random variables, Laws of Large Numbers. Quiz #7 written on and Assignment #4 due Monday, 20 July; Quiz #8 written on Wednesday, 22 July.
- Week 6.* [27–31 July] Chapters 8 & 9: Chebyshev's Inequality, independent trials, Central Limit Theorem. Quiz #9 written and Assignment #5 due on Monday, 27 July; possible Quiz #10 written on Wednesday, 29 July. The final exam will be written, at a time and location to be determined, on 4 or 5 August.

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.

## 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](http://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](mailto: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/](http://euclid.trentu.ca/math/sb/1550H/) will have hopefully-up-to-date information and all handouts.