

## Mathematics 1550H – Probability I: Introduction to Probability

TRENT UNIVERSITY, Summer 2020 (S62)

[In Peterborough!]

### Instructor

Stefan Bilaniuk (pronounced Стефан Біланюк)

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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](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)

### Delivery

The course will run during the second six-week summer session (S62), 17 June – 28 July (exams 29 July – 1 August). There will be pre-recorded video presentations of definitions, techniques, examples, and applications, backed up by written notes and the textbook, in the Content section of the course Blackboard site. Video office hours/seminars will be held each week at times and by means to be determined, backed up by a discussion group on Blackboard and by email.

### Marking Scheme

There will be at least six do-at-home quizzes (Tuesdays), at least five assignments (due Fridays), and a do-at-home final examination, all delivered and submitted via the Assignment module on Blackboard, with email as a backup. These will weigh as follows in the final mark:

Best 5 do-at-home quizzes (6% each)	30%
Best 4 assignments (10% each)	40%
Do-at-home final examination	30%

Please note that work worth at least 25% of the course should be completed, marked, and returned by the final date (Monday, 13 July) to withdraw from the course without academic penalty. The quizzes and assignments will not normally be accepted after the due date; students unable to return them in 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. 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 is not in the textbook.

**Week 0.** (17-19 June) Chapter 1: Discrete probability distributions.

**Week 1.** (22-26 June) Chapters 1 & 3: Discrete probability distributions and combinatorics. Quiz #1 written on Tuesday, 23 June; Assignment #1 due on Friday, 26 June.

**Week 2.** (29 June – 3 July) Chapters 2 & 4: Continuous probability distributions, conditional probability. Quiz #2 written on Tuesday, 30 June; Assignment #2 due on Friday, 3 July.

**Week 3.** (6-10 July) Chapter 5: Examples of discrete and continuous distributions. Quiz #3 written on Tuesday, 7 July; Assignment #3 due on Friday, 10 July.

**Week 4.** (13-17 July) Chapters 6 & 7: Expected values and variance, sums of random variables. Quiz #4 written on Tuesday, 14 July; Assignment #4 due on Friday, 17 July. *The last date to drop this course is Monday, 13 July.*

**Week 5.** (20-24 July) Chapters 7 & 8: Sums of random variables, Chebyshev's Inequality, Laws of Large Numbers. Quiz #5 written on Tuesday, 21 July; Assignment #5 due on Friday, 24 July.

**Week 6.** (27-28 July) Chapter 9: independent trials, Central Limit Theorem. Quiz #6 written on Tuesday, 28 July. *Classes end on Tuesday, 28 July.*

**Examination period.** (29 July – 1 August) The final exam will be posted at noon on Wednesday, 29 July, and be due by noon on Saturday, 1 August.

## 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](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 and final exam, you are permitted to use your textbook and all other course material, but you may not use any other sources or aids, nor give or receive any help**, except to ask the instructor to clarify questions and to use a calculator (any that you like), unless you have 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/](http://euclid.trentu.ca/math/sb/1550H/) has links to quizzes, assignments, tests, and exams, many with solutions, as well as various other materials, from past iterations of MATH 1550H taught by your instructor.

*Last modified 2020-06-16.*