Mathematics 1550H – Introduction to probability
Trent University, Winter 2018
[In Peterborough!]

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

Instructor

Stefan Bilaniuk (pronounced Стефан Біланюк)
office: GCS 337
Office hours: Tuesday and Wednesday 10:00-11:50, and
       Friday 11:00-11:50, or by appointment, or just drop by!
phone: 705 748-1011 x7474
home: 705 742-7862 [Do *not* call between 9 p.m. and 8 a.m. unless it's an emergency.]
e-mail: `sbilaniuk@trentu.ca` [If it's important, please call or drop by.]
web: `euclid.trentu.ca/math/sb/`

Department of Mathematics

Gina Collins
office: SC 327
hours: 09:00-12:00 & 13:00-16:00
phone: 705 748-1011 x7715
e-mail: `math@trentu.ca`

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: Wednesday 08:00-09:50 and Friday 12:00-12:50 in SC 137.
Workshops: Wednesday 15:00-15:50, 16:00-16:50, or 17:00-17:50, or 18:00-18:50 in CCN M2; students normally attend one workshop each week.

Marking Scheme

There will be at least ten assignments, two tests, and a final examination. The assignments will normally be handed out and collected each Friday. The tests will last fifty minutes and will probably be written during the lecture periods on Friday, 9 February, and Friday, 16 March. The final examination will last three hours and will be written as scheduled by the Registar's Office during the examination period (9–22 April). These will weigh as follows in the final mark:

Best 9 assignments (5% each)	45%
Tests (10% each	20%
Final Examination	35%

At least 25% of the course marks will be obtained by the final date (Friday, 10 March) to withdraw from Winter half-courses. Students who miss a test 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 1. *(8–12 January)* [Chapters 1 & 2] Discrete probability distributions and continuous probability densities. *No workshops this week.*

Week 2. *(15–19 January)* [Chapter 3] Counting discrete outcomes, permutations and combinations. Assignment #1 due on Friday, 19 January.

Week 3. *(22–26 January)* [Chapter 4] Discrete and continuous conditional probability. Assignment #2 due on Friday, 26 January.

Week 4. *(29 January – 2 February)* [Chapter 5] Important discrete distributions. Assignment #3 due on Friday, 2 February.

Week 5. *(5–9 February)* [Chapter 5] Important continuous densities. Assignment #4 due and Test #1 written on Friday, 9 February.

Week 6. *(12–16 February)* [Chapter 6] Expected value and variance. Assignment #5 due on Friday, 16 February.

Winter Reading Week. *(19–23 February)* Enjoy!

Week 7. *(26 February – 2 March)* [Chapters 6 & 7] More on expected values and variance, random variables, sums of random variables. Assignment #6 due on Friday, 2 March.

Week 8. *(5–9 March)* [Chapters 7 & 8] More on sums of random variables, Laws of Large Numbers. Assignment #7 due on Friday, 9 March. *The last date to withdraw from Winter half-courses is Friday, 9 March.*

Week 9. *(12–16 March)* [Chapter 8] Laws of Large Numbers, Chebyshev's Inequality. Assignment #8 due and Test #2 written on on Thursday, 16 March.

Week 10. *(19–23 March)* [Chapter 9] Independent trials of discrete and continuous random variables. Assignment #9 due on Friday, 23 March.

Week 11. *(26–30 March)* [Chapter 9] Central Limit Theorem. Assignment #10 due on Friday, 30 March.

Week 12. *(2–6 April) Friday, 7 April, is the last day of classes.* Clean-up and review. Possible Assignment #11 due on Friday, 6 April.

Winter final examination period. *(9–22 April)* 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 failure on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent Universitys Academic Integrity Policy. You have a responsibility to educate yourself unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trents 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 tests 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 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.

Web page

This course will make minimal use of Blackboard, at best. It will, however, have a web page at

<div align="center">

`euclid.trentu.ca/math/sb/1550H/`

</div>

with hopefully-up-to-date information and all handouts.

Last updated 2017.11.29.