Mathematics 1550H – Introduction to probability

Trent University, Summer 2017 *[In Peterborough!]*

Instructor

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          or by appointment, or just drop by!

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Department of Mathematics

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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

Mondays and Wednesdays 09:00-12:00 in GCS 108. We will usually employ the first 30–40 minutes for tutorial time and to write the quizzes, and the remainder of the time for lectures.

Marking Scheme

There will be at least nine quizzes, at least five assignments, a test, and a final examination. (Please see the schedule for the dates.) 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%

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 without academic penalty. 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

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

Week 1. *(19-23 June)* Chapters 1 & 2: Discrete probability distrbutions and continuous probability densities. Quiz #1 on Wednesday, 21 June.

Week 2. *(26-30 June)* Chapters 3 & 4: Combinatorics, conditional probability. Quiz #2 written and Assignment #1 due on Monday, 26 June; Quiz #3 written on Wednesday, 28 June.

Week 3. *(3-7 July) University closed on Monday, 3 July [Canada Day].* Chapter 5: Examples of discrete and continuous distributions. Quiz #4 written and Assignment #2 due on Wednesday, 5 July.

Week 4. *(10-14 July)* Chapter 6: Expected values and variance. Test written and Assignment #3 due on Monday, 11 July; Quiz #5 written on Wednesday, 13 July. *The last date to drop this course without academic penalty is Thursday, 13 July.*

Week 5. *(17-21 July)* Chapters 7 & 8: Sums of random variables, Laws of Large Numbers. Quiz #7 written on and Assignment #4 due Monday, 17 July; Quiz #8 written on Wednesday, 19 July.

Week 6. *(24-27 July)* Chapters 8 & 9: Chebyshev's Inequality, independent trials, Central Limit Theorem. Quiz #9 written and Assignment #5 due on Monday, 24 July; Quiz #10 written on Wednesday, 26 July.

Examination period. *(28-31 July)* The final exam will written at a time and location 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 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 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 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 at most minimal use 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.