

## Mathematics – Communications & Critical Thinking 1080H

### Mathematics for Everyday Life

TRENT UNIVERSITY, Winter 2018

[In Peterborough!]

This course shows how mathematics is used in everyday life. It will focus on how to approach everyday situations from a mathematical perspective as well as examine practical applications of mathematics.

#### 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!

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#### Department of Mathematics

Gina Collins

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**Prerequisite:** Grade 11U or U/C mathematics course or equivalent.

**Text:** There is no required text. There will be handouts on a number of topics as we encounter them.

#### Meetings

Lectures: Friday 08:00-10:50 in GCS 111.

Workshops: Tuesday 09:00-09:50 in GCS 111.

#### Marking Scheme

There will be eleven weekly 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 seminar periods on Tuesday, 6 February, and Tuesday, 13 March. The final examination will last three hours and will be written as scheduled by the Registrar's Office during the examination period (9–22 April). These will weigh as follows in the final mark:

Best 10 assignments (5% each)	50%
Tests (10% each)	20%
Final Examination	30%

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

By the end of the course a successful student should be able to:

1. Attack problems using Polya's four step approach.
2. Know and apply various problem solving strategies.
3. Use ratios to scale up or scale down and apply to triangle, objects, recipes, *etc.*
4. Use rates to convert from one measure to another such as imperial to metric, foreign currencies, *etc.*
5. Calculate discounts, tips, commissions.
6. Recognize and describe the role of data in statistical studies.
7. Understand and use mean, median and standard deviation to help classify data.
8. Describe the characteristics of a good sample, i.e. bias free, random, representative.
9. Collect data from primary and secondary sources and organize the data collected.
10. Solve problems involving probability of distinct events.
11. Apply counting techniques to calculate probability.
12. Solve problems which involve conditional probability.
13. Understand and use theorems from Euclidean Geometry.
14. Use measurement principles and formulae to calculate perimeter, area and volumes and apply this to everyday problems such as home renovations.
15. Solve problems that involve exponential growth such as bacteria growth, carbon dating and compound interest.
16. Understand the various choices for borrowing money.
17. Appreciate how symmetry, the golden ratio, the Fibonacci sequence, geometry, fractals, *etc.* appear in art, design, architecture and nature.

## 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! This is all the more likely since this is the first time MATH 1080H is being offered in Peterborough. We may slow down or speed up the presentation of some topics, depending on feedback from the class, perhaps rearrange the order in which they are presented, or even sacrifice some topics to make sure others are properly covered.

**Week 1.** (8–12 January) Arithmetic, fractions, and ratios and rates.

**Week 2.** (15–19 January) Applications of ratios and rates, especially to unit conversion. Assignment #1 due on Friday, 19 January.

**Week 3.** (22–26 January) “Lies, damned lies, and statistics.” Assignment #2 due on Friday, 26 January.

**Week 4.** (29 January – 2 February) More on ~~how to lie~~ with statistics. Assignment #3 due on Friday, 2 February.

**Week 5.** (5–9 February) Introduction to probability and conditional probability. Test #1 written on Tuesday, 6 February. Assignment #4 due Friday, 9 February.

**Week 6.** (12–16 February) Counting cleverly for probability. Assignment #5 due on Friday, 16 February.

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

**Week 7.** (26 February – 2 March) Geometry: perimeter, area, surface area, and volume Assignment #6 due on Friday, 2 March.

**Week 8.** (5–9 March) Exponents and exponential growth. 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) Sequences and series. Test #2 written on Tuesday, 13 March. Assignment #8 due on Friday, 16 March.

**Week 10.** (19–23 March) Applications to finance, Assignment #9 due on Friday, 23 March.

**Week 11.** (26–30 March) Puzzles. Assignment #10 due on Friday, 30 March.

**Week 12.** (2–6 April) Clean-up, catch-up, and review. *Friday, 7 April, is the last day of classes.* 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 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-CCTH 1080H:

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

In addition to its Blackboard site, MATH-CCTH 1080H will have a web page at

[euclid.trentu.ca/math/sb/1080H/](http://euclid.trentu.ca/math/sb/1080H/)

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

*Last updated 2018.01.09.*