

Mathematics 2200H – Mathematical Reasoning

TRENT UNIVERSITY, Fall 2015

[In Peterborough!]

Instructor

Stefan Bilaniuk (pronounced Стефан Біланюк)

office: GCS 337

Fall hours: Tuesday–Friday 10:00–10:50,

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 and sbilaniuk@gmail.com

[E-mail sent to my Trent address sometimes just vanishes. If it's important, please send it to both.]

web: euclid.trentu.ca/math/sb/

Department of Mathematics

office: GCS 346

hours: 08:30–12:30 & 13:30–16:30

phone: 705 748-1011 x7531

e-mail: math@trentu.ca

Prerequisite

At least 60% in MATH 1350H and in one of MATH 1100Y or 1101Y or 1120H.

Text

Doing Mathematics: An Introduction to Proofs and Problem Solving (2nd Edition),

by Steven Galovitch, Brooks/Cole, 2007, ISBN 0-495-10816-2.

Meetings

Lectures: Mon. 14:00–14:50 & Tue. 12:00–12:50 in GCS 103; Thu. 09:00–09:50 in BL 107.2.

Seminars: Thu. 18:00–18:50 in GCS 103.

Marking Scheme

There will be at least eleven weekly assignments and a take-home final examination. The best ten assignments will each count for 6.5% of the final mark and the final exam will count for the remaining 35%. Assignments will not normally be accepted after the due date; students unable to hand them in on time for reasons beyond their control should contact the instructor as soon as possible. This scheme may be modified 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.

Learning Outcomes

This course is an introduction to the basics of doing mathematical proofs while acquiring familiarity with a number of basic concepts, drawn from logic, set theory, and number theory, which are used in many mathematical fields. Successful students finishing the course should be able to solve problems using the methods developed in the course, read and write mathematics effectively, and formulate and write logically correct proofs.

Content & Schedule

We will cover almost all of Chapters I–IV of the textbook, with a few tidbits from Chapter V, and a particular emphasis on the four Cs of writing proofs: ideally, a proof should be correct, complete, clear, and concise. 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 not in the text may be covered on some problem sets, and other sources may be used to augment the text in a couple of places.

Week 0. (10–11 September) Organizational lecture. No seminar this week. Classes begin Thursday, 10 September.

Week 1. (14–18 September) Chapter I. Analyzing problems, problem-solving strategies.

Week 2. (21–25 September) Chapter II. Propositional logic, deductions. Assignment #1 due on Monday, 21 September.

Week 3. (28 September – 2 October) Chapter II. Basic set theory, functions. Assignment #2 due on Monday, 28 September.

Week 4. (5-9 October) Chapter II. First-order logic: relations and quantifiers. Assignment #3 due on Monday, 5 October.

Week 5. (12-16 October) Chapter III. Direct and indirect proof techniques. Assignment #4 due on Tuesday, 13 October. *No classes on Thanksgiving Day, Monday, 12 October.*

Week 6. (19-23 October) Chapter III. Mathematical induction, division and Euclidean algorithms. Assignment #5 due on Monday, 19 October.

Fall Reading Week. (26-30 October) Enjoy!

Week 7. (2-6 November) Chapter IV. Sets, relations, and functions. Assignment #6 due on Monday, 2 November.

Week 8. (9-13 November.) Chapter IV. Equivalence relations, definitions of number systems. Assignment #7 due on Monday, 9 November. *The last date to drop Fall half-courses without academic penalty is Tuesday, 10 November.*

Week 9. (16-20 November) Chapter IV. Real and complex numbers. Assignment #8 due on Monday, 16 November.

Week 10. (23-27 November) Chapter V. Cardinality of sets. Assignment #9 due on Monday, 23 November. Take-home final examination distributed on Thursday, 26 November.

Week 11. (30 November – 4 December) Chapter V. Schröder-Bernstein Theorem. Assignment #10 due on Monday, 30 November.

Week 12. (7-9 December) Catch-up and clean-up. Assignment #11 due on Monday, 7 December. *Wednesday, 9 December, is the last day of classes.*

Fall examination period. (10-22 December) Take-home final examination due on Friday, 18 December.

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

For clarity, the following guidelines will apply in MATH 2200H:

You are permitted and encouraged to work with others and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions for 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 the sources of help and information that you actually used.** There will be greater restrictions on the take-home final examination, which will be spelled out on the exam.

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. 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

MATH 2200H will make only minimal use of Blackboard/LearningSystem. Information about the course and all handouts will be posted to: www.trentu.ca/mathematics/sb/2200H/

Last modified 2015.09.09.