

Mathematics 3200H – Number Theory

TRENT UNIVERSITY, Fall 2015

[In Peterborough!]

Instructor

Stefan Bilaniuk (pronounced Стефан Білانیук)

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 MATH 2200H.

Text

Elementary Number Theory (2nd Edition), by Underwood Dudley, 1978.

Reprinted by Dover Publications, ISBN 978-0-46931-7.

Meetings

Lectures: Monday 13:00–13:50 and Wednesday 09:00–09:50 in GCS 111, and Friday 13:00–13:50 in GCS 108.

Seminars: Thursday 11:00–11:50 in SC 208.

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 elementary number theory. A student successfully completing the course should be able to understand, be able to explain, and be able to prove results in elementary number theory up to and including the Quadratic Reciprocity Theorem. and do computations using the concepts developed in the course.

Content & Schedule

We will cover §1–12, 18, 19, and 21 of the textbook, with some tidbits from other sections. Please note that where the material covered is concerned the schedule below is a polite fiction: no lesson plan survives contact with actual students unchanged! A little additional material not in the text may be covered on some assignments, and other sources may be used to augment the text in a couple of places.

Week 0. (10–11 September) Organizational seminar. Classes begin Thursday, 10 September.

Week 1. (14–18 September) §1–2. Natural numbers, integers, unique factorization.

Week 2. (21–25 September) §3–5. Linear Diophantine equations, congruences. Assignment #1 due on Monday, 21 September.

Week 3. (28 September – 2 October) §5–6. Chinese Remainder and Fermat's Theorems. Assignment #2 due on Monday, 28 September.

Week 4. (5–9 October) §6–7. Wilson's Theorem, divisors. Assignment #3 due on Monday, 5 October.

Week 5. (12-16 October) §7–8. Divisors, perfect and amicable numbers. Assignment #4 due on Tuesday, 13 October. *No classes on Thanksgiving Day, Monday, 12 October.*

Week 6. (19-23 October) §9. Euler’s totient function, Euler’s Theorem. Assignment #5 due on Monday, 19 October.

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

Week 7. (2-6 November) §10. Primitive roots. Assignment #6 due on Monday, 2 November.

Week 8. (9-13 November.) §11. Quadratic congruences. 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) §12. Quadratic reciprocity. Assignment #8 due on Monday, 16 November.

Week 10. (23-27 November) §18–19. Sums of two and four squares Assignment #9 due on Monday, 23 November. Take-home final examination distributed on Thursday, 26 November.

Week 11. (30 November – 4 December) §21. The distribution of primes. 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 3200H:

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/3200H/

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