Mathematics 2260H – Euclidean Geometry
TRENT UNIVERSITY, Winter 2025

Instructor

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Department of Mathematics

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Prerequisite

At least one of MATH 1005H or 1110H or 1350H, or permission of instructor.

Text

The first half or so of the course will be based on parts of the oldest mathematics textbook still in use:

> *Euclid's Elements of Geometry*, in Greek, edited and translated into English by Richard Fitzpatrick, 2008. ISBN 978-0-6151-7984-1. Free e-text at: `farside.ph.utexas.edu/books/Euclid/Euclid.html`

The remainder of the course will not have a textbook, though there will be occasional handouts and references to other freely available sources.

Meetings: Mondays 09:00-10:50 in ENW 110 and Thursdays 14:00-15:50 in DNA B105. Please consult the Academic Timetable at `https://www.trentu.ca/registrar/timetable/undergraduate` for up-to-date times and locations.

Marking scheme

There will be at least eleven weekly assignments and a take-home final examination. Please consult the schedule below for due dates. The work will weigh as follows:

Best 10 assignments (6.5% each)	65%
Take-home final examination	35%

At least 25% of the course marks will be obtained by the final date (Friday, 7 March) to withdraw from Winter courses. Students who are unable to submit an assignment or the take-home final exam on the due date, or who miss more than one assignment, for reasons beyond their control should contact the instructor as soon as possible.

This scheme may also 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 2260H is an introduction to Euclidean plane geometry, starting from Euclid's axioms and developing properties of lines, angles, polygons, and circles. Successful students will acquire knowledge of and the ability to use results concerning congruence, similarity, cross-ratios, concurrency, and collinearity, including the Butterfly, Ceva's, Menelaus', and Pappus' Theorems, and develop some of the relationships between triangles and circles, up to and including the nine-point circle. Other topics in geometry may be touched on from time to time. Note that having or acquiring familiarity with doing proofs is necessary in this course.

Schedule

Please note that where the material covered is concerned, the schedule below is a polite fiction: no lesson plan survives contact with students unchanged ...

Week 1. *(6-10 January) Classes begin on Monday, 6 January.* Examples of geometries and systems of axioms. Book I of Euclid's *Elements*: Euclid's definitions, postulates, and common notions; Hilbert's axioms for plane geometry. Neutral geometry (*i.e.* without the parallel postulate).

Week 2. *(13-17 January)* Book I of Euclid's *Elements*: More neutral geometry. Assignment #1 due on Friday, 17 January.
Week 3. *(20-24 January)* Book I of Euclid's *Elements*: Even more neutral geometry. Assignment #2 due on Friday, 24 January.
Week 4. *(27-31 January)* Book I of Euclid's *Elements*: Parallel lines, equivalents of the Parallel Postulate. What happens if the Parallel Postulate is not true? Assignment #3 due on Friday, 31 January.
Week 5. *(3-7 February)* Book I of Euclid's *Elements*: Areas and the Pythagorean Theorem. Assignment #4 due on Friday, 7 February.
Week 6. *(10-14 February)* A little of Books II & V of Euclid's *Elements*: Areas and proportions. Assignment #5 due on Friday, 14 February.
Reading Week. *(17-21 February)* Enjoy! *University closed on Family Day, Monday, 17 February.*
Week 7. *(24-28 February)* A little of Book III of Euclid's *Elements*: Circles and triangles. Assignment #6 due on Friday, 28 February.
Week 8. *(3-7 March)* A little of Book IV of Euclid's *Elements*: Regular polygons, circumference and area of a circle. Assignment #7 on Friday, 7 March. *The last date to withdraw from Winter courses is Friday, 7 March.*
Week 9. *(10-14 March)* Triangles and circles. Assignment #8 due on Friday, 14 March.
Week 10. *(17-21 March)* Division of line segments, Menelaus' and Pappus' Theorems. Assignment #9 due on Friday, 21 March.
Week 11. *(24-28 March)* Ceva's Theorem, the Euler line. Assignment #10 due and take-home final examination distributed on Friday, 28 March.
Week 12. *(31 March – 4 April)* The nine-point circle. Catch-up and clean-up. Assignment #11 due on Friday, 4 April. *Friday, 4 April, is the last day of classes.*
Winter Examination Period. *(7-23 April)* Take-home final examination due on Thursday, 17 April. *University closed on Good Friday, 18 April.*

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 2260H:

You are permitted and encouraged to work together and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions on the assignments, and to use what software and 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**. The restrictions applicable to the take-home final exam will be spelled out on the exam.

Access to Instruction

> *IIt 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 they 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.*

Blackboard and Archive Page

All course materials will be posted to or linked from the course Blackboard site. A web page at `euclid.trentu.ca/math/sb/2260H/` will eventually archive this material, and already archives material from a number of previous iterations of the course taught by the instructor.

Last modified 2024-11-21.