Mathematics 326H – Geometry II: Projective and non-Euclidean geometries
Trent University, Winter 2007

Instructor

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  . . . or by appointment, or just drop by!
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Prerequisite: MATH 135H or permission of the instructor.

Text: *The Elements of Non-Euclidean Geometry*, D.M.Y. Somerville
Dover Publications, 2006, ISBN 0-486-44222-5   (Originally published by G. Bell and Sons, 1914.)
The text will often be supplemented with handouts on various topics.

Meetings

Lectures: Tuesdays 9:00-9:50 in CC A1, Wednesdays 10:00-10:50 in SC W1, Thursdays 9:00-9:50 in SC W2
Seminars: Tuesdays 10:00-10:50 in CC A1

Marking scheme

There will be six fortnightly problem sets, at least ten weekly quizzes, and a take-home final exam. The best five problem sets will each count for 8% of the final mark, the best eight quizzes will each count for 2% of the final mark, and the exam will count for the remaining 44% of the final mark.

This scheme may be modified for students in *exceptional* circumstances. Any such modification will require the agreement of both the student and the instructor.

Honour

Plagiarism is an extremely serious academic offence and carries penalties varying from failure in an assignment to suspension from the University. Definitions, penalties and procedures for dealing with plagiarism are set out in Trent University's *Academic Dishonesty Policy* which is printed in the Calendar. It can also be found online at http://www.trentu.ca/deansoffice/dishonestypolicy.html .

For clarity, the following guidelines will apply in MATH 326H: You are permitted and encouraged to work together and ask anyone willing (especially the instructor!) for explanations, hints, and suggestions on the problem sets, and to consult whatever sources you wish. However, **all work submitted for credit must be written up entirely by you, giving due credit to all relevant sources of help and information. You may neither give nor receive any help on the quizzes and may consult references only as explicitly permitted by the instructor.** The rules applying to the final exam will will be spelled out when you receive it.

Content

We will cover as many topics and problems as we can in the following areas of geometry. With very few exceptions we will stick to two-dimensional (*i.e.* planar) geometry.

1. Euclid's and Hilbert's axioms for Euclidean geometry, the parallel postulate and equivalents
2. Independence of axioms, alternatives to the parallel postulate, hyperbolic and elliptic geometries, consistency of systems of axioms
3. Hyperbolic geometry: basic results, model(s) of hyperbolic geometry in Euclidean geometry
4. Elliptic geometry: basic results, model(s) of eliptic geometry in Euclidean geometry
5. Projective geometry: axioms for affine and projective incidence geometry, basic properties, duality
6. Real projective plane: constructions, coordinate systems, transformations, Desargues' and Pappus' Theorems
7. Other examples and constructions of projective planes, introduction of coordinates, algebraic properties

Other topics may also be touched on if there is time and interest.

MATH 326H Home Page: http://euclid.trentu.ca/math/sb/326H/

Check it for (hopefully!) up-to-date information and handouts.