

Mathematics 3260H – Geometry II: Projective and non-Euclidean geometry

TRENT UNIVERSITY, Winter 2015

[In Peterborough!]

Instructor

Stefan Bilaniuk (pronounced Стефан Біланюк)

office: GCS 337

hours: Monday to Friday 11:00-11:50,

or by appointment, or just drop by!

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Department of Mathematics

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phone: 705 748-1011 x7531

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Prerequisites

Prerequisite: 60% or higher in MATH 1350H.

Text

Notes will be provided by the instructor, drawn from various sources, for the material on non-Euclidean geometry. (See the handout *Sources* . . .) For projective geometry, we will use *A Problem Course on Projective Planes*, by Stefan Bilaniuk, which is freely available for download in pdf format at: euclid.trentu.ca/math/sb/pcpp/ .

Meetings

Lectures: Monday 14:00-14:50 in BL 107.2, and Tuesday 12:00-12:50 in GCS 106, and Thursday 09:00-09:50 in GCS 106.

Seminars: Monday 12:00-12:50 in GCS 112.

Marking Scheme

There will be eleven weekly quizzes, eleven weekly assignments, and a take-home final examination. Quizzes will normally be written weekly in the Monday lectures and last between ten and twenty minutes each. Assignments will normally be due on Thursdays. The final examination will be handed out two weeks before the end of classes and will be due near the end of the examination period in April. (Please consult the handout *Readings and Schedule* for a detailed list of dates.) The work will weigh as follows in the final mark:

Best 10 quizzes (2% each)	20%
Best 10 assignments (4.5% each)	45%
Final Examination	35%

At least 25% of the course marks will be obtained by the final date (Thursday, 5 March, 2015) to withdraw from Winter half-courses without academic penalty.

Assignments will not normally be accepted after the due date. Students who miss more than one quiz or assignment for reasons beyond their control should contact the instructor as soon as possible. Note that there is no attendance requirement *per se*, but the consequences of missing classes are ultimately the students' responsibility to deal with.

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

MATH 3260H is an introduction to alternatives to Euclid's axioms, beginning with alternatives to the parallel postulate. Students will acquire some familiarity with basic results about hyperbolic and elliptic planes, especially the relationship between areas and interior angles of triangles, as well as the Poincaré disk and/or half-plane models of the hyperbolic plane and the antipodal sphere

model of the elliptic plane. Students will also learn the axioms for affine and projective planes and basic properties of these structures, and various examples of and constructions of affine and projective planes and their properties, especially the real projective plane, as well as the introduction of coordinate systems in and transformations of projective planes, and related geometrical results, especially Desargues' and Pappus' Theorems.

Additional material, including material not in the text, may be covered on assignments and in class, and other sources may be used to augment the text in a couple of places. Please consult the handout *Readings and Schedule* for a tentative description of what material will be covered when.

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 3260H:

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. No aid may be given or received on the quizzes and final exam**, except with the instructor's permission.

Access to Instruction

In some circumstances you may also be eligible for additional help or accommodation:

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), (BH Suite 132, 748 1281 or e-mail accessibilityservices@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.

It might also be useful to speak to the instructor directly: in some cases the instructor may be able to get help or extend accommodation beyond what the Disability Services Office can arrange.

Aids

For the quizzes, you may use whatever calculators you wish and an 8.5" × 11" (or A4) aid sheet with whatever you want written on all sides of it. Software such as Maple, Mathematica, Geogebra, or Geometer's Sketchpad may come in handy when doing some of the assignments or to check your answers when studying.

Web Page

Hopefully up-to-date information about the course and all handouts will be posted to:

www.trentu.ca/mathematics/sb/3260H/

Note that MATH 3260H will make minimal or no use of Blackboard/LearningSystem.

Last modified 2014.12.05.