Mathematics 3260H – Geometry II: Projective and non-Euclidean geometry
Trent University, Winter 2015
Readings and Schedule

The following schedule is *tentative* – no lesson plan survives contact with actual students! – and our actual pace will be adjusted as necessary. Please note that, in the absence of a single textbook, the instructor will periodically provide notes based on a variety of sources for the material on non-Euclidean geometry. The material on projective geometry will be largely drawn from *A Problem Course on Projective Planes*, by Stefan Bilaniuk.

Week 1. *(5–9 January, 2015.)* Classes begin on Wednesday, 7 January. Euclid's and Hilbert's axioms for Euclidean plane geometry. *No seminar this week.*

Week 2. *(12–16 January, 2015.)* The parallel postulate, the hypotheses of the acute angle and the obtuse angle, neutral geometry of triangles. Quiz #1 written on Monday, 12 January, and Assignment #1 due on Thursday, 15 January.

Week 3. *(19–23 January, 2015.)* Hyperbolic and elliptic planar geometry, the Poincaré disk and half-plane models of the hyperbolic plane, the antipodal sphere model of the elliptic plane. Quiz #2 written on Monday, 19 January, and Assignment #2 due on Thursday, 22 January.

Week 4. *(26–30 January, 2015.)* Triangles in hyperbolic and elliptic planes; defect, excess, and area of triangles. Quiz #3 written on Monday, 26 January, and Assignment #3 due on Thursday, 29 January.

Week 5. *(2–6 February, 2015.)* The inconsistency of the hypothesis of the obtuse angle with Euclid's Postulate II; consistency with Postulates I, III, and IV. Quiz #4 written on Monday, 2 February, and Assignment #4 due on Thursday, 5 February.

Week 6. *(9–13 February, 2015.)* The consistency of the hypothesis of the acute angle with Euclid's Postulate's I–IV. Quiz #5 written on Monday, 9 February, and Assignment #5 due on Thursday, 12 February.

Winter Reading Week. *(16–20 February, 2015.)* Enjoy!

Week 7. *(23–27 February, 2015.)* Incidence, axioms for projective and affine planes, configurations, examples. Quiz #6 written on Monday, 23 February, and Assignment #6 due on Thursday, 26 February.

Week 8. *(2–6 March, 2015.)* Quiz #7 written on Monday, 2 March, and Assignment #7 due on Thursday, 5 March. *The last date to withdraw from Winter half-courses without academic penalty is Thursday, 5 March.*

Week 9. *(9–13 March, 2015.)* Constructions of affine and projective planes, affine and projective coordinates. Quiz #8 written on Monday, 9 March, and Assignment #8 due on Thursday, 12 March.

Week 10. *(16–20 March, 2015.)* Subplanes, completions of configurations, free completions, collineations. Quiz #9 written on Monday, 16 March, and Assignment #9 due on Thursiday, 19 March.

Week 11. *(23–27 March, 2015.)* Coordinatization, algebraic *vs.* geometric properties. Quiz #10 written on Monday, 23 March, and Assignment #10 due on Thursday, 26 March. Take-home final examination distributed on Tuesday, 24 March.

Week 12. *(30 March – 3 April, 2015.) No classes on Good Friday, 3 April.* Desargues' and Pappus' Theorems. Quiz #11 written on Monday, 30 March.

Week 13. *6–10 March, 2015. Tuesday, 7 April, is the last day of classes.* Clean-up. Assignment #11 due on Tuesday, 7 April.

Winter final examination period. *(10–24 April, 2015.)* Take-home final examination due on Wednesday, 22 April.