Pries: 470 Euclidean and non-Euclidean Geometry: Tentative Syllabus

Week	Starts	Topics
		Axiomatic Geometry
1	1/18	intro to non-Euclidean geometry, axiomatic proofs
2	1/23	examples of geometries, parallel postulates, construction proofs
3	1/30	Euclidean axioms, exterior angle theorem, similar triangles
4	2/6	Descartes' angle sum formula, Pythagorean theorem
		Analytic Geometry: Euclidean
5	2/13	Euclidean distance, metrics, vectors, projection, Cauchy-Schwarz
6	2/20	convexity, circles, tilings
		Analytic Geometry: Spherical
7	2/27	spherical distance, area, angle sum and pythagorean theorem
8	3/6	stereographic projection, Platonic solids,
		Spring break
		Analytic Geometry: Hyperbolic
9	3/20	hyperbolic models, lines, and distance
10	3/27	hyperbolic angle sum, Pythagorean theorem, tilings
		Transformations
11	4/3	Isometries, Euclidean isometries-complex number form
12	4/10	matrix form of isometries - Euclidean and spherical
13	4/17	hyperbolic isometries, cross-ratio
		Fun Topics
14	4/24	surfaces: torus, Klein bottle, Euler characteristic, fractals
15	5/1	presentations, review

Important Dates:
Midterm 1: Axiomatic and Analytic Euclidean Geometry: Week 6, Friday 2/24
Midterm 2: Spherical/Hyperbolic Geometry and Transformations: Week 13, Friday 4/21
Extra Credit: due Wednesday 4/26

Possible extra credit topics:
Constructible numbers and impossible constructions.
Triangles: Euler line and Morley triangle theorem.
Circles: Nine Point Circle and Feuerbach's theorem.
Hexagons: Pascal Mystic Hexagon and Brianchon's theorem.
Penrose tilings.
Bezier curves.
Apollonian circles.
Symmetries of Platonic solids.
Triangular model of the hyperbolic plane.
Sphere packing.
Projective geometry.