

DEPARTMENT OF MATHEMATICS SYLLABUS

Course # & Name: MAT 141: Euclidean Geometry

Recommended Text(s) & Price: Greenberg's "Euclidean and Non-Euclidean
Geometry" 3rd Edition (\$70.00)

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Lecture(s)	Sections	Comments/Topics
1	Chapter 1	Geometry, the five axioms of Euclid (have students read Chapter 1)
5	Chapter 2	Logic, incidence geometry, models, affine and projective planes.
3	Chapter 3	Hilbert's axioms (add axiom 0: a line is a set of points. Proposition's 3.2 proof is incorrect).
3	Chapter 4	Neutral geometry.
0	Chapter 5	(Have students read)
1	Chapter 6	(Have students read selected sections)
5	Chapters 7 and 10	Models and properties of hyperbolic geometry.
2		Spherical geometry.
5	Chapter 9	Geometric symmetries and group theory.

Additional Notes:

1. Spherical geometry and trigonometry. Area of spherical triangle. Spherical barycenter, orthocenter, and incenter. Spherical Ceva's theorem. (George A. Jennings, modern Geometry with Applications, Section 2, and online sources.)
2. Advanced Euclidean geometry: Ceva's theorem and its applications. The Euler line and the 9-point circle. The Fermat point. Napoleon triangles. Morley's theorem. (Sources: H.S.M. Coxeter, Geometry revisited, and multiple online sources [for instance, <http://www.cut-the-knot.org/goemetry.shtml>]).
3. Have students explore hyperbolic geometry with NonEuclid, a hyperbolic geometry freeware developed by Joel Castellanos (currently at <http://cs.unm.edu/~joel/NonEuclid/>). Requirements: Java-enabled internet browser. A possible project is to experimentally verify that heights/medians/bisectors of a hyperbolic triangle are concurrent.
4. Have students explore Euclidean geometry with Geometers Sketchpad or similar available online free software.