TOPICS FOR MATHEMATICS 133, FALL 2013

The approximate numbers of lectures for each unit are given in parentheses; additional classes during the quarter will be used for catching up, review and examinations. Items marked with an asterisk (*) will be covered to the extent that time permits. The units and sections correspond to the online notes in the following online directory:

http://math.ucr.edu/~res/math133

This directory also contains exercises and other documents for the course.

I. Topics from linear algebra (5)

1. Dot products
2. Cross products (*)
3. Linear varieties
4. Barycentric coordinates

II. Vector algebra and Euclidean geometry (6)

1. Approaches to Euclidean geometry
2. Synthetic axioms of order and separation
3. Measurement axioms
4. Congruence, superposition and isometries
5. Euclidean parallelism

III. Basic Euclidean concepts and theorems (6)

1. Perpendicular lines and planes
2. Basic theorems on triangles
3. Convex polygons
4. Concurrence theorems
5. Similarity
6. Circles and classical constructions
7. Areas and volumes (*)

[**Note:** *Unit* **IV** *in the notes will* **not** *be covered in the course*]

V. Introduction to hyperbolic geometry (5)

1. Facts from spherical geometry
2. Attempts to prove Euclid's Fifth Postulate
3. Neutral geometry
4. Angle defects and related phenomena
5. Further topics in hyperbolic geometry (*)
6. Subsequent developments (*)
7. Non – Euclidean geometry in modern mathematics (*)
8. Summarizing the impact of non – Euclidean geometry