

**MATH 312A - GEOMETRY  
FALL 2007**

TTH: 1:10 - 2:30 P.M. (HATHORN 100)

**Syllabus:**

- Parameterized curves in  $\mathbb{R}^2$  and in  $\mathbb{R}^3$ 
  - arc length, curvature, Frenét formulas
- Parameterized surfaces in  $\mathbb{R}^3$ 
  - normal and tangent vectors, Gaussian curvature
- Euclidean isometries
  - isometries in  $\mathbb{R}^2$
  - translations, rotations, reflections, and glide reflections
  - isometries as products of reflections
- Symmetries
  - frieze patterns, wallpaper designs
  - groups of symmetries
  - tessellations: regular and semi-regular
- Planar graphs
  - Euler's formula
- Solids
  - Euler's formula and classification of regular solids, golden ratio
- Hyperbolic Geometry
  - upper half plane model
  - linear fractional transformations
- Miscellany
  - rubber sheet geometry: cut and paste topology