

**Syllabus and tentative schedule**

1. *Curves*: (week 1-3, one homework, one take-home mid-term), parametrized curves, regular curves, arc-length, vector product, the local theory of curves, the local canonical curves, global properties of curves.
2. *Regular surfaces*; (week 4-5, one homework assignment), regular surfaces, inverse images of regular values, change of parameters, the tangent plane, the differential of a map, the first fundamental form, area, orientation;
3. *The Geometry of the Gauss maps*; (week 6-7, one homework set, one take-home mid-term exam), the second fundamental form, Gauss map in local coordinates, ruled surfaces, minimal surfaces, constant mean curvature surfaces.
4. *The intrinsic geometry of surfaces*: (week 8-10, one homework set); Isometries, conformal maps, geodesics, parallel transport, the Gauss-Bonnet Theorem.
5. *Global differential geometry*: (week 11-13, one homework set, take-home final exam), the variational formulas, surfaces of constant Gauss curvature, Chern-Lashof formula.

If you have any further questions about Math 438, please feel free to contact Professor Cao at 631-8847.