Classical Differential Geometry, Math 424, Term II 2016

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Textbook: Differential Geometry of Curves and Surfaces, 2nd Ed, M. do Carmo

Pre-requisites: Multivariable calculus, linear algebra

Time and Location: Tue and Thu, 2:00 pm-15:30 pm, Math Building, Room 202

Course work: There will be regular homework sets and a take home final exam.

Topics: The course is on differential geometry of curves and surfaces in $\mathbb{R}^3$, with emphasis on surface theory. We will introduce some basic concepts, such as curvature of curves, the tangent plane and differential of maps, differential forms, the first and the second fundamental forms, Gauss curvature and the mean curvature of surfaces, Gauss map and vector fields. We will study Gauss' Theorema Egregium and the Gauss-Bonnet Theorem. If we have time, we will discuss the rigidity of the sphere and the Hopf-Rinow theorem for complete surfaces.