

Math 591

Prerequisites: 451, 452, 590

Course Description: This is one of the basic courses for students beginning the PhD program in mathematics. The approach is rigorous and emphasizes abstract concepts and proofs. The first 2-3 weeks of the course will be devoted to general topology, and the remainder of the course will be devoted to differential topology.

Topics include: Product and quotient topology, CW-complexes, group actions, topological groups, topological manifolds, smooth manifolds, manifolds with boundary, smooth maps, partitions of unity, tangent vectors and differentials, the tangent bundle, submersions, immersions and embeddings, smooth submanifolds, Sard's Theorem, the Whitney embedding theorem, transversality, Lie groups, vector fields, Lie brackets, Lie algebra, multilinear algebra, vector bundles, differential forms, exterior derivatives, orientation, De Rham cohomology groups, homotopy invariance, degree theory.