# Math 762 Differential Topology

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This course will explain the fundamental concepts of topology for smooth manifolds. After developing the fundamental tool of transversality theory (we prove Sard's theorem) we will prove the Brouwer Fixed Point Theorem, the Brouwer No Retraction Theorem, and the Whitney Embedding Theorem, and the "27 lines on a cubic surface" using this tool. Then we cover Morse Theory and use it to classify 2-manifolds and prove the Bott Periodicity Theorem and Lefschetz Hyperplane Theorem. If time permits we will explain Smale's proof of the higher dimensional Poincaré Conjecture. This material is covered in (the union of) the following texts.

- Raoul Bott, Loring W. Tu: *Differential forms in algebraic topology*, Springer GTM **82**.
- Morris W. Hirsch: *Differential Topology*, Springer GTM **33**.
- John Milnor: *Morse Theory*, Princeton Annals of Math studies **51**.
- John Milnor: *Lectures on the H Cobordism Theorem*, Princeton Math NoTes **3**.
- John Milnor: *Topology from the Differentiable Viewpoint*, University of Virginia.