

**Math 80440, Topics in Topology II**  
Bordism Old and New  
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The theory of cobordism developed by Lev Pontryagin and René Thom in the mid-20<sup>th</sup> century is a cornerstone of modern topology. It relates directly to both the topology of manifolds and to stable homotopy theory. In this classical theory when two manifolds jointly bound another they are called cobordant, and we study manifolds up to this equivalence relation. Topological field theories, introduced in the late-20<sup>th</sup> century, are similar but now the cobordism itself is treated as an interesting dynamical process rather than as an equivalence relation.

This course will explore a variety of topics related to manifolds, the classical theory of cobordism, and more modern developments connected to topological field theories.

Possible Topics Include:

- Classical topics: Pontryagin-Thom theory, signature theorem, etc
- Topological Field Theories
- Morse theory and Cerf theory
- (infinity,n)-categories
- The Bordism Hypothesis
- The Galatius-Madsen-Tillmann-Weiss theorem and generalizations
- H-principles