

Oral Exam Syllabus
Gary Guth

Books:

- (1) Gompf and Stipsicz, *4-Manifolds and Kirby Calculus*
 - Chapter 1: Intersection form
 - Chapters 2-3: Surfaces in $\mathbb{C}P^2$, blow-ups and blow-downs, topology of $E(n)$
 - Chapters 4-5: Kirby calculus, framings for 2-handles, surgery, relative Kirby diagrams.
 - Chapters 6-7: Plumblings, embedded surfaces and their complements, branched covers.
- (2) Characteristic Classes (Milnor and Stasheff, *Characteristic Classes*, Hatcher, *Vector Bundles and K-Theory*)
 - Thom Isomorphism, Euler class
 - Cohomology of Grassmanians and universal bundles
 - Definition of Stiefel-Whitney classes and applications to immersions and cobordisms
 - Smooth manifolds, connection between Euler class and Euler characteristic
 - Obstruction theory
 - Chern classes

Papers:

- (1) Levine and Zemke, *Khovanov Homology and Ribbon Concordances*.
 - Bar-Natan Homology, ribbon concordance induces injective map on Kh .
- (2) Daemi, Lidman, Vela-Vick, Wong, *Ribbon Homology Cobordisms*, Sections 5 and 7.
 - Homology cobordism, topology of the double of ribbon cobordism, surgery and cobordism maps in Heegaard Floer theory. The double of a homology ribbon cobordism induces the identity map on HF° .
- (3) Sarkar, *Ribbon Distance and Khovanov Homology*.
 - Extorsion order, knot cobordism maps on Kh , application to ribbon distance.
- (4) Juhász, Miller, Zemke, *Knot Cobordisms, bridge index, and torsion in Floer Homology*.
 - Knot Floer homology and cobordism distance, application to Sarkar's ribbon distance for Knot Floer homology.