

Morse Theory & Beyond

Lectures will be on Fridays 2-3:30 pm & may extend slightly over the assigned duration.

Lecture 0	[SB] Overview of the landscape [24/7]
Topic	Morse Theory (MT)
Lecture 1	[SK] Morse lemmas, handle attachment, Morse inequalities [31/7]
Lecture 2	[SK] Morse inequalities; existence of Morse functions [7/8]
Lecture 3	[SB] Closed geodesics exist [14/8]
Lecture 4	[SS] Morse-Smale flows, stable and unstable submanifolds [21/8]
Lecture 5	[SB] Morse theory via currents I [28/8]
Lecture 6	[SB] Morse theory via currents II [4/9]
Topic	Morse-Bott Theory (MBT)
Lecture 7	[AB] Reeb's Theorem & exotic spheres [11/9]
Lecture 8	[SB] Generalized Reeb's Theorem [18/9]
Lecture 9	[SB] Definition & basic properties/examples [25/9]
Lecture 10	[SK] Cohomology of complex Grassmannians I [2/10]
Lecture 11	[SS] Cohomology of complex Grassmannians II [9/10]
Topic	Cohen-Jones-Segal Theorem (CJS)
Lecture 12	[SK] Flow category of Morse function [16/10]
Lecture 13	[AB] Simplicial sets & geometric realization [30/10]
Lecture 14	[Ab] Bar construction of algebras & categories [6/11]
Lecture 15	[SK] Moduli space & classifying space of flow categories [13/11]
Lecture 16	[SS] Bar construction of infinity categories & algebras [20/11]
Topic	Further Topics (FT)
Lecture 17	[SB] G-equivariant Morse-Bott functions [27/11]
Lecture 18	[AB] Circle-equivariant (co)homology [4/12]
Lectures 19, 20	[AB, SK] Morse-Bott theory on free loop spaces [11/12, 18/12]
Lectures 21, 22	[SB] Circle valued Morse functions via flat connections