Oral Exam Syllabus

Douglas Schultz

1 Symplctic Geometry

- Symplectic Manifolds

  Chapters 1 and 2 in [2]

- Lagrangian Submanifolds

  Ch 3 in [2]

- Moser and Darboux Theorem

  Ch 6-8

- Almost Complex Structures

  Ch 12 and 13

- DolBeault Theory and Kaehler Manifolds

  Ch 14-16

- Moment Maps

  Ch 19, 21-22, 25

- Symplectic Reduction

  Ch 23-24

2 Algebraic Topology

- Fundemental Group

  The van Kampen Theorem

  Covering Spaces

- Homology
  - Simplicial and Singular Homology
  - Cellular Homology
  - Mayer-Vietoris Sequence
- Singular Cohomology
  - Universal Coefficient Theorem
  - Cup products
  - Kunneth Formula
- DeRham Cohomology ([1] and [4])
  - Mayer-Vietoris Sequence
  - Agreement of de Rham and Singular cohomology of manifolds
  - Orientation and Integration
  - Poincare Duality

References

[1] Bott R., L. W. Tu, *Differential Forms in Algebraic Topology*

[2] da Silva, A. C., *Lectures in Symplectic Geometry*

[3] Hatcher, A., *Algebraic Topology*

[4] Lee, John M., *Smooth Manifolds*