

**SYMPLECTIC GEOMETRY**  
PROPOSAL FOR SPECIAL TOPICS COURSE FOR FALL, 2004  
Instructor: Philip Foth

Symplectic geometry is one of the most rapidly advancing areas in the last thirty years. It has strong connections to mathematical physics, algebraic geometry, representation theory, and other disciplines. The purpose of this course is to give a comprehensive introduction to the subject and outline its fascinating applications and deep connections with other branches. A special emphasis will be made on presenting a variety of examples.

A rough outline of the course is as follows:

- Symplectic vector spaces and manifolds.
- Examples: cotangent bundle, coadjoint orbits, etc.
- Lagrangian submanifolds.
- Darboux theorem.
- Kähler manifolds and line bundles.
- Hamiltonian mechanics and integrable systems.
- Moment maps and convexity theorems.
- Symplectic reduction, examples.
- Symplectic toric manifolds and Duistermaat-Heckman theorem.

*Prerequisites:* MATH 534 - core course in Topology-Geometry.

*Text:* Lectures on Symplectic Geometry by Ana Cannas da Silva, *Springer Lecture Notes in Mathematics*, Vol. 1764, 2001. Available on-line via [www.springeronline.com](http://www.springeronline.com)