This course is an introduction to Poisson geometry. Poisson geometry is the study of differentiable manifolds equipped with a Poisson bracket. Its roots lie in Classical Mechanics, but it became an independent field of study in the 70's and in the 80's, in parallel to its close cousin Symplectic geometry. If you have a basic knowledge of manifolds, vector fields and differential forms, you can get an idea of what Poisson geometry is by reading a brief introduction. In this course I will be following a book that I am writing with Marius Crainic and Ioan Marcut. You can check the table of contents. Students taking this course are assumed to know differential geometry at the level of Math 518 - Differentiable Manifolds.

**Syllabus:**

- **Basic Concepts.** Poisson brackets; Poisson bivectors; The Darboux-Weinstein Theorem.
- **The Symplectic Foliation.** Symplectic leaves and symplectic foliations; Poisson transversals; Symplectic realizations; Dirac geometry; Submanifolds in Poisson geometry.
- **Global Aspects.** Lie groupoids, integrability, symplectic realizations, averaging and linearization, Van Est map.
- **Symplectic Groupoids.** Complete symplectic realizations; Lie groupoids and Lie algebroids; Symplectic groupoids.
- **Special Topics.** To be chosen from: Moduli space of flat connections; A-symplectic structures; Conn's Linearization Theorem; Cluster algebras; Symplectic stacks; Symplectic foliations; Quantization deformation.

**Textbooks:**

I will provide some lecture notes as the course progresses, but the following two references should also be very helpful:


**Grading Policy**

- **Expository Paper:** Students will be encouraged to write (in LaTeX) and present a paper. This is not mandatory. Following the tradition of topics courses, there will be no homework and no written exams.