Symplectic Mechanics (Meccanica Superiore)

F.Cardin
University of Padova, Italy
Faculty of di Mathematics, Physics and Natural Sciences
Mathematics Second Level Course

It is open to students of the **Master's degree in Mathematics (Laurea Specialistica)**, and to students of the **Master Mundus ALGANT program**.

When: first trimester 2008/09

Where: Department of Pure and Applied Maths, Padova.

Total number of hours: about 48 (6 credits).

Examination: oral.

Program

Essential of Differential Geometry and Exterior Differential Calculus. Cohomology.

Riemannian manifolds: Existence of metrics, Whitney theorem.

Symplectic Geometry: Symplectic manifolds. Introduction and developments of Hamiltonian Mechanics on symplectic manifolds.

Local and global parameterization of the Lagrangian submanifolds and their generating functions. Theorem of Maslov-Hörmander.

Hamilton-Jacobi equation, its geometrical solutions and links to the Calculus of Variations. Conjugate points theory in calculus of variations.

Relative cohomology and Lusternik-Schnirelman theory. Introduction to Symplectic Topology: existence and classification of critical points of functions and applications to generating functions of Lagrangian submanifolds. The min-max solution of Hamilton-Jacobi equation. Morse theory.

References

Course notes of the teacher.