SYLLABUS DEL CORSO

Topologia Differenziale

2122-1-F4001Q111

Aims

The scope of this course is the continuation of the study of Geometry along the path started in the Laurea Triennale (Bachelor). While i

The expected learning outcomes include the following:

- the knowledge and understanding of the basic definitions and statements, as well as of the basic strategies of proof in the theory of differential topology; the knowledge and understanding of some of the most relevant basic applications and examples of the theory;
- the ability to apply the acquired abstract knowledge to the construction and discussion of simple examples and solution of exercises; the ability to expose and communicate effectively and clearly the theoretical content of the course.

Contents

De Rham Theory for smooth manifolds; transversality and intersection theory.

Detailed program

Part I:

- De Rham cohomology. Mayer-Vietoris sequence. Poincarè Lemmas and the degree of a proper map. Poincarè duality on orientable manifolds. Kunneth's Formula and Laray-Hirsch's Theorems. Vector bundles and Thom isomorphism. The Euler class and Euler characteristic.

Part II:

- Transversal maps, intersection of transversal varieties. Applications: classifications of 1-manifolds and Brower fixed point Theorem. Transversality Theorems. Intersection numbers mod 2 and degree of a map mod 2. Intersection Theory for oriented varieties.

Prerequisites

The content of the courses of Analysis I, Linear Algebra and Geometry, Geometry I. The basics on differential varieties and differential forms (as content of Geometry II and Geometry III). Brief recalls will be offered as needed.

Teaching form

Front lessons at the blackboard.

Textbook and teaching resource

R. Bott e L. Tu, Differential Forms in Algebraic Topology, Springer-Verlag

V. Guillemin, P. Haine, Differential forms, World Scientific Publishing Co.

V. Guillemin e A. Pollack, Differential Topology, Prentice Hall

Semester

Second semester

Assessment method

different sessions. It is possible to enroll in both written tests, but only the second one gives the registration of

the vote. The date of the oral discussion will be announced after the correction.

Office hours

Upon appointment.