ICTP DIPLOMA PROGRAMME IN MATHEMATICS 2015-16

Algebraic Topology

B. Zimmermann (10 lectures : 15 hrs)

Homotopy and path homotopy; fundamental group; coverings, path and homotopy lifting; fundamental group of the circle, the spheres and projective spaces; retractions and Brouwer fixed point theorem in dimension two; fundamental theorem of algebra; theorem of Borsuk-Ulam; homotopy equivalences and deformation retractions;

Simplices and simplicial complexes; simplicial homology; singular homology; chain complexes, short exact sequences of chain complexes and the long exact homology sequence; small simplices and the exact sequence of Mayer-Vietoris; axiom of homotopy (without proof); homology of the spheres; Brower fixed point theorem in arbitrary dimensions.

Textbooks:

J. R. Munkres, Topology (second edition). Prentice Hall 2000

J. R. Munkres, Elements of Algebraic Topology. Addison-Wesley 1984