



PH.D. IN MATHEMATICS AND COMPUTER SCIENCE

COURSE SCHEDULE

ACADEMIC YEAR 2020/2021

INTRODUCTION TO BASS-SERRE THEORY

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The Bass-Serre theory gives a complete and satisfactory description of groups acting on trees via the structure theorem. It relates geometric and combinatorial aspects of the group theory. The fundamental structure theorem in this theory asserts that group that acts on a tree decomposes as a free product via iterated applications of HNN extensions and free products with amalgamation. These latter constructions are well-regulated from a combinatorial perspective and studied by using the geometric language of covering theory and fundamental groups.

The course will provide a brief introduction to graph theory in order to establish the necessary background needed to explore the classical Bass-Serre theory. Moreover it will focus on research perspectives and on possible developments and applications in other fields of mathematics and computer science.