

Title of the course: Descriptive combinatorics		
Course instructor: Stevo Todorčević		
Status of the course:		
Number of ESPB points:		
Prerequisites:		
Aim of the course: Descriptive combinatorics is the research area on the boundary of combinatorics, descriptive set-theory, topological dynamics, ergodic theory, and theoretical computer science whose aim is to extend and combine methods of these areas. The aim of the course is to introduce this area to students through its applications, such as, for example, the problem of Tarski on the circle squaring and other open problems for future research.		
Expected results of the course: Students should learn central methods in descriptive combinatorics so that they are able to do research work in this area.		
Syllabus: <i>Lectures:</i> Borel graph theory, G_0 dichotomy, graphs induced by group actions, König's lemma on perfect matching for Borel graphs in 'almost everywhere' version based on the Lebesgue measure and the Baire category. Perfect matchings, paradoxical decompositions, and the circle squarings in the sense of Banach and Tarski. Connections to graph limits in the sense of Lovasz. Connections to theoretical computer science. <i>Tutorial:</i>		
Recommended literature: <ol style="list-style-type: none"> 1. A.S. Kechris and A. Marks, Descriptive graph combinatorics, available online from the webpage of Alekos Kechris. 2. A.S. Kechris, Classical Descriptive Set Theory, Springer, 1995. 3. L. Lovasz, Large Networks and Graph Limits, Amer. Math. Soc., 2012. 4. S. Todorcevic, Introduction to Ramsey spaces. Annals of Mathematics Studies, 174. Princeton University Press, Princeton, NJ, 2010. 		
Number of teaching hours:	Lectures:	Tutorial:
Methods of teaching: 10 lectures followed by 10 tutorials		
Grade (maximum number of points 100) 100		