

Study programme(s): Mathematics (M3), Mathematics (M4)				
Level: bachelor				
Course title : Combinatorial Geometry (M-10)				
Lecturer: Olga I. Bodroža-Pantić				
Status: elective				
ECTS: 5				
Requirements: none				
Learning objectives Obtaining the basic knowledge of convex figures and introduction to the problems of combinatorial geometry, techniques and methods used.				
Learning outcomes <i>Minimum:</i> Understanding the need to prove the existence of some geometric objects in some problems of combinatorial geometry, as well as some basic on how to achieve this. Comprehension of the basic properties of convex figures and the application of theorems that are processed. <i>Desired:</i> Students should be able to independently solve problems of existence of some geometric objects and other more complex problems in combinatorial geometry by using the techniques adopted.				
Syllabus <i>Theoretical instruction</i> Basic concepts and theorems, Question of existence, Jordan curve theorem - Proof for the polygonal case, Convex figures, Supporting line of a figure, Convex bundle of rays, Convex hull (cover), Arrangement of points in the plane, Integer lattice, Plane tilings, Pick's theorem, Helly's theorem, Decomposition of bounded figure into parts with smaller diameter, Isoperimetric theorem. <i>Practical instruction</i> Techniques to prove the existence of geometric objects, Theta curve theorem - a proof for the polygonal case, Points belonging to straight lines and circumferences, Properties of convex figures, Belonging to the convex hull of a set, Arrangement of points in the plane, Combinatorial problems in the integer lattice, Constructions of some tilings, Application of Pick's and Helly's theorem, Isoperimetric theorems for triangles.				
Literature 1. O. Bodroža-Pantić, Kombinatorna geometrija, Univerzitetski udžbenik, sveska 132, Univerzitet u Novom Sadu, 2001. 2. Г. Хадвигер, Г. Дебруннер, <i>Комбинаторная геометрия плоскости</i> , Наука, Москва, 1965. 3. Д. Шклярский, Н. Ченцов, И. Яглом, <i>Геометријскије оценки и задачи из комбинаторной геометрии</i> , Наука, Москва, 1974 4. M. Yaglom, V. G. Boltyanskii, <i>Convex Figures</i> , Holt, Rinehart and Winston, New York, 1961.				
Weekly teaching load				Other: 0
Lectures: 2	Exercises: 2	Other forms of teaching: 0	Student research: 0	
Teaching methodology Conventional methods of teaching (PowerPoint Presentation) are used in lectures. Students practise their skills to understand the problems and find possible solutions in exercises on the blackboard. Knowledge and ability to solve problems are checked in two colloquia (preliminary exams). At the final, oral exam, students are expected to demonstrate in-depth understanding of the presented material.				
Grading method (maximum number of points 100)				
Pre-exam obligations	points	Final exam	points	
Colloquia	50	Oral exam	50	