Study programmes: Bachelor (Master / PhD) studies – Mathematics	
Course name: Introduction to Extremal Problem Theory	
Lecturers: Aleksandar Savić	
Status: Compulsory	
ECTS: 5	
Attendance prerequisites: Linear algebra, Mathematical analysis 2	

Course aims: Introduction to basic types of extremal problem and necessary and sufficient conditions of extremums.

Course outcome: At the end of cours, student should know necessary and sufficient conditions of extremums for linear, convex and differential extremal problems and how, by their application, solve extremal problems.

Course content:
Quadratic function and quadratic forms of several variables. Conditions of the first and the second order for differential problems without constrainst. Formulation of the extermal problem with constraints in the form of equalities and inequalities. Necessary and sufficient conditions in the form of Lagragean principle. Convex function of one or more variables. Kuhn-Tucker theorem. Systems of linear equalities and inequalities. Theorems of alternatives. Duality in linear programming. Necessary condtion of extremum for differential problem with conditions in the form of equalities and inequalities.

Literature:
Ašić M., Kovačević-Vujčić V., N. Đuranović-Miličić, *Matematičko programiranje*, MI SANU, 1980.
A.W. Roberts, D.E. Varberg, *Convex functions*, Academic Press, 1973
В.М. Алексеев, Э.М Галеев, В.М. Тихомиров, *Сборник задач по оптимизации*, „Наука", 1984

Number of hours: **4**	Lecures: **3**	Tutorials: **1**	Laboratory: **-**	Research: **-**

Teaching and learning methods: Frontal

Assessment (maximal 100 points)				
Course assignments	**points**	**Final exam**		**points**
Lectures	-	Written exam		40
Exercises / Tutorials	-	Oral exam		40
Colloquia	20			
Essay / Project	-			