

Study programmes: Bachelor – Mathematics				
Course name: Variational calculus				
Lecturers: Aleksandra Delić, Sandra Živanović				
Status: Compulsory				
ECTS: 5				
Attendance prerequisites: Introduction to Extremal Problem Theory, Introduction to the Theory of Extremal Problems, Differential equations				
Course aims: Introduction to basic problems and results of classical variational calculus.				
Course outcome: At the end of the course students should be able to solve problems which belongs to the category of the simplest problems of variational calculus, as well as problems whose reductions they are. Also, students should know how to solve problems with derivatives of higher order and problems from the categories of isoperimetric problems of variational calculus.				
Course content: Formulation of the simplest problem of variational calculus and concepts of weak and strong solution. Theorems of rounding of cusps. The first order necessary conditions : Euler’s equation, Weierstrass inequalities and Weierstrass-Erdmann’s condition. Euler’s equation and convexity as sufficient conditions for an extremum. The simplest problem of variational calculus with quadratic functional. The second order necessary and sufficient conditions: Legendre’s and Jacobi’s conditions. Field theory in variational calculus. Problems that can be reduced to the simplest problem of variational calculus. Isoperimetric problem in variational calculus. Problem with derivatives of higher order.				
Literature: S. Aljančić, <i>Matematika 2 – Varijacioni račun</i> , Beograd, 1972. В.М. Алексеев, В.М. Тихомиров, С.В. Фомин, <i>Оптимальное управление</i> , Москва, 1979. D. Ioffe, V. M. Tihomirov, <i>Theory of Extremal Problems</i> , North-Holland Publishing Company, 1979. В.М. Алексеев, Э.М. Галеев, В.М. Тихомиров, <i>Сборник задач по оптимизации</i> , „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	-			