

Study programmes: PhD – Mathematics				
Course name: Riemannian geometry B				
Lecturers: Zoran P. Rakić, Mirjana Đ. Đorić, Miroslava Antić, Srđan N. Vukmirović				
Status: Optional (compulsory for students in Geometry)				
ECTS: 9				
Attendance prerequisites: Differential geometry				
Course aims: Acquisition of general and specific knowledge in foundations of Riemannian geometry. Preparing student for individual scientific work: studying of literature in Riemannian geometry and gradually including student for individual research work.				
Course outcome: Upon completion of the course, the student has necessary knowledge about some important topics in Riemannian geometry such as: The Jacobi vector fields, isometric immersions, complete manifolds, spaces of constant sectional curvature and variations of energy. Student is qualified to individual understanding basic examples and solving problems from this area. Also, student is qualified for individual studying of scientific papers.				
Course content: The Jacobi equation and the Jacobi vector field. Taylor expansion of norm of the Jacobi field. Conjugate points. Multiplicity of conjugate points. The second fundamental form. Shape operator. Main curvatures. Gauss' and mean curvature. Gauss' formula. Totally geodesic immersions. Fundamental equations: Gauss', Ricci's and Codazzi's. Complete manifolds. The Hopf-Rinow theorem. The Hadamard theorem. Spaces of constant sectional curvature. The Cartan theorem. Hyperbolic space. Space forms. The Liouville theorem. The first and the second variations of energy. The Bonnet-Myers theorem. The Synge-Weinstein theorem.				
Literature:				
1. M. P. do Carmo, Riemannian Geometry, 1992, Birkhauser, Boston.				
2. T. Aubin, Differential Geometry, 2002 American Mathematical Society.				
Number of hours: 10	Lecures: 4	Tutorials: -	Laboratory: -	Research: 6
Teaching and learning methods: Lectures/ Tutorials				
Assessment (maximal 100 points)				
Course assignments	points	Final exam		points
Lectures	-	Written exam		-
Exercises / Tutorials	20	Oral exam		60
Colloquia	-	Written-oral exam		-
Essay / Project	20			