

Study programme: Astronomy and Astrophysics – PhD Studies			
Course: Geometry in astronomy			
Teacher or teachers: Srdjan Vukmirovic, Ivan Dimitrijevic			
Status: optional			
ECTS credits: 9			
Requirements: none			
Course objective: Acquiring knowledge about geometric concepts used in astronomy			
Course outcome: At the end of the course, student is familiar with mathematical concepts used in general relativity and astrodynamics.			
Course description: Pseudo Riemannian manifolds. Affine connection and covariant derivatives, Geodesics. Curvature tensor, sectional curvature. Ricci and scalar curvature. Applications of differential geometry in astronomy. Two body problem, elliptic, hyperbolic and parabolic orbits. Lambert problem. Three body problem. Lagrange points. Least action principle. Coordinate transformations. Spherical geometry. Euler angles...			
Recommended literature: B. O'Neill, Semi-Riemannian geometry, Academic Press, 1983. S. Sternberg, Semi-Riemann Geometry and General Relativity, Orange Grove Texts Plus, 2009. R. Bate, D. Mueller J. White, Fundamentals of astrodynamics, Dover Publications Inc, 1971. R. Battin, An Introduction to the Mathematics and Methods of Astrodynamics, Revised Edition, American Institute of Aeronautics and Astronautics Inc, 1999			
Total number of classes: 10		Theoretical classes: 4	
Practical classes: 6			
Teaching methods: Ex cathedra, group work, student research			
Grading system (maximum number of points: 100)			
Pre-exam requirements		points	Final exam
Activity in class			Written exam
Practical work			Oral exam
Colloquia			
Seminars			