

Study programmes: Astronomy and Astrophysics - PhD studies				
Course name: Analytical mechanics				
Lecturers: Anđelka Kovačević				
Status: Optional				
ECTS: 9				
Attendance prerequisites: None				
Course aims: Familiarization with methods and problems of analytical dynamics, which are connected with development of universe exploration.				
Course outcome: Students are able to use methods of symplectic geometry and to apply to research of astrophysical problems of motion of particles and rigid bodies.				
Course content: General laws and the dynamic of a particle. Kinematics of reference systems. Investigations of the equations of motion. Rigid bodies: geometry, kinematics, dynamics. Lagrangian mechanics. Oscillations. Linearization. Small oscillations. Behavior of characteristics frequencies. Parametric resonance. Motion in moving coordinate system. Hamiltonian mechanics. Symplectic Manifolds. Canonical perturbation theory. Introduction to ergodic theory and chaotic motion. Statistical mechanics: kinetic theory, Gibbs sets.				
Literature: Lectures and exercises based on : 1. V.I Arnold: Mathematical methods of classical mechanics, 2nd edition, Springer Verlag (english), 1991 2. A. Fasano & S. Marmi, Analytical mechanics, Oxford University Press, 2006 3. Scripts of A. Kovačević				
Number of hours: 10	Lectures: 6	Tutorials: 4	Laboratory: -	Research: -
Teaching and learning methods: Frontal / Group / Practical				
Assessment (maximal 100 points)				
Course assignments	points	Final exam	points	
Lectures	4	Written exam	-	
Exercises / Tutorials	-	Oral exam	-	
Term paper 1	18	Written-oral exam	60	
Term paper 2	18			