

<b>Study programmes:</b> Astronomy and Astrophysics - PhD studies			
<b>Course name:</b> Dynamical Astronomy			
<b>Lecturers:</b> Anđelka Kovačević			
<b>Status:</b> Compulsory			
<b>ECTS:</b> 9			
<b>Attendance prerequisites:</b> None			
<b>Course aims:</b> An overview of dynamical process in astrophysical systems from planetary to galactic.			
<b>Course outcome:</b> Students are able to solve problems related to stability and evolution of planetary orbits, processes of scattering, structure and dynamics of galaxies and their collisions.			
<b>Course content:</b> Order and Chaos in General. Terminology and Classification. Dynamical Systems. Integrable, Chaotic, Ergodic, Mixing, Kolmogorov and Anosov Systems. Old and New Classification. Integrable Systems. The Third Integral. KAM Theory. Nekhoroshev Theory. Periodic Orbits. Systems of Two Degrees of Freedom. Transition from Order to Chaos. The Last KAM Torus. Properties of the last KAM torus. Methods for Locating the Last KAM Torus. Dynamical Spectra. Lyapunov Characteristic Numbers. Distinction Between Ordered and Chaotic Motions. Frequency Analysis. Systems of Three Degrees of Freedom. Simple Resonant 3-D Systems. Fractals. Order and Chaos in Galaxies. Orbits in 2-D Galaxies. Orbits in 3-D Galaxies. Integrable and Nonintegrable Galactic Models.			
<b>Literature:</b> Lectures and exercises based on: 1. George Contopoulos: Order and Chaos in Dynamical Astronomy, Springer, 2002 2. Dynamical Astronomy Java Lab: <a href="http://burro.astr.cwru.edu/JavaLab/">http://burro.astr.cwru.edu/JavaLab/</a> 3. Scripts of A. Kovačević			
<b>Number of hours: 10</b>	<b>Lectures: 4</b>	<b>Tutorials: 6</b>	<b>Laboratory: -</b>
<b>Research: -</b>			
<b>Teaching and learning methods:</b> Frontal / Group / Practical			
<b>Assessment (maximal 100 points)</b>			
<b>Course assignments</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Lectures	4	Written exam	-
Exercises / Tutorials	-	Oral exam	-
Term paper 1	18	Written-oral exam	60
Term paper 2	18		