

<b>Study programmes:</b> PhD studies - Mathematics			
<b>Course name:</b> Integrable Dynamical Systems and Solitons			
<b>Lecturers:</b> Darko Milinković			
<b>Status:</b> Optional			
<b>ECTS:</b> 9			
<b>Attendance prerequisites:</b> Mathematical methods of mechanics			
<b>Course aims:</b> Acquisition of knowledge and mastering modern techniques in the theory of integrable systems.			
<b>Course outcome:</b> Mastering the criteria of integrability, qualitative analysis of dynamics and its geometric visualization; solving of the system in its finite form.			
<b>Course content:</b> Classical examples of integrable systems. Integrable Hamiltonian systems. The Liouville–Arnold theorem. Infinite-dimensional integrable Hamiltonian systems. Lax's method. Examples. Introduction to theory of solitons. The Korteweg–de Vries equation. Direct and inverse problem of scattering theory. Riemannian surfaces, algebraic curves and their Jacobians. The Riemann–Roch and Abel's theorem. Theta functions. Riemann's theorem on zeros and inverse Jacobi's problem. The Baker-Akhiezer theorem and finite-zone integration. The Kadomtsev–Petviashvili equation. The Riemann-Schottky problem and Novikov's hypothesis. Applications of solitons theory.			
<b>Literature:</b>			
1. С. П. Новиков, В. Е. Захаров, С. В. Манаков, Л. В. Питевский, Теорија солитонов, Наука, Москва 1980. (in English: Soliton theory: the inverse scattering method, Plenum, New York 1984)			
2. Б. А. Дубровин, Тета-функции и нелинейные уравнения, Успехи Мат. Наук 36, (1981) 11-80, (in English: Theta functions and nonlinear equations, Russian Math. Surv. (1981)			
3. D. Mumford, Tata lectures on theta, Birchouser, 1984 (in Russian: Лекции о тета-функциях, ИО НФМИ 1998.)			
<b>Number of hours:</b> 10	<b>Lectures:</b> 4	<b>Research:</b> 6	
<b>Teaching and learning method:</b> Frontal/Individual/Research			
<b>Assessment (maximal 100 points)</b>			
<b>Course assignments</b>	<b>points</b>	<b>Final exam</b>	<b>points</b>
Lectures	10	Written exam	30
Exercises / Tutorials	-	Oral exam	30
Colloquia	-	Written-oral exam	-
Essay / Project	30		