

Study programmes: Doctoral studies of the programme Mathematics – Applied Mathematics			
Course name: 3M536 – Spectral Graph Theory with Applications			
Lecturers: Zoran Stanić			
Status: Optional			
ECTS: 9			
Attendance prerequisites: No			
Course aims: Introducing students to the theoretical and practical aspects of spectral graph theory. Working with the relevant software packages.			
Course outcome: Upon completion of the course students have knowledge of spectral graph theory and they are familiar with some of its applications. Trained for independent scientific work in this field. They should also be able to use some of the software packages.			
Course content: Matrix representation of graphs and spectra of graphs. Basic properties of graph spectra. Operations on graphs and resulting spectra. Relations between the spectral and structural properties of graphs. Graph divisors. Characterizing graphs by means of their spectra. Spectral techniques in graph theory and combinatorics. Open problems in spectral graph theory. Applications in computer science, chemistry and physics. Software packages and their implementations.			
Literature:			
1. D.M. Cvetković, P. Rowlinson, S.K- Simić, <i>An Introduction to the Theory of Graph Spectra</i> , Cambridge University Press, Cambridge, 2010.			
2. D.M. Cvetković, M. Doob, H. Sachs, <i>Spectra of graphs</i> , Johann Ambrosius Barth, Heidelberg-Leipzig, 1995.			
3. Z. Stanić, <i>Inequalities for Graph Eigenvalues</i> , Cambridge University Press, Cambridge, 2015.			
4. Z. Stanić, <i>Regular Graphs. A Spectral Approach</i> , De Gruyter, Berlin, 2017.			
5. D. Cvetković, <i>Teorija grafova i njene primene</i> , Naučna knjiga, Beograd, 1986.			
Number of hours: 10	Lecures: 4	Research work: 6	
Teaching and learning methods: Lectures and Consultations			
Assessment (maximal 100 points)			
Course assignments	points	Final exam	points
Lectures	-	Written exam	-
Exercises / Tutorials	-	Oral exam	-
Colloquia	-	Written-oral exam	70
Essay / Project	30		