Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Common		
Type and level of studies		Doctoral studies		
The name of the course		Discrete structures and combinatorics		
Lecturer (for lectures)		Milovanović Ž. Igor, Matejić M. Marjan		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	**Course status (obligatory/elective)**	Elective	
Prerequisites				
Course objectives	Acquiring scientific, theoretical and practical knowledge of enumerative combinatorics, algebraic combinatorics and spectral graph theory			
Course outcomes	Students should be qualified for further independent scientific and research work in solving various combinatorial problems.			
Course outline				
Theoretical teaching	Special number sequences. Stirling numers. Bell numbers. Catalan numbers. Euler numbers. Bernouli numbers. Applications in combinatorial mathematics. Extremal problems. Combinatorial block schemes. Special matrices: Binary, Hadamard, Stohastics, Permutation matrices. Combinatorial distribution and counting problems. Spectral matrices and graph theory. Graph invariants. Energy of matrices and graphs. Directed graphs. Mapping of directed coordinated graphs on plane and line.			
Practical teaching (exercises, OFE, study and research	Individual research study			
Textbooks/references				
1	A. Anderson, Discrete Mathematics with Combinatorics, Second Edition, Prentice Hall, 2003			
2	F.R.K.Chung, Spectral graph theory, Providence, 1991.			
3	I.Gutman, B.Furtula, K.Ch. Das, E. Milovanović, I. Milovanović, Bounds in chemical graph theory - Mainstreams, MCM, Kragujevac, 2017.			
4	I.Gutman, X.Li (eds.), Energies of graphs - Theory and applications, MCM, Kragujevac, 2016.			
5	релевантни научни чланци			
Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
3	0	0	0	0
Teaching methods	Consultations, disscussion, individual research.			
Grade (maximum number of points 100)				
Pre-exam duties		**Points**	**Final exam**	**Points**
Activity during lectures			**Written exam**	
Exercises			**Oral exam**	50
Colloquia				
Projects		50		