Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Computing and Informatics		
Type and level of studies	Undergraduate Academic Studies		
The name of the course	Algorithm Design and Analysis		
Lecturer (for lectures)	Janković S. Dragan		
Lecturer/associate (for exercises)	Rajković J. Petar		
Lecturer/associate (for OFE)	Rajković J. Petar		
Number of ECTS	5	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	The role and the importance of algorithms. Algorithm efficiency and complexity. Algorithm generation paradigms (brute force, iterative algorithms, recursive algorithms, recursion elimination, divide-conquer, backtracking, dynamic programming, linear programming). Algorithm classification (sorting algorithms, searching, string, graph, geometry algorithms, cryptographic algorithms, data compression, arithmetic algorithms, etc). Algorithms complexity calculation techniques. Algorithm complexity measures and criteria. Basic algorithm analysis: best, average and worst case; empirical. Proofing techniques overview. The role of probability. Data structures and operation complexity. Choosing data structure for algorithm implementation. String algorithms. Approximate matching. Suffix trees and suffix arrays. Dynamic programming. Greedy algorithms. FFT. NP problems. SAT.		
Course outcomes	The topics presented on the auditive and laboratory exercises follow material presented during lectures. The exercises are envisioned as a basis for the individual student projects development.		
Course outline			
Theoretical teaching	The role and the importance of algorithms. Algorithm efficiency and complexity. Algorithm generation paradigms (brute force, iterative algorithms, recursive algorithms, recursion elimination, divide-conquer, backtracking, dynamic programming, linear programming). Algorithm classification (sorting algorithms, searching, string, graph, geometry algorithms, cryptographic algorithms, data compression, arithmetic algorithms, etc). Algorithms complexity calculation techniques. Algorithm complexity measures and criteria. Basic algorithm analysis: best, average and worst case; empirical. Proofing techniques overview. The role of probability. Data structures and operation complexity. Choosing data structure for algorithm implementation. String algorithms. Approximate matching. Suffix trees and suffix arrays. Dynamic programming. Greedy algorithms. FFT. NP problems. SAT.		
Practical teaching (exercises, OFE, study and research	The topics presented on the auditive and laboratory exercises follow material presented during lectures. The exercises are envisioned as a basis for the individual student projects development.		
Textbooks/references			
1	T.Cormen, C. Leiserson, R. Rives, Introduction to algorithms, MIT Press, Cambridge, 2001.		
2	R.Sedgevick, Algorithms in C, Addison Wesley, 1998.		
3	Jon Kleinberg, Eva Tardos, Algorithm Design, Pearson International Edition, USA, 2006.		
4	Miodrag Zivkovic, Algorithms, Mathematical faculty, Belgrade, 2000 (in Serbian)		
5	Lectures and exercises as Power point presentation		

Number of classes of active education per week during semester/trimester/year

Lectures	Exercises	OFE	Study and research work	Other classes
2	2	1	0	0

Teaching methods	Lectures, Exercises, Laboratory Exercises, Consultations

Grade (maximum number of points 100)

Pre-exam duties	Points	Final exam	Points
Activity during lectures	5	**Written exam**	20
Exercises	15	**Oral exam**	20
Colloquia	40		
Projects			