

Program	Level	First cycle					
	Name of the program	Theoretical Computer Science, Mathematics and Informatics Education					
COURSE							
Course title	Graph Theory						
Course code	Semester	Course status	ECTS	Contact hours	(L+AE+LE)		
AMAT 380	VI	Mandatory course	6	3+2+0			
Lecturer							
Course Goals	The objectives of the module are familiarization with the basic elements of graph theory and its applications. One of the most important goals is to show how to model problems using graphs and how to solve them or at least define the appropriate problem.						
Learning Outcomes	Upon completion of the module, students will be able to model real-world problems with the mathematical apparatus of graph theory and apply classical graph algorithms for those types of problems for which effective solutions are known						
COURSE CONTENT							
<ul style="list-style-type: none"> -Basic terms and definitions, graph as a model - Isomorphisms, special graphs and graph decompositions - Connectivity, Bipartite Graphs, Euler Graphs, Interval Graphs, Node Degrees and Graph Counting - Oriented graphs and corresponding models - Basic features of the tree, distance in the trees, tree counting - Matching and coverings, matching on bipartite graphs - Matching on graphs (Tutte theorem) - Connectivity (2 and 3 connectivity) - Menger's theorems and connectivity - Graph colouring, Chromatic polynomials - Perfect graphs, Triangular graphs - Planarity, Planarity and Kuratowski's theorem - Hamilton cycle - Basic graph search algorithms 							
LITERATURE							
<p>[1] Bela Bollobas, Modern Graph Theory, Springer-Verlag, 1998</p> <p>[2] D. West, Introduction to Graph Theory, Prentice Hall, Pearson; 2 ed., 2000.</p> <p>[3] Jonathan Gross, Jay Yellen Graph theory and its applications, Chapman and Hall; 2 ed., 2005.</p> <p>[4] Gary Chartrand, Introductory graph theory Dover Publications, 1984</p>							
STUDENT WORKLOAD (hours in a semester)							
Lectures	45	Exercises	30	Individual work	75	T o t a l	150
GRADING				REMARKS			
Criterion	Maximum points	Minimum points					
Midterm exams	40	20					
Projects	20	10					
Final exam	40	20					
Total	100	55					