

Course Name : Graph Theory and Algorithms							
Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
CMP 226	D	Spring	2.00	0.00	2.00	3.00	6.00
Lecturer		Andi Goro, Msc					
Assistant		Olsi Shehu, MSc					
Course language		Albanian					
Course level		Bachelor					
Description		The course content includes: Basic knowledge of combinatorics – permutations, variations, combinations, partitions, compositions; the intuitive meaning of graph; definition of graph; roads and circuits; Euler's graph and Hamilton's graph; shortest path problem; isomorphic graphs; operations with graphs; planar graphs.					
Objectives		Get to know the basic elements of combinatorics - permutations, variations, combinations, partitions, compositions Get to know the meaning of graphs, the types of graphs, and apply this knowledge in solving different problems and apply them in programming. Familiarize with the concept of roads and circuits and connectivity, with the aim of applying them to phenomena and problems from the field of social sciences. To become familiar with Euler's and Hamilton's Graph and their application in programming. To become familiar with the shortest path problem and its application in programming. To be familiar with isomorphic graphs.					
Core Concepts		To become familiar with Euler's and Hamilton's Graph and their application in programming. To become familiar with the shortest path problem and its application in programming. To be familiar with isomorphic graphs.					
Course Outline							
Week	Topic						
1	The concept of graph and some accompanying notions						
2	Eulerian cycles						
3	Cycle and co-cycle spaces						
4	Stacks, their main properties						
5	Queues, their main properties						
6	Trees, edges with minimal weight						
7	Vertex Coloring						
8	Semi Final Exam						
9	Matching						
10	Hamiltonian cycles						
11	Binary Trees						
12	Binary Stacks						
13	Balanced Trees						
14	Splay Trees						
15	General Review						

16	Final Exam			
Prerequisites		The student must attend the course at a minimum rate of 75%.		
Literature		• Algoritme dhe struktura e të dhënave, Avni Rexhepi 2014 • Cikël leksionesh Teori Grafesh, E. Cuni 2010		
References		• J. A. Bondy and U. S. R. Murty: Graph theory with applications		
Course Outcome				
1	Get to know the basic elements of combinatorics - permutations, variations, combinations, partitions, compositions			
2	Get to know the meaning of graphs, the types of graphs, and apply this knowledge in solving different problems and apply them in programming.			
3	Familiarize with the concept of roads and circuits and connectivity, with the aim of applying them to phenomens and problems from the field of social sciences.			
4	To become familiar with Euler's and Hamilton's Graph and their application in programming.			
5	To become familiar with the shortest path problem and its application in programming.			
6	To be familiar with isomorphic graphs.			
Course Evaluation				
In-term Studies		Quantity	Percentage	
Midterms		1	40	
Quizzes		0	0	
Projects		0	0	
Term Projects		0	0	
Laboratory		0	0	
Class Participation		1	10	
Total in-term evaluation percent			50	
Final exam percent			50	
Total			100	
ECTS Workload (Based on Student Workload)				
Activities		Quantity	Duration (hours)	Total (hours)
Course duration (Including the exam week: 16x Total hours of the course)		16	4	64
Study hours outside the classroom (Preparation, Practice, etc.)		14	6	84
Duties		0	0	0
Midterms		1	1	1
Final Exam		1	2	2
Other		0	0	0
Total Work Load				151
Total Work Load / 25 (hours)				6.04
ECTS				6.00