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 phenomens 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**