

Course Name : Graphs and Algorithms							
Course Code	Course Type	Regular Semester	Lecture (hours/week)	Seminar (hours/week)	Lab. (hours/week)	Credits	ECTS
EMS 220	B	Spring	3.00	1.00	0.00	3.50	5.00
Lecturer		Ardit Dauti, Msc					
Assistant							
Course language		English					
Course level		Bachelor					
Description		The purpose of this course is to provide an introduction to the design and analysis of efficient graphs and algorithms.					
Objectives		● Understand the design, analysis and implementation of graphs and algorithms ● Be familiar with standard symbol manipulations that arise in algorithm design. ● Understand how to calculate the efficiency of implementing specific operations and Understand implementation of algorithms and data structure in a modern programming language like Java / Python ● Enhance programming skills through the proficient use of newly learned algorithms and data structures. Present one’s work and results in a convincing way.					
Core Concepts		This course is an introduction to the design and analysis of efficient data structures. Topics include lists, stacks, queues, priority queues, trees, graphs, and their associated algorithms, sorting, searching and hashing techniques; time and space complexity.					
Course Outline							
Week	Topic						
1	Intro. to Course, Analysis of Algorithms and Asymptotic Notations						
2	Abstract data types						
3	Linked Lists, Stacks and Queues						
4	Trees, Binary Trees						
5	Binary Search Trees						
6	Tree Traversals						
7	Balanced Search Trees						
8	MIDTERM EXAM						
9	Sorting: Merge Sort, Heap Sort						
10	Sorting: Quick Sort, Bucket Sort						
11	Mapping, Hashing Tables						
12	Graph Data Structure						
13	Prim`s Algorithm, Kruskal`s Algorithm, Dijkstra Algorithm						
14	Project Presentation						
15	Review						
16	Final Exam						

Prerequisites	The student must attend the course at a minimum rate of 75%.		
Literature	• Robert Sedgewick and Kevin Wayne, Algorithms, 4th Edition,Addison-Wesley Professional, 2011, ISBN-13: 978-0321573513		
References			
Course Outcome			
1	Understand the design, analysis and implementation of graphs and algorithms		
2	Be familiar with standard symbol manipulations that arise in algorithm design		
3	Understand how to calculate the efficiency of implementing specific operations and Understand implementation of algorithms and data structure in a modern programming language like Java / Python		
4	Enhance programming skills through the proficient use of newly learned algorithms and data structures		
5	Present one’s work and results in a convincing way.		
Course Evaluation			
In-term Studies		Quantity	Percentage
Midterms		1	30
Quizzes		2	10
Projects		1	10
Term Projects		0	0
Laboratory		0	0
Class Participation		1	10
Total in-term evaluation percent			60
Final exam percent			40
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	4	56
Duties	1	4	4
Midterms	1	2	2
Final Exam	1	2	2
Other	0	0	0
Total Work Load			128
Total Work Load / 25 (hours)			5.12
ECTS			5.00