Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	Institute of Mechatronics and Vehicle Engineering

Subject title and code: **Advanced Algorithms BMXHAE4BNF** **Credits:** *4*

Full-time study 2025/2026 *ac. year* 2 *semester*

The course is available at:	mechatronical engineering
Supervised by: Dr. Frigyik András	**Instructors:** Dr. Frigyik András
Prerequisite (neptun code):	Object-Oriented Programming BMXOPE3BNF

Weekly number of lessons

Lecture: 1	Group seminar:	Lab: 2	Consultation:

Way of assessment: Exam (Oral)

Online consultation *(in case it's required): ... (BBB link)*

Edu. goal: *The goal of the course is to demonstrate how to apply the knowledge the students acquired during the Algorithms and Data Structures and the Object -Oriented Programming courses to dynamical data structures and the related algorithms. Graph algorithms are behind many solutions to problems that arise in robotics and logistics: Problems related to optimal paths or routing problems, in general. The lab sessions provide the students with opportunities to try out the algorithms covered in the lecture and hone their skills on problems of ever increasing complexity.*
Topics: Linked list, binary search tree, graph algorithms, breadth-first and depth-first search, topological sorting, path-finding in graphs, minimal spanning trees.

Schedule

Education week	**Topics**
1.	Recursive algorithms
2.	Data structure: Array
3.	Singly linked list
4.	Ordered linked list
5.	Binary search tree: Insertion, traversal
6.	Binary search tree: Search
7.	Binary search tree: Deletion
8.	**Rector's Day**
9.	Introduction to Graph algorithms / **Lab Midterm**
10.	Graph algorithms I
11.	Graph algorithms II
12.	Breadth-first / Depth-first search
13.	**Theory Midterm** **Make-up / Retake of Lab Midterm**
14.	Topological sorting, Path-finding in graphs, Minimal spanning trees

Mid-semester requirements

Test		Assignment to be submitted		Lab measurement	
amount	dates	amount	deadlines	amount	dates
2	9th,13th week			10	2,3,4,5,6,7,10 ,11,12,14 (week)

According to the HKR attendance of group seminars and lab exercises are mandatory.

Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:

Test		Assignment to be submitted		Lab measurement	
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab
40/20 points	16/8 points	…points	…points	10 points	…points

Total number of points achievable in semester: …points				
Grading thresholds	**satisfactory** 40 % and above	**average** 55 % and above	**good** 70 % and above	**excellent** 85 % and above

Other evaluation criteria:

During the semester, in accordance with the schedule above, a student can make up one of the midterms if they have a valid official absence note (from a doctor or from a coach). The theory make up test will happen during the semester at a separately assigned time. The blitz quizzes cannot be made up.

For the midterms you can use only those solution elements (data or control structures and algorithms) that were covered either in the lectures or in the lab sessions.

A passing **midterm grade** is obtained if and only if both the lab midterm and the theory midterm results exceed 40%.

During the semester, if you fail to satisfy the signature requirements, you still can **fulfill** them in the following cases: if you failed one of the midterms (but you passed the other) you can retake it. Also, if you have a doctor's note that you were ill at the time of a midterm, you can retake it. In any situation, you can retake only one of the midterms.

Percentage-wise contribution of the different tests to the final grade: Lab midterm: 40%, theory midterm 20% and the oral exam another 40%. Blitz quizzes provide extra points: 6 and 4 points to lab and theory midterms, respectively.

Receive a signature denied entry:	Signature is **denied** if the student cannot justify the absence for a test, has failed to write any of the tests, or miss blitz quizzes more then two times, or the number of absences exceeds the number specified in the SRS.
Required references:	
Recommended references:	(Undergraduate Topics in Computer Science) K. Erciyes - Algebraic Graph Algorithms. A Practical Guide Using Python-Springer (2022)
Quality assurance methods of the subject:	

Things, that are not included, can be found within the regulations of Óbuda University.