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

Subject title and code: **Algorithms and Data Structures, BMXAAE2BNF** **Credits:** *4*

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

The course is available at: mechatronical engineering

Supervised by: Dr. habil Laufer Edit	**Instructors:** Dr. Frigyik András, Dr. habil Laufer Edit

Prerequisite (neptun code): -

Weekly number of lessons

Lecture: 1	Group seminar:	Lab: 3	Consultation:

Way of assessment: Midterm mark (Written)

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

Educational goal: To develop algorithmic thinking, introduce the basic tools of programming, which are needed during engineering work. To acquire of basic algorithms and data structures. To show basic computer programming techniques and approaches. Students learn about the basic algorithms and data structures using an easy to learn programming language. This subject helps to solve complex engineering problems.

Schedule

Education week	**Topics**
1.	*Theory*: The aim and tools of computer programming. Programming paradigms. Basic data structures and their operations. (integers, real, boolean). Conditional statement. *Practice*: Visual Studio environment Basic methods of Console class. Variables.
2.	*Practice*: Application of mathematical functions. Conditional statement.
3.	*Theory*: Loops. Array data structure. Value and reference types. *Practice*: Loops. Random number generator.
4.	*Practice*: Array data structure. Operations with arrays.
5.	*Theory*: Methods. Elementary programming theorems. *Practice*: Methods in practice. Application of elementary programming theorems.
6.	*Practice*: 1st **Midterm**
7.	*Theory*: Character and string type. *Practice*: Character operations. Strings as character arrays.
8.	*Practice*: **Rector's Day**
9.	*Theory*: File management. *Practice*: String operations.
10.	*Practice*: Simple-structure text file management.
11.	*Theory*: Complex programming theorems. *Practice*: Delimited text file management.
12.	*Practice*: Complex task.
13.	*Theory*: **Midterm** *Practice*: 2nd **Midterm**
14.	*Practice*: **Retake/Makeup midterm**

Mid-semester requirements

Test		Assignment to be submitted		Lab measurement	
amount	dates	amount	deadlines	amount	dates
3	6,13			8	2,3,4,5,7,9,10, 11

According to the Study and Examination regulations of Óbuda University attendance of group seminars and lab exercises are mandatory.

Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:
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. Those problems that can be solved by using programming theorems are expected to be solved that way.

A passing **midterm grade** is obtained if and only if all the lab midterms and the theory midterm results exceed 40% (each separately).

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 SRS.

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 midterms together 60%, theory midterm 40%. Blitz quizzes provide extra points: 4-4 points to lab and theory midterms, respectively.

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
100points	40points	…points	…points	…points	…points

Total number of points achievable in semester: 100points				
Grading thresholds	**satisfactory** 40 % and above	**average** 55 % and above	**good** 70 % and above	**excellent** 85 % and above

Other evaluation criteria:

Receive a signature denied entry:	if the student cannot justify the absence for a test, has failed to write any of the tests, or blitz quizzes more then two times, or the number of absences exceed the number specified in the SRS.
Required references:	Moodle materials
Recommended references:	Computer Programming: The Bible: Learn From The Basics to Advanced of Python, C, C++, C#, HTML Coding, and Black Hat Hacking Step-by-Step, Createspace Independent Publishing Platform, 2018. Robert Ciesla, Programming basics, Getting Started with Java, C#, Python, Apress, 2021
Quality assurance methods of the subject:	

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