

Óbuda University John von Neumann Faculty of Informatics		Software Engineering Institute		
Name and code: Programming paradigms and data structures (NSXPA1EMNF) Credits: 5				
Computer Science Engineering MSc		Full-term, 2025/26 year, 2st semester		
Subject lecturers: Kaziwa Hassan Saleh, Prof. Dr. Sándor Szénási				
Prerequisites:		-		
Weekly hours:	Lecture: 0	Seminar: 0	Lab hours: 0	Consultation: 0
Way of assessment:	Colloquium (exam)			
Course Description				
Goal: The aim of the course is to introduce the basic data structures, their implementation and basic use cases. In addition, students will be introduced to the basic strategies and programming paradigms used in general problem solving and optimization.				
Course description: The course introduces the basic operations of data structures (list, queue, stack, set, dictionary) and their use cases. It then discusses the commonly used possible implementations (arrays, sorted arrays, linked lists, binary search trees, hash tables). It then introduces special-purpose data structures (graphs, B-trees, heaps) and additional graph algorithms (shortest path search, spanning tree search, topological ordering). Students will be introduced to the basic strategies that can be used to solve general and optimization problems (brute force method, divide and conquer, memoization method, dynamic programming, greedy algorithms, backtracking, branch and bound). Finally, they gain insights into the world of functional and logic programming.				

Type of the exam	
The course can be completed by successfully passing an exam. The exam is written.	
Calculation of the exam mark	
The final grade is based on the exam score as follows.	
0 – 49: Fail (1) 50 – 61: Pass (2) 62 – 73: Satisfactory (3) 74 – 85: Good (4) 86 – 100: Excellent (5)	
References	
<i>Obligatory:</i>	
Cormen, Leiserson, Rivest, Stein: Introduction to Algorithms (The MIT Press, 2022)	
<i>Recommended:</i>	
Bradley L. Jones: Teach Yourself C# in 21 Days (Sams Publishing, 2001)	
<i>Other references:</i>	
Additional material available in the e-learning system	