

Software Engineering Institute			Semester 1. of the curriculum 2026-27-1			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Programming paradigms and data structures	NSXPPDEMNF	5	full-time	3	0	2
Responsible person for the subject: László Csink			Classification: associate professor			
Subject lecturer(s): László Csink						
Prerequisites:						
Way of the assessment:			written exam			
Course description						
Goal:	The aim of the course is to familiarise students with the most important data structures and their algorithms in various programming paradigms concentrating on Python and C#.					
Course description:	Lists and Arrays, Stacks, Queues, Linked Lists, Hash Tables, Trees, Binary Trees, Binary Search Trees, Graphs, Linear and Binary Search, $O(n^2)$ sorting algorithms, MergeSort, QuickSort, Basics of Machine Learning.					

Lecture schedule	
Education week	Topic
1.	Introduction
2.	Lists and Arrays
3.	Stacks, Queues
4.	Linked Lists
5.	Hash Tables
6.	Graphs and Trees
7.	Binary Trees
8.	Binary Search Trees
9.	Linear and Binary Search, $O(n^2)$ sorting algorithms
10.	MergeSort
11.	QuickSort
12.	Basics of Machine Learning 1
13.	Basics of Machine Learning 2
14.	Summary
Mid-term requirements	
Conditions for obtaining a mid-term grade/ <u>signature</u>	Attending the laboratory sessions at the scheduled times is mandatory. Attending lectures is strongly recommended. Students write two assessment midterm tests. Both tests are worth 50 points each. Only students having completed both midterm tests at least 40% and obtained a total of at least 50 points can have a signature (the right to register for the exam). If the number of absences of the student exceeds 30% of the total number of lessons, the student will be banned from the course.
Assessment schedule	
Education week	Topic
8th lab	Midterm test from the topics presented in the lecture and lab
13th lab	Midterm test from the topics presented in the lecture and lab
14th lab	Replacement of either the first or the second midterm test (optional)
Method used to calculate the <i>mid-term grade</i> (to be filled out only for subjects with mid-term grades)	

Type of the replacement	
Type of the replacement of written test/mid-term grade/signature	<u>One of the two midterm tests can be retaken in week 14.</u> If the student did not complete the replacement test at least 40%, or did not manage to achieve at least 50 points out of the 100 points that can be obtained during the semester, the signature can be only obtained on the signature retake exam in the examination period.
Type of the exam (to be filled out only for subjects with exams)	
written exam in the exam period	
Calculation of the exam mark (to be filled only for subjects with exams)	
Maximum possible points for each subtask will be indicated on the exam sheet. A successful exam must exceed 50 % of points.	
Final grade calculation methods:	
The final grade is the average of the total midterm result and the written exam grade, provided that they are both above minimum level.	
average of midterm grade and written test	final mark
0-49%	1
50-61%	2
62-73%	3
74-85%	4
86-100%	5
References	
Obligatory:	<ul style="list-style-type: none"> • Moodle • Luciano Ramalho: Fluent Python. O'Reilly Media 2022. ISBN-10 1491946008. • www.w3schools.com Python Tutorial, Python DSA, C#, Machine Learning
Recommended:	
Other references:	