

Syllabus Details

Syllabus ID:	9986
Syllabus Name:	Data Structures and Algorithm with Python_Cấu trúc dữ liệu và giải thuật với Python
Course Name English:	Data Structures and Algorithm with Python
Subject Code:	CSD203
NoCredit:	3
Degree Level:	Bachelor
Time Allocation:	45h (60 sessions) contact hours + 1h TE + 1h PE + 103h self-study
Pre-Requisite:	PFP191 (Programming Fundamentals with Python_Cơ sở lập trình với Python)
Description:	This course introduces the basic concepts of data structures and algorithms in data structures with the use of Python. Topics introduced in the course include the basics of algorithm analysis, basic data structures (including stack, queue, linked list, hashtable, tree), recursion and some important applications of these data structures and algorithms.
StudentTasks:	<ul style="list-style-type: none"> - Students must attend more than 80% of contact slots in order to be accepted to the final examination. - Student is responsible to do all exercises, assignments and labs given by instructor in class or at home and submit on time - Use laptop in class only for learning purpose - Promptly access to the FU LMS at https://flm.fpt.edu.vn/ for up-to-date course information
Tools:	<ul style="list-style-type: none"> - Thonny - PyCharm - Visual Studio Code
Scoring Scale:	10
DecisionNo MM/dd/yyyy:	808/QĐ-ĐHFPT dated 08/03/2023
IsApproved:	True
Note:	1) On-going Assessment - 2 Assignments: 20% - At least 2 progress tests: 20% - 1 Practical Exam (PE) 30% 2) 1 Final Exam: 30% 3) Final Result 100% Completion Criteria: 1) Every on-going assessment component > 0 2) Practical Exam > 0 3) Final Exam Score >= 4 & Final Result >= 5
MinAvgMarkToPass:	5
IsActive:	True
ApprovedDate:	8/3/2023

6 material(s)

MaterialDescription	Author	Publisher	PublishedDate	Edition	ISBN	IsMainMaterial	IsHardCopy	IsOnline	Note
Data Structures and Algorithms in Python	Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser	Wiley	2013	1st	9781118290279	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
- PowerPoint Slides						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- Assignments						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
- Labs						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Data Structures and Algorithms using Python	Rance D. Necaise	Wiley	2011	1st	9788126562169	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Data Structures and Algorithms with Python	Kent D. Lee Steve Hubbard	Springer	2015	1st	9783319130712	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

8 LO(s)

CLO Name	CLO Details
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CLO1	L01. Describe the list data structure and its' different way of implementations. Implement the singly linked list.
CLO2	L02. Define stack and queue. Describe basic operations and the use of these structures.
CLO3	L03. Describe about recursive definitions, algorithms, functions and their implementation and use.
CLO4	L04. Explain about general tree, Binary Tree and Binary Search Tree (BST). Implement BST with basic operations.
CLO5	L05. Discuss about graphs and their application. Implement a graph with some basic operations.
CLO6	L06 Explain the operation and performance of some basic and advanced sorting algorithms
CLO7	L07 Explain about hashing and application.
CLO8	L08 Describe the Text Processing problem and its' application. Explain the Huffman, LZW and Run-length encoding Algorithms.

Mapping of CLOs to PLOs of Curriculum BIT_AI

CLO	PLOs																	
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14	PLO15	PLO16	PLO17	PLO18
CLO1										✓								
CLO2										✓								
CLO3										✓								
CLO4										✓								
CLO5										✓								
CLO6										✓								
CLO7										✓								
CLO8										✓								

Download All Teacher Material

Download All Student Material

Session	Topic	Learning-Teaching Type	LO	ITU	Student Materials	S-Download	Lecturer Materials	T-Download	Student's Tasks	Lecturer Tasks	URLs
1	Course Introduction 1.1. Using Arrays 1.2. Singly Linked Lists	Offline	CLO1	IT	- Slides: Chapter 1 Text book:- Chapter 5 page 184 - 224 - Chapter 7 page 256- 275	mat1	Course Implementation - Syllabus CSD203 - Slides: Chapter 1, chapter 5, chapter 7 - Textbook	mat1	Read Chapter 1,5,7	Review Chapter 1,5,7	
2	1.3. Circularly Linked Lists 1.4. Doubly Linked Lists	Offline	CLO1	IT	- Slides: Chapter 1 Text book:- Chapter 5 page 184 - 224 - Chapter 7 page 256- 275		Course Implementation - Syllabus CSD203 - Slides: Chapter 1, chapter 5, chapter 7 - Textbook		Read Chapter 1,5,7	Review Chapter 1,5,7	
3	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 1	U	slide chapter 1, 5, 7 Lab 1: Lab1_st (.docx file)		Slide: Chapter 1, 5, 7 Lab 1: Lab1_in (.docx file)		Review Chapter 1, 5, 7 Do Lab 1	Review Chapter 1, 5, 7 Review Lab 1	

4	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 1	U	slide chapter 1, 5, 7 Lab 1: Lab1_st (.docx file)		Slide: Chapter 1, 5, 7 Lab 1: Lab1_in (.docx file)		Review Chapter 1, 5, 7 Do Lab 1	Review Chapter 1, 5, 7 Review Lab 1	
5	2.1 Stacks Guiding Exercises/Assignment	Offline	CLO 2	T U	- Slides: Chapter 6 - Text book: Chapter 6 page 228-238	drive.google.com	- Syllabus CSD203 - Slides: Chapter 6 - Textbook	drive.google.com	Read Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
6	2.1 Stacks Guiding Exercises/Assignment (cont.)	Offline	CLO 2	T U	- Slides: Chapter 6 - Text book: Chapter 6 page 228-238	drive.google.com	- Syllabus CSD203 - Slides: Chapter 6 - Textbook	drive.google.com	Read Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
7	2.2 Queues 2.3 Double-Ended Queues (Deque)	Offline	CLO 2	T	- Slides: Chapter 6 - Text book: Chapter 6 page 239-250	drive.google.com	- Syllabus CSD203 - Slides: Chapter 6 - Text book	drive.google.com	Read Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
8	2.4 The Priority Queue	Offline	CLO 2	T	- Slides: Chapter 6 - Text book: Chapter 6 page 239-250	drive.google.com	- Syllabus CSD203 - Slides: Chapter 6 - Text book	drive.google.com	Read Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
9	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 2	U	- Slides: Chapter 6 - Textbook - Lab 2: Lab2 (.docx file)		- Syllabus CSD203 - Slides: Chapter 6 - Textbook		Review Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
10	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 2	U	- Slides: Chapter 6 - Textbook - Lab 2: Lab2 (.docx file)		- Syllabus CSD203 - Slides: Chapter 6 - Textbook		Review Chapter 6 Do Lab 2	Review Chapter 6 Review Lab 2	
11	3.1 Illustrative Examples 3.1.1 The Factorial Function 3.1.2 Binary Search 3.1.3 File Systems 3.2 Analyzing Recursive Algorithms	Offline	CLO 3	T	- Slides: Chapter 4 - Text book: Chapter 4 page 148 - 180	drive.google.com	- Syllabus CSD203 - Slides: Chapter 4 - Text book	drive.google.com	Read Chapter 4	Review Chapter 4	
12	3.3 Further Examples of Recursion 3.3.1 Linear Recursion 3.3.2 Binary Recursion 3.3.3 Multiple Recursion 3.4 Designing Recursive Algorithms 3.5 Eliminating Tail Recursion	Offline	CLO 3	T	- Slides: Chapter 4 - Text book: Chapter 4 page 148 - 180	drive.google.com	- Syllabus CSD203 - Slides: Chapter 4 - Text book	drive.google.com	Read Chapter 4	Review Chapter 4	
13	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 3	U	Lab 3: Lab3 (.docx file)		Lab 3: Lab3 (.docx file)		Do Lab 3	Review Lab 3	

14	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 3	U	Lab 3: Lab3 (.docx file)		Lab 3: Lab3 (.docx file)		Do Lab 3	Review Lab 3	
15	4.1 General Trees 4.1.1 Tree Definitions and Properties 4.1.2 The Tree Abstract Data Type 4.2 Binary Trees - . 317 4.2.1 The Binary Tree Abstract Data Type 4.2.2 Properties of Binary Trees	Offline	CLO 4	T	- Slides: Chapter 8 - Text book: Chapter 8 page 300 - 310	drive.google.com	- Syllabus CSD203 - Slides: Chapter 8 - Text book	drive.google.com	Read Chapter 8	Review Chapter 8	
16	4.3 Implementing Trees 4.4 Tree Traversal Algorithms	Offline	CLO 4	T	- Slides: Chapter 8 - Text book: Chapter 8 page 300 - 310	drive.google.com	- Syllabus CSD203 - Slides: Chapter 8 - Text book	drive.google.com	Read Chapter 8	Review Chapter 8	
17	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 4	U	Lab 4: Lab4 (.docx file) - Text book: Chapter 8 page 300 - 310		Lab 4: Lab4 (.docx file) Chapter 8 page 300 - 310		Review Chapter 8 Do Lab 4	Review Chapter 8 Review Lab 4	
18	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 4	U	Lab 4: Lab4 (.docx file) - Text book: Chapter 8 page 300 - 310		Lab 4: Lab4 (.docx file) Chapter 8 page 300 - 310		Review Chapter 8 Do Lab 4	Review Chapter 8 Review Lab 4	
19	4.5 Binary Search Trees 4.5.1 Searching Within a Binary Search Tree	Offline	CLO 4	T	- Slides: Chapter 11 - Text book: Chapter 11 page 460 - 473	drive.google.com	- Syllabus CSD203 - Slides: Chapter 11 - Text book	drive.google.com	Read Chapter 11	Review Chapter 11	
20	4.5.2 Insertions and Deletions	Offline	CLO 4	T	- Slides: Chapter 11 - Text book: Chapter 11 page 460 - 473	drive.google.com	- Syllabus CSD203 - Slides: Chapter 11 - Text book	drive.google.com	Read Chapter 11	Review Chapter 11	
21	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 4	U	- slide chapter 11 - Lab 4: Lab4 (.docx file) - Text book: Chapter 11 page 460 - 473		Slide: Chapter 11 Lab 4: Lab4 (.docx file) Chapter 11 page 460 - 473		Review Chapter 11 Do Lab 4	Review Chapter 11 Review Lab 4	
22	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 4	U	- slide chapter 11 - Lab 4: Lab4 (.docx file) - Text book: Chapter 11 page 460 - 473		Slide: Chapter 11 Lab 4: Lab4 (.docx file) Chapter 11 page 460 - 473		Review Chapter 11 Do Lab 4	Review Chapter 11 Review Lab 4	

23	4.6 Balanced Search Trees 4.7 AVL Trees	Offline	CLO 4	T	- Slides: Chapter 11, 9 - Chapter 11 page 475 - 488 - Chapter 9 page 370 - 384	drive.google.com	- Syllabus CSD203 - Slides: Chapter 11, 9 - Text book	drive.google.com	Read Chapter 9,11	Review Chapter 9,11	
24	4.8 Heaps	Offline	CLO 4	T	- Slides: Chapter 11, 9 - Chapter 11 page 475 - 488 - Chapter 9 page 370 - 384	drive.google.com	- Syllabus CSD203 - Slides: Chapter 11, 9 - Text book	drive.google.com	Read Chapter 9,11	Review Chapter 9,11	
25	Progress test and/or Review Exercises Guiding Exercises/Assignment	Offline	CLO 4	U	- Lab 4: Lab4 (.docx file)		Lab 4: Lab4 (.docx file)		Do Lab 4	Review Lab 4	
26	Progress test and/or Review Exercises Guiding Exercises/Assignment (cont.)	Offline	CLO 4	U	- Lab 4: Lab4 (.docx file)		Lab 4: Lab4 (.docx file)		Do Lab 4	Review Lab 4	
27	Progress test 1 and review	Offline		U	- Content 1 - 4 - Text book - Progress test 1		Content 1 - 4 Text book Progress test 1		Review Content 1 - 4 Do Progress test 1	Review Content 1 - 4 Review Progress test 1	
28	Progress test 1 and review (cont.)	Offline		U	- Content 1 - 4 - Text book - Progress test 1		Content 1 - 4 Text book Progress test 1		Review Content 1 - 4 Do Progress test 1	Review Content 1 - 4 Review Progress test 1	
29	5.1 Graphs 5.2 Data Structures for Graphs 5.2.1 Edge List Structure 5.2.2 Adjacency List Structure 5.2.3 Adjacency Matrix Structure	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 620 - 648	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
30	5.3 Graph Traversals 5.3.1 Depth-First Search 5.3.3 Breadth-First Search	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 620 - 648	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
31	Progress test and/or Assignment Review Exercises Guiding Exercises/Assignment	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file) - Assignment 1		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5 Do - Assignment 1	Review Chapter 14 Review Lab 5	

32	Progress test and/or Assignmen Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file) - Assignment 1		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5 Do - Assignment 1	Review Chapter 14 Review Lab 5	
33	5.4 Shortest Paths 5.4.1 Weighted Graphs	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 659 - 669	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
34	5.4.2 Dijkstra's Algorithm	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 659 - 669	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
35	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file)		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5	Review Chapter 14 Review Lab 5	
36	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file)		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5	Review Chapter 14 Review Lab 5	
37	5.5 Minimum Spanning Trees 5.5.1 Prim-Jarník Algorithm 5.5.2 Kruskal's Algorithm	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 670 - 685	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
38	5.6. Euler's tour and Euler's cycle	Offline	CLO 5	T	- Slides: Chapter 14 - Text book: Chapter 14 page 670 - 685	drive.google.com	- Syllabus CSD203 - Slides: Chapter 14 - Chapter 14 page 620 - 686	drive.google.com	Read Chapter 14	Review Chapter 14	
39	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file)		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5	Review Chapter 14 Review Lab 5	
40	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 5	U	- slide chapter 14 - Lab 5: Lab5 (.docx file)		Slide: Chapter 14 Lab 5: Lab5 (.docx file)		Review Chapter 14 Do Lab 5	Review Chapter 14 Review Lab 5	
41	6.1 Selection-Sort 6.2 Insertion-Sort	Offline	CLO 6	T	- Slides: Chapter 9, 12 - Text book: Chapter 9 page 385 -386 - Chapter 12 page 550 - 559	drive.google.com	- Syllabus CSD203 - Slides: Chapter 9, 12 - Chapter 9 page 385 -386 - Chapter 12 page 550 - 559	drive.google.com	Read Chapter 9, 12	Review Chapter 9,12	

42	6.3 Bubble-sort 6.4 Quick-Sort	Offline	CLO 6	T	- Slides: Chapter 9, 12 - Text book: Chapter 9 page 385 -386 - Chapter 12 page 550 - 559	drive.google.com	- Syllabus CSD203 - Slides: Chapter 9, 12 - Chapter 9 page 385 -386 - Chapter 12 page 550 - 559	drive.google.com	Read Chapter 9, 12	Review Chapter 9,12	
43	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 6	U	- slide chapter 9, 12 - Lab 6: Lab6 (.docx file)		Slide: Chapter 9, 12 Lab 6: Lab6 (.docx file)		Review Chapter 9, 12 Do Lab 6	Review Chapter 9, 12 Review Lab 6	
44	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 6	U	- slide chapter 9, 12 - Lab 6: Lab6 (.docx file)		Slide: Chapter 9, 12 Lab 6: Lab6 (.docx file)		Review Chapter 9, 12 Do Lab 6	Review Chapter 9, 12 Review Lab 6	
45	6.5 Merge-Sort 6.6 Heap-Sort	Offline	CLO 6	T	- Slides: Chapter 9, 12 - Text book: Chapter 9 page 370 -388 - Text book: Chapter 12 page 538 - 547	drive.google.com	- Syllabus CSD203 - Slides: Chapter 9, 12 - Chapter 9 page 370 -388 - Chapter 12 page 538 - 547	drive.google.com	Read Chapter 9, 12	Review Chapter 9, 12	
46	6.7 Linear-Time Sorting: Bucket-Sort and Radix-Sort 6.8 Comparing Sorting Algorithms	Offline	CLO 6	T	- Slides: Chapter 9, 12 - Text book: Chapter 9 page 370 -388 - Text book: Chapter 12 page 538 - 547	drive.google.com	- Syllabus CSD203 - Slides: Chapter 9, 12 - Chapter 9 page 370 -388 - Chapter 12 page 538 - 547	drive.google.com	Read Chapter 9, 12	Review Chapter 9, 12	
47	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 6	U	- slide chapter 9, 12 - Lab 6: Lab6 (.docx file)		Slide: Chapter 9, 12 Lab 6: Lab6 (.docx file)		Review Chapter 9, 12 Do Lab 6	Review Chapter 9, 12 Review Lab 6	
48	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 6	U	- slide chapter 9, 12 - Lab 6: Lab6 (.docx file)		Slide: Chapter 9, 12 Lab 6: Lab6 (.docx file)		Review Chapter 9, 12 Do Lab 6	Review Chapter 9, 12 Review Lab 6	
49	7.1 Hash Tables 7.2 Hash Functions 7.3 Collision-Handling	Offline	CLO 7	T	- Slides: Chapter 10 - Text book: Chapter 10 page 410 - 422	drive.google.com	- Syllabus CSD203 - Slides: Chapter 10 - Chapter 10 page 410 - 422	drive.google.com	Read Chapter 10	Review Chapter 10	

50	7.4 Load Factors, Rehashing, and Efficiency 7.5 Python Hash Table Implementation	Offline	CLO 7	T	- Slides: Chapter 10 - Text book: Chapter 10 page 410 - 422	drive.google.com	- Syllabus CSD203 - Slides: Chapter 10 - Chapter 10 page 410 - 422	drive.google.com	Read Chapter 10	Review Chapter 10	
51	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 7	U	Lab 7: Lab7 (.docx file)		Lab 7: Lab 7 (.docx file)		Do Lab 7	Review Lab 7	
52	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 7	U	Lab 7: Lab7 (.docx file)		Lab 7: Lab 7 (.docx file)		Do Lab 7	Review Lab 7	
53	8.1 Abundance of Digitized Text 8.2 Pattern-Matching Algorithms 8.2.1 Brute Force 8.2.2 The Knuth-Morris-Pratt Algorithm	Offline	CLO 8	T	- Slides: Chapter 13 - Text book: Chapter 13 page 581 -612	drive.google.com	- Syllabus CSD203 - Slides: Chapter 13 - Chapter 13 page 581 -612	drive.google.com	Read Chapter 13	Review Chapter 13	
54	8.3 Text Compression 8.3.1 The Huffman Coding Algorithm 8.3.2 The LZW Algorithm 8.3.3 The Run-length Encoding Algorithm	Offline	CLO 8	T	- Slides: Chapter 13 - Text book: Chapter 13 page 581 -612	drive.google.com	- Syllabus CSD203 - Slides: Chapter 13 - Chapter 13 page 581 -612	drive.google.com	Read Chapter 13	Review Chapter 13	
55	Progress test and/or Review Exercises Guiding Exercises/Assignmen	Offline	CLO 8	U	slide chapter 13 Lab 8: Lab 8 (.docx file)		Slide: Chapter 13 Lab 8: Lab 8 (.docx file)		Review Chapter 13 Do Lab 8	Review Chapter 13 Review Lab 8	
56	Progress test and/or Review Exercises Guiding Exercises/Assignmen (cont.)	Offline	CLO 8	U	slide chapter 13 Lab 8: Lab 8 (.docx file)		Slide: Chapter 13 Lab 8: Lab 8 (.docx file)		Review Chapter 13 Do Lab 8	Review Chapter 13 Review Lab 8	
57	Course review Practical Exam	Offline		I	Review the course - Assignment 2		Review the course Do questions and problems at the end of the course		Review the course - Do Assignment 2	Review the course Do questions and problems at the end of the course	
58	Course review Practical Exam (cont.)	Offline		I	Review the course - Assignment 2		Review the course Do questions and problems at the end of the course		Review the course - Do Assignment 2	Review the course Do questions and problems at the end of the course	

59	Progress test 2 and review	Offline		U, I	Content 5 - 8 Text book Prgress test 2		Content 5 - 8 Text book Prgress test 2		Review the course Do Prgress test 2	Review the course Review Prgress test 2	
60	Progress test 2 and review (cont.)	Offline		U, I	Content 5 - 8 Text book Prgress test 2		Content 5 - 8 Text book Prgress test 2		Review the course Do Prgress test 2	Review the course Review Prgress test 2	

39 Constructive question(s)

	Session No	Name	Details
1	2	CQ1	Please list the advantages of Linked List over Array?
2	2	CQ2	Please list the advantages of Array over Linked List?
3	2	CQ3	What are difference between Single, Circularly and Doubly Linked List
4	2	CQ1	What are difference between Stacks and Queue?
5	4	CQ2	List the applications of Stack and Queue to specific problems
6	4	CQ3	What are difference between Queue, Double-Ended Queue and Priority Queue
7	4	CQ1	What are advantages of Binary Search over Linear Search?
8	6	CQ2	What are pro and cons of recursion and tail-recursion?
9	6	CQ3	Lis the application of recursion and tail-recursion to specific problems
10	6	CQ1	What is Tree?
11	8	CQ2	What are difference between Binary Tree and Binary Search Tree?
12	8	CQ3	List the application of BT to specific problems
13	8	CQ1	How to search value on a BST?
14	10	CQ2	How to insert value into BST?
15	10	CQ3	How to delete exist node of BST?
16	10	CQ1	How to balancing BST?
17	12	CQ2	What is AVL?
18	12	CQ3	What is Heaps?
19	14	CQ1	QWhat is Graphs?
20	16	CQ2	How to descript the graph on Python?
21	16	CQ3	What are difference between BFS and DFS?
22	16	CQ1	How to find the shortest path from node S to node E?
23	18	CQ2	What is Dijkstra?
24	18	CQ3	How to find all shortest path from node S to node E?
25	18	CQ1	How to find minimum spanning trees?
26	20	CQ2	What is difference between Prim and Kruskal
27	20	CQ3	What is Euler's tour and Euler's cycle?
28	20	CQ1	Compare performace between selection, bubble and inser sort?
29	22	CQ2	What is Quick sort?
30	22	CQ3	Explain about finding pivot item and partitioning of an array in Quick sort algorithm.
31	22	CQ1	Compare performace between merge, heap and quick sort?
32	24	CQ2	What is Bucket sort?
33	24	CQ3	What is radix-sort?
34	24	CQ1	What is Hash and hash table?

35	26	CQ2	What is collision and how to solve the problem?
36	26	CQ3	How to apply hash in Java programming language?
37	26	CQ1	What is KMP?
38	28	CQ2	What is Huffman coding?
39	28	CQ3	Compare between LZW and run-length encoding

6 assessment(s)

Category	Type	Part	Weight	Completion Criteria	Duration	CLO	Question Type	No Question	Knowledge and Skill	Grading Guide	Note
Assignment 1	on-going	1	10.0%	>0	45		Written test questions	2	- cover content 1,2,3,4	in class, by instructor	Instructor has responsibility to review the test for students after graded.
Assignment 2	on-going	1	10.0%	>0	45'		Written test questions	2	- cover content 5,6,7,8	in class, by instructor	Instructor has responsibility to review the test for students after graded.
Practical exam	on-going	1	30.0%	>0	60'		Written test questions	2	- cover content 1,2,3,4,5,6,7	by exam board, using computer	The exam questions must be updated or different at least 70% to the previous ones.
Progress test 1	on-going	1	10.0%	>0	10'-30'		Multiple choices Marked by Computer or a suitable format	30	- cover content 1,2,3,4	in class, by instructor	<p>Instruction and schedules for Progress tests must be presented in the Course Implementation Plan approved by director of the campus.</p> <p>Progress test must be taken right after the last lectures of required material.</p> <p>Instructor has responsibility to review the test for students after graded.</p>
Progress test 2	on-going	2	10.0%	>0	10'-30'		Multiple choices Marked by Computer or a suitable format	30	- cover content 5,6,7,8	in class, by instructor	<p>Instruction and schedules for Progress tests must be presented in the Course Implementation Plan approved by director of the campus.</p> <p>Progress test must be taken right after the last lectures of required material.</p> <p>Instructor has responsibility to review the test for students after graded.</p>
Final exam	final exam	1	30.0%	4	60'		Multiple choices Marked by Computer	50	concepts, algorithms; all studied chapters	by exam board, using computer	The exam questions must be updated or different at least 70% to the previous ones.