

Algorithms and Data Structures

Course Title: Algorithms and Data Structures					
Course Code: CIT61007	Student Workload: 8.50 Hours/ Weeks	Credits: 3 Credits (4.50 ECTS)	Semester: 3 st Semester	Frequency: Odd Semester	Duration: 16 Weeks/ Semester (<i>Lecture:</i> 14 weeks; <i>Midterm assessment:</i> 1 week; <i>Final assessment:</i> 1 week)
1	Types of Courses: Knowledge Course	Contact Hours: <i>Lecturing:</i> 1.667 Hours/ Week; <i>Practical Work:</i> 0.833 Hours/ Week	Independent Study: <i>Self-study:</i> 3.00 Hours/ Week; <i>Structured Assignment:</i> 3.00 Hours/ Week	Class Size: 40 Students	
2	Prerequisites for Participation (If Applicable): Advanced Programming				
3	Learning Outcomes: 1. M1: Students can understand the concept of algorithms and data structures fundamentally. 2. M2: Students can analyze data structures and appropriate algorithms for solving a particular problem. 3. M3: Students can implement data structures and algorithms designed in programming languages. 4. M4: Students can implement sorting and search algorithms.				
4	Subject aims/Content: At the end of the course, students are expected: 1. L1: Students can understand algorithms and write them in the form of flowcharts and pseudocode. (M1) 2. L2: Students can understand the concept of Abstract Data Type. (M1) 3. L3: Students can understand the concepts of Single Linked List, Double Linked List and Circular Linked List. (M2) 4. L4: Students can apply the stack using ADT arrays and linked lists. (M2) 5. L5: Students can apply queues using ADT arrays and linked lists. (M2) 6. L6: Students can implement the concept of tree, binary tree, and tree traversal. (M3) 7. L7: Students can implement heap tree, binary search tree and AVL Tree. (M3) 8. L8: Students can implement graphs along with tracing graph data using the DFS and BFS methods. (M3) 9. L9: Students can implement sorting algorithms which include selection sort, insertion sort, bubble sort, merge-sort, and Quick Sort algorithms. (M4) 10. L10: Students can implement searching algorithms which include sequential search and binary search algorithms. (M4)				
5	Teaching Methods: Lecturing, Group Discussion, Case-Based Learning, Project-Based Learning				
6	Assessment Methods: Essay, multiple-choice, product assessment, project assessment, anecdotal record/logbook				
7	This Course is Used in The Following Study Programme/s as Well: -				
8	Responsibility for Course: 1. Bayu Rahayudi, ST., MT. 2. Issa Arwani, S.Kom., M.Sc.				

9

Other Information:

Bibliography:

1. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms Using Java 6 edition", Wiley, USA, 2014.
2. John R. Hubbard, "Scaum's Out!Schaum'sData Structures With Java second Edition", McGraw-Hill, New york, 2007.Yorkert Lafore, "Data Structures and Algorithm in Java second Edition", Sams Publishing, Indiana, 2003