

SYLLABUS:

Date / Revision April 2017/September 2017/IT
Faculty Engineering
Study Program Computer Science

SUBJECT: ADVANCE DATA STRUCTURE

1 Basic Information

1.01	Subject Name	ADVANCE DATA STRUCTURE
1.02	Semester	2
1.03	Level	2
1.04	SKS	3
1.05	Mandatory / Curriculum	D-02
1.06	Subject Code	ADDS
1.07	Subject Code	CSE-D-ADDS-217
1.08	Year	2017
1.09	Quality Control	Final Test, see evaluation
1.10	Limitations	Min 12 and Max 32 students in one class
1.11	Combined with	-
1.12	Pre-requisite	
1.13	Responsible	
1.14	Revision	September 2017

2 Description of Subject

The course covers abstraction of data types and their implementation as data structures using object-oriented programming principles in the selection and analysis of various implementations. It also covers sequential and linked storage representations: lists, stacks, queues, and tables. Nonlinear data structures: trees and graphs. It also touches recursion, sorting, searching, and algorithm complexity

3 Objectives

To give students understanding about data abstraction and its application in many aspect of computer science subjects

4 Competency

- To be able to apply appropriate data structures and abstract data types such as bags, lists, stacks, queues, trees, tables, and graphs in problem solving.
- To be able to apply object-oriented principles of polymorphism, inheritance, and generic programming when implementing data types for data structures.
- To be able to create alternative representations of data types and recursion
- To be able to determine appropriate data type and structures for various sorting and searching algorithms.
- To be able to determine time and space requirements of common sorting and searching algorithms.

5 Learning Approach / Methodology

- Lectures/ Class contact (time-tabled) supplemented with interactive questions and answers;
- Student Study Effort: homework/assignment; preparation for test/quizzes/ examination.

6 Evaluation

5.1	Absence maximum	25%
5.2	Participation in Discussion	05 Points
5.3	Homework / Classwork	05 Points
5.4	Presentation /Simulation	10 Points
5.5	Daily Quiz	20 Points
5.6	Final Examination	60 Points
	Total	100 Points

7 Text Book and Reference

1	Main Text Book: Elliot B. Koffman & Paul A.T. Wolfgang, Objects, Abstraction, Data Structures and Design using Java Version 5.0, Wiley, ISBN 0-471-69264-6
2	Supplement Textbooks:

8 Content / Topics of Lecture

Week	Content/Topics of Lecturing	Text Book Chapter	Remark
1	Java Syntax Refresher	-	
2	Software Design Principles: software life cycle, types of testing, etc.; big-O and loop invariants	Chapter 1-2	
3	Inheritance, interfaces, basics of lists	Chapter 3	
4	Array Based Lists, linked lists	Chapter 4	
5	Double-linked lists, iterators, the Collection interface	Chapter 4	
6	Stacks	Chapter 5	
7	Queues	Chapter 6	
8	Mid Term Break		
9	Recursion	Chapter 7	
10	Tree Basics, Complete Binary Tree, Full Binary Tree, etc.	Chapter 8	
11	Binary Search Trees, max and min heaps, priority queues, Huffman trees	Chapter 8	
12	Sorting algorithms: bubble, insertion, selection, shellsort, quicksort, mergesort & heapsort	Chapter 10	
13	Sets & Maps; hash tables and hashing techniques	Chapter 9	
14	Self-balancing binary trees: Red-black trees, AVL trees	Chapter 11	
15	Final Examination		