**Course syllabus**

**XXXXXXXX Data Structure and Algorithm (1/2017)**

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| **Unit** | **Topic** | **Week** |
| 1. Review Object Oriented Programming (Java) | * Introduction to Java. * Variable, Data type and Operator. * Control statement. * What is Object oriented programming? * Class, Object and Method. * Modifier in Java. * Java package. * Constructor * Inheritance and Encapsulation. * Abstract and Interface.   \*\*\*Note: Lab #1 | 1-2 |
| 1. Introduction to Data structure and algorithm. | * What is data structure and algorithm. * Abstract data type (ADT). * Type of algorithm. | 3 |
| 1. Performance analysis of algorithm. | * Basic math for performance analysis of algorithm. * Space complexity analysis. * Time complexity analysis. * Algorithm growth rates. * Compare algorithm growth rates. * Operation count. * Function of algorithm growth rates. * Best-case, Worse-case and Average-case   \*\*\*Note: Assignment #1 | 3 |
| 1. Array | * 1 dimension array * Multi dimension array   \*\*\*Note: Lab #2 | 4 |
| 1. Link-list | * Singly link-list * Doubly link-list   \*\*\*Note: Lab #3 |  |
| 1. Stack | * Array stack * Link-list stack * Infix to postfix   \*\*\*Note: Lab #4 |  |
| 1. Queue | * Array queue * Link-list queue   \*\*\*Note: Lab #5 |  |
| 1. Tree | * What is tree? * Binary tree * Traveling in tree. * Preorder * Inorder * Postorder * AVL tree * 2-3 trees * 2-3-4 trees * Red-black tree * B-tree   \*\*\*Note: Lab #6 and Assignment #2 |  |
| 1. Recursion | * Java recursive function   \*\*\*Note: Lab #7 |  |
| 1. Hash | * What is hash? * Resolving collision |  |
| 1. Tries | * Simple tries * Full tries * Compressed tries   \*\*\* Note: Assignment #3 |  |
| 1. Priority queue and heap | * Priority queue * Heap |  |
| 1. Sorting and searching data | * Selection sort * Bubble sort * Insertion sort * Merge sort * Quick sort * Radix sort * Heap sort * Shell sort * Sequential search or Liner search * Binary search or Half interval search   \*\*\* Note: Lab #8 |  |
| 1. Graph | \*\*\* Note: Assignment #4 |  |
| 1. Lab exam | \*\*\* Note: Lab exam #1 |  |