

 SLIIT <i>Discover Your Future</i>	DEPARTMENT OF INFORMATION TECHNOLOGY		
	FACULTY OF COMPUTING		

MODULE OUTLINE			
Module Name	Data Structures and Algorithms		
Module Code	IT2070	Version No.	2017 - 1
Year	2	Semester	2
Credit Points	4		
Pre-requisites	IT2030		
Co-requisites	None		
Methods of Delivery	Lectures (Face-to-face)	2	Hours/Week
	Tutorials	1	Hours/Week
	Labs	2	Hours/Week
Course Web Site	http://courseweb.sliit.lk/		
Date of Original Approval	January, 2017		
Date of Next Review	January, 2022		

MODULE DESCRIPTION	
Introduction	This module introduces students to fundamental data structures such as stacks, queues, linked lists and trees. In addition, it offers an in-depth coverage of different algorithms and techniques of designing algorithms which enables students to understand, analyze a problem in algorithmic way.
Learning Outcomes	At the end of the module student will be able to:
LO1:	Describe fundamental data structures.
LO2:	Solve problems using standard data structures.
LO3:	Transform problems in algorithmic terms.
LO4:	Identify efficient algorithms to solve problems.

Assessment Criteria	During the semester, there will be practical tests. At the end of the semester there will be a comprehensive written final exam. The distribution of marks for the assessed components of the module are as follows:			
	Continuous Assessments			
	• Practical Tests	40	%	LO1–LO3
	End Semester Assessment			
	• Final Examination	60	%	LO1-LO4
	TOTAL	100	%	
Estimated Student Workload	Contact Hours			
	• Lecture	26 hours		
	• Tutorial	13 hours		
	• Laboratory	26 hours		
	Time Allocated for Assessments			
	• Continuous Assessments	02 hours		
	• Final Examination	02 hours		
	Reading and Independent Study	131 hours		
	TOTAL	200 hours		
Module Requirement	To pass this module, students need to obtain an overall mark that would qualify for a “C” grade or above			
Primary References	1. Mitchell Waite,Robert Lafore, <i>Data Structures and Algorithms in Java</i> , 2 nd Edition, Sams Publishing, 2002.			
	2. T.H. Cormen, C.E. Leiserson, R.L. Rivest, <i>Introduction to Algorithms</i> , 3 rd Edition, MIT Press, 2009			

CONTENTS OF THE MODULE	
Topic	Aligned learning outcomes
1. Introduction <ul style="list-style-type: none"> Introducing data structures 	LO1
2. Stack data structures <ul style="list-style-type: none"> Introduction to stack data structure Implementing and using a stack data structure 	LO1, LO2

3. Queue data structures <ul style="list-style-type: none"> • Introduction to linear queue and circular queue • Implementing and using a queue data structure 	LO1, LO2
4. Linked List data structures <ul style="list-style-type: none"> • Introduction to linked list data structure • Implementing and using a linked list data structure 	LO1, LO2
5. Tree data structures <ul style="list-style-type: none"> • Introduction to tree data structure • Implementing and using a tree data structure 	LO1, LO2
6. Introduction to Algorithms and Asymptotic Notations <ul style="list-style-type: none"> • Introduction to algorithm and analysis • Analysis methods • Big – O notation • Big – Omega notation • Big – Theta notation • Analysis of data structures using Big – O notation 	LO3, LO4
7. Algorithm designing techniques <ul style="list-style-type: none"> • Divide and Conquer (Quick Sort & Merge Sort with analysis) • Greedy method (Kruskal's algorithm & Dijkstra algorithm) 	LO4
8. Introduction to Heaps <ul style="list-style-type: none"> • Heaps algorithm and priority queue Implementation 	LO3, LO4
9. Introduction to searching and sorting algorithms <ul style="list-style-type: none"> • Binary Search algorithms • String Searching and Finite State Machines • Bubble Sort • Selection Sort 	LO3, LO4
GENERIC INFORMATION	
<p>Any type of plagiarism is not allowed.</p> <p>Plagiarism: Academic honesty is crucial to a student's credibility and self-esteem, and ultimately reflects the values and morals of the Institute as whole. A student may work together with one or a group of students discussing assignment content, identifying relevant references, and debating issues relevant to the subject. Plagiarism occurs when the work of another person, or persons, is used and presented as one's own.</p> <p style="text-align: center;">-----End of Module Outline-----</p>	