1.	Name of Course/Module	Data Structures and Algorithms
2.	Course Code	TCS1011
3.	Status of Subject	Core for B.IT Artificial Intelligence
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6
5.	Version (state the date of the last Senate approval)	June 2012
6.	Requirement for Registration	TCP1241 Computer Programming II
7.	Name(s) of academic/teaching staff	Chong Lee Ying Wee Kuok Kwee Mohd Fikri Azli bin Abdullah
8.	Semester and Year offered	Trimester 1 (Gamma Level)

9.	Objective of the course/module in the programme :
	To provide a good understanding of data structures and their implementation. Students are also expected to analyze and design basic algorithms.

10.	Learning Outcomes :
	At the completion of the subject, students should be able to: LO1: Define basic concept of data structures (Cognitive, Level 1). LO2: Explain the data structures and algorithms (Cognitive, Level 5). LO3: Compare the algorithms (Cognitive, Level 6). LO4: Create a program by implementation of algorithms or data structures (Cognitive, Level 5).

11.	Synopsis:
	The major areas of study include: Data Types and ADT, Data Structures, Searching and Sorting, Trees, Graphs.
	Bidang pengajian utama merangkumi jenis data dan jenis data abstrak, struktur data, pegelintaran dan isihan, pokok, graf.

12.	Mapping of Subject to Programme Outcomes :	
	Programme Outcomes	% of Contribution
	PO1: Apply soft skills in work and career related activities	20
	PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices	80

13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Mid Term Test	Written Exam	20%
	Lab Test	Programming Test	10%
	Quiz	Written Exam	10%
	Assignment	Report & Presentation	20%

	Final Exam		Written Exam		40%

14.					
	Details of Subject				
	Topics			Mode of Delivery	
				Lecture	Lab
	1. Data Types & ADT Data types, Arrays & Pointers, Data structures, ADTs & implementation, objects, classes. Programming language support for ADTs.			6	6
	2. Data Structures Stacks: implementation & linked stacks. Recursion: Backtracking & Look-Ahead. Queues: circular, linked. Polynomial arithmetic. List & strings.			6	6
	3. Searching and Sorting. Big Oh notation. Sequential search, binary search, comparison trees, Insertion sort, selection sort, shell sort, quicksort, mergesort, Radix sort & Heapsort. Hashing. Analysis of these searching and sorting techniques.			6	6
	4. Trees Binary trees. Traversal of binary tree. Binary search trees: Insertion and deletion & building binary trees. Height balance. Multiway trees. Polish Notation.			4	4
	5. Graphs Graph ADT. Graph travesal, depth-first & breadth-first algorithms. Shortest Paths, best-first, uniform-cost traversals.			6	6
	Total			**28**	**28**

15.	Labs
	- Implementation using data types & ADT - Implementation using data structures, stacks and queues - Implementation using searching and sorting algorithms - Implementation using trees - Implementation using graphs

16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning
	Lecture	28	28
	Tutorials		
	Laboratory/Practical	28	14
	Presentation		
	Assignment	-	10
	Mid Term Test	1	5
	Lab Test	2	4
	Final Exam	2	15
	Quizzes	2 times	2
	Sub Total	61	78
	Total SLT	139/40 = 3.475 => 3	

17.	Credit Value	3
18.	Reading Materials :	
	Textbook	Reference Materials

	1. Nyhoff, L., "ADTs, Data Structures, and Problem Solving with C++", Pearson Prentice Hall, 2005. ISBN: 978-0131409095	1. Weiss, M., "Data Structures and Algorithm Analysis in C++", Addison Wesley, 2006. 2. Main, M. and Savitch, W., "Data Structures & Other Objects Using C++", Addison Wesley, 2005. 3. Carrano, F., "Data Abstraction and Problem Solving with C++: Walls and Mirrors", Addison Wesley, 2005.
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) : 1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Programme Objective and Outcomes (Measurement and Descriptions)	