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SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Object-Oriented Programming and Data Structures
2.	Course Code	TCP1201
3.	Status of Course [Applies to (cohort)]	Core
4.	MQF Level/Stage Note : *Certificate – MQF Level 3* *Diploma – MQF Level 4* *Bachelor – MQF Level 6* *Masters – MQF Level 7* *Doctoral – MQF Level 8*	Bachelor – MQF Level 6
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Previous: June 2014 Current: March 2017
6.	Pre-Requisite	TCP1101 Programming Fundamentals
7.	Name(s) of academic/teaching staff	Dr. Wong Lai Kuan Mr. Goh Chien Le Dr. John See Su Yang Mr. Neoh Kee Lin
8.	Semester and Year offered	Trimester 2 (Beta)
9.	Objective of the course in the programme : To equip students with knowledge of formulating problems from object-oriented perspective, and then solve the problems using programming languages and elementary data structures.	
10.	Justification for including the course in the programme : To provide students with skills in object-oriented programming and developing data structures.	

11.

Course Learning Outcomes :	Domain	Level
LO1: Interpret the concepts of object-orientation.	Cognitive	2
LO2: Construct an object-oriented solution for a given problem.	Cognitive	6
LO3: Explain elementary data structures.	Cognitive	2
LO4: Select appropriate data structures for a given problem.	Cognitive	5

12. Mapping of Learning Outcomes to Programme Outcomes :

Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
LO1		X					X		
LO2			X						
LO3		X					X		
LO4			X						

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13. Assessment Methods and Types :

Method and Type	Description/Details	Percentage
Assignment	Programming	20
Quiz	Written	20
Test	Programming/Written	20
Final Exam	Written Exam	40

14. Mapping of assessment components to learning outcomes (LOs)

Assessment Components	LO1	LO2	LO3	LO4
Assignment (20%)		X		X
Quiz (20%)	X		X	X
Test (20%)	X	X	X	X
Final Exam (40%)	X	X	X	X

15. Details of Course

Topics	Mode of Delivery (eg : Lecture, Tutorial, Workshop, Seminar, etc.) Indicate allocation of SLT (lecture, tutorial, lab) for each subtopic	
	Lecture (Hrs)	Lab (Hrs)
1. Introduction to Object-Orientation Abstraction, encapsulation, Unified Modeling Language (UML) class diagram, relationships among objects: association, aggregation, composition, is-a relationship	4	2
2. Inheritance Base and derived classes, protected qualifier, function overloading, function overriding, constructor chaining	4	3
3. Polymorphism Static and dynamic polymorphism, early and late binding, virtual function, abstract and concrete class, upcasting, downcasting, virtual destructor, virtual table	6	4
4. Recursion Recursive function, recursive problems: Fibonacci numbers, binary search, Tower of Hanoi, recursion versus iteration	6	4
5. Exception Handling try-catch block, cascading throws, exception class hierarchies, custom exception class, programming techniques for exception handling	2	1
6. Generic Programming Generic function, generic class, vector, list	3	2
7. Stack and Queue Stack ADT, Queue ADT, Comparison between stack and queue, array-based implementation, application of stack and queue	4	3

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	8. Array List and Linked List Revision of dynamic array, concept of List Abstract Data Type (ADT), node and linked List ADT, implementation of stack and queue using List, advantages and disadvantages of using array list and linked list	6	4
	9. Binary Tree Tree ADT, binary tree, tree traversal, binary search tree, array-based and linked structure implementation, implementation of tree traversal using recursion	4	3
	10. Map, Dictionary and Set Map ADTs, hash table, collision handling scheme, Set ADTs, Union/Find structures	3	2
		42	28

	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
	Lecture	42	21
	Tutorials		
	Laboratory/Practical	28	28
	Presentation		
	Assignments		12
	Quizzes	Conducted in class	4 0
	Mid Term Test	1	4 6
	Final Exam	2	20
	Sub Total	73	87
	Total SLT	160	
16.	Credit Value	4 (160 / 40 = 4)	

17. Reading Materials :

Textbooks

Reference Material (including 'Statutes' for Law)

1. Deitel, P., & Deitel, H. (2017) C++ How to Program, 10/e. Pearson
2. Carrano, F. M., & Henry, T. M. (2017) Data Abstraction & Problem Solving with C++: Walls and Mirrors, 7/e, Pearson
3. Gaddis, T., Walters, J., & Muganda, G. (2017) Starting Out with C++: Early Objects, 9/e, Pearson
4. Liang, Y. Daniel. (2015) Intro to Java Programming, Comprehensive Version, 10/e, Pearson
5. Carrano, F. M. (2015) Data Structures and Abstractions with Java, 4/e, Pearson
6. Roberts, E. (2017) Programming Abstractions in Java, Pearson

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Appendix (to be compiled when submitting the complete syllabus for the programme) :

1. Mission and Vision of the University and Faculty
2. Programme Objectives or Programme Educational Objectives
3. Programme Outcomes (POs)
4. Mapping of POs to the 8 MQF domain
5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below :

Subject	Learning Outcomes (please state the learning 0utcomes)	Bloom's Taxonomy Domain		
		Affective	Cognitive	Psychomotor
TCP1201	Learning Outcome 1		2	
	Learning Outcome 2		6	
	Learning Outcome 3		2	
	Learning Outcome 4		5	

6. Summary of LO to PO measurement
7. Measurement and Tabulation of result for LO achievement
8. Measurement Tabulation of result for PO achievement