MULTIMEDIA UNIVERSITY®

COURSE INFORMATION

1 .	**Name of Course**	Discrete Structures
2 .	**Course Code**	DCS5028
3 .	**Type of Course** **(e.g. : Core, major, elective etc.)**	Core/ Major Subject June 2016 onwards
4 .	**Synopsis**	This course introduces students to ideas and techniques from discrete mathematics that are widely used in science and engineering . Among topics to be discussed are propositional and predicate calculus, quantification, mathematical induction, sets, sequences, relations and functions, as well as fundamental ideas about combinatorial analysis, recurrence relations, graphs and tree theory.
5 .	**Version** **(State the date of theSenate's approval - previous and the current approval date)**	Current Version: October 2017 Previous Version: June 2017 New version : ADC Nov 2017 Senate meeting 195 Jan 2018
6 .	**Name(s) of Academic Staff**	Chandrika, Nun Shwu Huey, Julie Yew Mei Yee, Rubiah Mohd Yunus, Lim Liyen, Nurasma' binti Shamsuddin, Mohd Azizi Sanwani
7 .	**Semester and Year Offered**	Trimester 2, Year 1
8 .	**Credit Value**	4
9 .	**Pre-Requisite**	None

10 . **Objective of the course in the programme:**

To explain the fundamental discrete mathematical principles and techniques, which are widely used in computer science applications.

11 . **Justification for including the course in the programme:**

This subject will provide students the theoretical concept and basic application of discrete mathematics in Information Technology programme

12 . **Course Learning Outcomes (CLO)**

		Domain	Level
CLO1:	Apply the fundamental concepts, theories and techniques of discrete mathematics	Cognitive	3
CLO2:	Use mathematical proving techniques, counting theories and algorithms to solve problems	Cognitive	3
CLO3:	Demonstrate teamwork in solving discrete mathematics problems	Affective	3

13 . **Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment:**

Course Learning Outcomes (CLO) (Must tally with CLOs in item 12)	Programme Learning Outcomes (PLO)								Teaching Methods	Assessment Method
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8		
CLO1	✓								Lecture, Tutorial	Midterm, Final
CLO2	✓								Lecture, Tutorial	Quiz
CLO3					✓				Group Discussion	Assignment
Total	**2**				**1**				*Indicate the relevancy between the CLO and PLO by ticking "✓" the appropriate relevant box (This description must be read together with standards 2.1.2, 2.2.1, and 2.2.2 in Area 2 – pages 16 & 18 of COPPA 2.0)*	

14 . **Transferable Skills:**

Teamwork, Communication and Leadership

15 . **Distribution of Student Learning Time (SLT)**

Course Content Outline	**CLO	Teaching and Learning Activities – Guided Learning (F2F)* *L	*T	*P	*O	Guided Learning (NF2F)*	Independent Learning (NF2F)*	Total SLT
1 Logic and Proofs Logic; Proposition; Truth tables; Propositional Equivalences; Logical Equivalences; Predicates and Quantifiers; Implication and equivalence; Tautology; Consistency and Contradiction; First order logic; Resolution; Proof techniques.	**1,2,3**	6	2			2	6	16
2 Sets, Relations and Functions Review of set theory; Binary relations; Composition of relations; Relations and partitions; Partially ordered sets and lattices, Functions, Injection, surjection and bijection.	**1,3**	4	2			2	4	12
3 Induction and Recursion Principle of mathematical induction; Recursive functions.	**1,2,3**	4	2			1	5	12
4 Algorithms Algorithms Characteristics; Program Tracing; Notation for Algorithm; The Euclidean Algorithm; The Least Common Multiple (LCM).	**1,2,3**	4	1			2	3	10
5 5. Counting The Basics of Counting; Permutations; Combinations; Generalized Permutations and Combinations; Inclusion-exclusion principle; The Pigeonhole Principle.	**1,2,3**	6	2			2	6	16

	6	**6. Graphs** Introduction to Graphs and Graphs Terminology (Directed and undirected graphs); Eulerian paths and Cycles; Hamiltonian paths and cycles; Dijkstra's Algorithm;	**1,3**	6	1			1	6	14
	7	**Trees** Introduction to Trees; Binary tress, Binary search trees and tree traversals; Spanning Tree.	**1,3**	3	1			2	2	8
	8	**Boolean Algebra** Boolean expressions and Boolean Functions; Logic Gates; Minimization of Circuits - Karnaugh Maps.	**1,3**	4	1				5	10
	9	**Finite State Machines** Finite-State Machines with Output; Finite-State Machines with No Output; Finite State Automation.	**1,3**	3	1				4	8
									Total SLT	**106**

SUMMATIVE ASSESSMENT

1. Continuous Assessment	**Percentage %**	**Total SLT**
Quiz	15%	9
Assignment	15%	18
Midterm	20%	5
	Total SLT for Continuous Assessment	**32**

2. Final Assessment	**Percentage %**	**Total SLT**	
		F2F	**ILT**
Final Exam	50%	2	20
	Total SLT for Final Assessment (F2F + NF2F)	**22**	
Grand Total	**100%**	**160**	

****Indicate the CLO based on the CLO's numbering in Item 12.**
***L= Lecture, *T= Tutorial, *P= Practical, *O= Others, F2F*= Face to Face, NF2F*= Non Face to Face**

16 . **Identify Special Requirement to Deliver the Course (e.g., software, nursery, computer lab, simulation room):**

17 . **Main References:**

Johnsonbaugh , R. (2018), *Discrete Mathematics (8th Edition)* . Prentice Hall.

18 . **Additional References:**

Rosen, K. (2012), *Discrete Mathematics and Its Applications (7th edition)* , McGraw-Hill
Malik, D.S., Sen, M.K. (2010), *Discrete Mathematical Structure: Theory and Applications* , Cengage Learning
Kolman, B., Busby, R. & Ross, S.C. (2018), *Discrete Mathematical Structures (Classic Version) (6th edition)* , Pearson