MULTIMEDIA UNIVERSITY®

COURSE INFORMATION

1 .	**Name of Course**	Introduction to Digital Systems
2 .	**Course Code**	PDS0101
3 .	**Type of Course** (e.g. : Core, major, elective etc.)	Core
4 .	**Synopsis**	Digital systems addresses the fundamental principles in digital circuit design, from the number systems to sequential logic, as a fundamental foundation for computer design
5 .	**Version** (State the date of theSenate's approval - previous and the current approval date)	Current: January 2018 Previous: June 2016
6 .	**Name(s) of Academic Staff**	Timothy Yap Tzen Vun, Ng Hu, Soo Wooi King,
7 .	**Semester and Year Offered**	Trimester 2
8 .	**Credit Value**	4
9 .	**Pre-Requisite**	NIL

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

To equip students with knowledge of number systems and ability to design logic circuits.

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

To provide students with fundamental concepts in Digital Systems.

12 .

Course Learning Outcomes (CLO)		Domain	Level
CLO1:	Solve problems related to different number systems	Cognitive	3
CLO2:	Design Combinational Logic Circuits	Cognitive	6
CLO3:	Describe the operations of Sequential Logic Circuits	Cognitive	2

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
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
CLO1	✓	✓											Lecture/Tutorial	Test/Final Exam/Assignment/Quizes
CLO2	✓	✓				✓							Lecture/Tutorial	Test/Final Exam/Assignment/Quizes
CLO3	✓												Lecture/Tutorial	Final Exam/Assignment/Quizes
Total	**3**	**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:**

Critical skills

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

	Course Content Outline	**CLO	Teaching and Learning Activities – Guided Learning *L	*T	*P	*O	Guided Learning (NF2F)*	Independent Learning (NF2F)*	Total SLT
1	**Digital Concepts** Digital and Analog Quatities. Basic Logic Operations. Pulse Waveform Parameters. Overview of Digital Integrated Circuits. Digital System Applications.	CLO1	2	2				4	8
2	**Number Systems, Operations, and Codes** Decimal and Binary Number System. Conversion between decimal and binary. 1's and 2's complements. Arithmetic operations with binary. Hexadecimal and Octal number systems.	CLO1	1	3			4	4	12
3	**Logic Gates** Operation of the Inverter, AND gate, and OR gate. Operation of the NAND gate and NOR gate. Operation of the exclusive-OR and exclusive-NOR gates.	CLO2	3	3				6	12
4	**Boolean Algebra and Logic Simplification** Laws of Boolean Algebra. DeMorgan's theorems. Boolean Expressions. Sum-of-products (SOP) form. Product-of-sums (POS) form. Simplification using Karnaugh map	CLO2	2	4			4	6	16
5	**Combinational Logic Analysis** Basic combinational logic circuit. Boolean expression for combinational logic circuit. Design and simplify combinational logic circuit. Design combinational logic circuit using NAND and NOR gates	CLO2	2	4			4	6	16
6	**Functions of Combinational Logic** Half-adders and Full-adders. Ripple carry and look-ahead carry parallel adder. Basic binary decoder	CLO2	3	3				6	12
7	**Latches and Flip-Flops** Basic Latches construction. S-R latch and D latch. S-R, D and J-K flip-flops.	CLO3	2	2				4	8

	8	**Counters** Asynchronous and synchronous counter. Counter timing diagram. Counter circuits. Modulus of a counter. 4-bit binary counter and a decade counter. Up/down counter. IC counter. Cascaded counter.	**CLO3**	4	4				8	16
	9	**Shift Registers** Operation of serial in/serial out, serial in/parallel out, parallel in/serial out, and parallel in/parallel out shift register. Johnson counter. Ring counter.	**CLO3**	3	3				6	12
								Total SLT		**112**

SUMMATIVE ASSESSMENT

1. Continuous Assessment	**Percentage %**	**Total SLT**
Quizzes	10%	3
Test	20%	5
Assignments	20%	18
Project		
Total SLT for Continuous Assessment		**26**

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:**
Floyd, T. (2015) Digital Fundamentals (11th Edition), Pearson Education International.

18 . **Additional References:**
Tocci, R. J., Widmer N. S., Moss G. L. (2011). Digital System, Principles and Applications (11th Edition). Prentice Hall.

Note:
Cells shaded light grey contain formulas / fixed values. Edit these formulas only if needed.