1.	Name of Course/Module	Digital System
2.	Course Code	TCE1111
3.	Status of Subject	Core for B.IT Security Technology
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	None
7.	Name(s) of academic/teaching staff	Mohd Fikri Azli Bin Abdullah Lau Siong Hoe Lillian Wang Yee Kiaw
8.	Semester and Year offered	Trimester 1 (Beta Level)

9. Objective of the course/module in the programme :

To provide sound understanding and practical knowledge of the fundamentals of logic design of digital circuits.

10. Learning Outcomes :

At the completion of the subject, students should be able to:

LO1: Demonstrate basic combinational circuits and design of logic circuits. (Cognitive, Level 3)
LO2: Explain functionalities of basic building blocks of a microprocessor. (Cognitive, Level 5)
LO3: Distinguish between various logic families and memory devices. (Cognitive, Level 4)
LO4: Construct various digital logic circuits and its applications. (Psychomotor, Level 4)

11. Synopsis:

The course introduces for expose student to the field of Digital technology elements such as Logic elements, Counters and registers and etc.

Kursus ini diperkenalkan untuk mendedahkan pelajar mengenai Teknologi digital sistem dan diantara tajuk penting untuk sukatan matapelajaran ini ialah “Logic Element”,” Counters and register” dan lain - lain lagi.

12. Mapping of Subject to Programme Outcomes :

Programme Outcomes	**% of Contribution**
PO1: Apply soft skills in work and career related activities	50
PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices	50

13. Assessment Methods and Types :

Method and Type	Description/Details	Percentage

	Laboratory	Practical Work/ Written Laboratory Report	20%
	Midterm Test	Written Midterm Test	20%
	Final Exam	Written Final Exam	60%

14. Details of Subject

Topics	Mode of Delivery	
	Lecture	Lab
1. Introduction Digital and Analog Systems. Number Systems: Binary/Octal/Hex Number Systems. Binary Arithmetic. Other Codes: BCD, Excess-3, Gray, ASCII.	3	2
2. Logic Elements. Logic operators. Symbols, Logic Gates, Truth tables, Evaluation of logic circuit output, Gate level circuit, TTL, Boolean Algebra & DeMorgan's Theorems. NAND and NOR gates.	5	4
3. Combination Logic Circuit. Sum-of-Product & Product-of-Sum, Simplification of Logic Circuit. Designing Combinational Logic. K-Map, Basic characteristics of Digital ICs, XOR and XNOR circuits and Parity generator.	5	4
4. Sequential Logic. Delays & Latches, Clock signal, JK & D Flip- flops Timing & State, Asynchronous inputs, Master/slave flip-flop, Flip-flop synchronisation and application. Monostable and astable multivibrators.	6	4
5. Arithmetic Circuits. Signed numbers, 2's complement, Addition & subtraction, Multiplications and Division, BCD Addition, Half & Full Adder, Parallel/Aerial Adder and Carry propagation.	4	4
6. MSI Logic circuits. Decoder/Encoder, 7 – Segment drivers, Multiplexer & Demultiplexer, Code Converter & Comparators and Tristate register.	5	4
7. Counters and Register. Synchronous/Asynchronous counters. Up/down counters, Design counters, Shift register Parallel & series load). Counter / Shift register ICs and Counter/Shift applications.	5	4
8. IC logic families. TTL/CMOS/ECL Characteristics, Loading & Fan-out, Open Collectors & Open drain and Tristate TTL.	5	0
9. Interfacing with analog devices. DAC &ADC, Converter circuits and Digital-ramp ADC.	2	0
10. Memory Devices. Memory Architecture, Memory Operations, CPU-memory Connection, ROM/RAM/EPROM and Read/Write Cycle.	2	0
Total	**42**	**26**

15. Laboratories

	• Experiments using Basic gates & introduction to tolls (e.g. multimeter, oscilloscope, IC tester, breadboard, etc.). • Experiments to design & implement combinational logic circuits. • Experiments using flip-flops. • Experiments using counters and shift-registers. • Experiments on Arithmetic circuits & Arithmetic ICs. • Experiments using decoder/encoders & seven-segments.

16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning
	Lecture	42	42
	Tutorials	-	-
	Laboratory/Practical	26	13
	Presentation	-	-
	Assignment	-	-
	Mid Term Test	2	10
	Final Exam	2	20
	Quizzes	-	-
	Sub Total	**72**	**85**
	Total SLT	**157/40 = 3.925 => 4**	
17.	Credit Value	4	
18.	Reading Materials :		
	Textbook	Reference Materials	
	1. Ronald J. Tocci*," Digital systems: Principle and Application",10*th Ed. Pearson Prentice Hall, 2007.	1. Jhon P.Hayes*," Introduction to Digital Logic Design",* Addison – Wesley, 1993. 2. M. Mano,"*Digital Design",* 2/E. Prentice hall,1991. 3. J.F. Wakerly*,"Digital Design: Principles and Practices",* 3E, Prentice Hall, 2001. 4. J. Uffenback*," Digital Electronics: A Modern Approach",* Prentice hall,1994. 5. 5. Thomas L. Floyd*," Digital Fundamentals", 9*/E, Pearson Prentice Hall, 2006.	
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. Progarmme Objective and Outcomes (Measurement and Descriptions)		