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SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Data Communications and Networking
2.	Course Code	TDC 1231
3.	Status of Course [Applies to (cohort)]	Common Core for B.IT (Hons) Data Communications and Networking B.IT (Hons) Information Technology Management B.IT (Hons) Artificial Intelligence B.IT (Hons) Security Technology B.Sc (Hons) Bioinformatics
4.	MQF Level/Stage	Bachelor – MQF Level 6
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version: June 2012 Date of current version: June 2014
6.	Pre-Requisite	None
7.	Name(s) of academic/teaching staff	Lew Sook Ling Lilian Wang Yee Kiaw
8.	Semester and Year offered	Trimester 2, Year 1
9.	**Objective of the course in the programme** : To provide students with concepts of data communications and networking. (ii) To understand the fundamentals of Communication Architecture, Protocols and Local Area Networks. (iii) To expose the various types of network in terms of the technologies, hardware, and usage.	
10.	**Justification for including the course in the programme :** As one of the fastest growing technologies in our culture today, data communications and networking presents a unique challenge for IT industry. Knowledge of data communications and networking is crucial to today's IT professional. Virtually all computers are connected to some sort of network and exchange information with each other. This course will cover the topics of Network Models and Architecture, Interfacing and Communication, Fault Tolerance and System Performance Evaluation. A student project of sufficient rigor will be the core of this course and the project will be retained in the IS student's permanent portfolio for future use. This course provide students with familiarity with the core concepts of networking, including awareness of the existence of protocols; an understanding of hardware such as routers and hubs and switches, common operating systems, basic systems and IP Network security.	

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11.	Course Learning Outcomes :		Domain	Level
	LO1	*Demonstrate understanding about various data communication transmission media, interface and modulation techniques.*	Cognitive	3
	LO2	*Understand the link layer data transmission techniques and protocols.*	Cognitive	2
	LO3	Explain the basic building blocks of a Local Area Network.	Cognitive	2
	LO4	Describe the network models, standards, protocols, and concepts of frequency spectrum and bandwidth.	Cognitive	1

12. Mapping of Learning Outcomes to Programme Outcomes :

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

13. Assessment Methods and Types :

Method and Type	Description/Details	Percentage
Test	Written midterm test	20%
Tutorials	Written tutorials, class participation, etc.	10%
Laboratories	Laboratory works	10%
Final Exam	Written exam	60%

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

Assessment Components	%	LO1	LO2	LO3	LO4
Test	20	20	20	20	20
Tutorials	10	10	10	10	10
Laboratories	10	10	10	10	10
Final Exam	60	60	60	60	60

15. Details of Course

Topics	Mode of Delivery		
	Lecture	Lab	Tutorial

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	1. Introduction Data Communications. Data Communication Networking. Protocols and Protocol Architecture (TCP/IP and OSI). Compare TCP/IP architecture and OSI model. Standards Organizations.	3		2
	2. Data Transmission Transmission Terminology. Frequency, Spectrum and Bandwidth. Transmission Impairments. Nyquist's and Shannon's Law.	3		2
	3. Transmission Media Guided and Unguided. Twisted pair. Coaxial cable. Fibre optic. Microwave. Cellular. Satellite.	3		2
	4. Data Encoding and Modulation Digital to Digital: NRZ-L, NRZ-I, Bipolar-AMI, Pseudoternary, Manchester, Differential Manchester. Modulation Rate. Digital to Analog: Amplitude Shift keying (ASK), Frequency Shift keying (ASK), Phase Shift keying (PSK). Analog to Digital: PCM. Analog to Analog: Amplitude Modulation, Frequency Modulation, Phase Modulation.	5		2
	5. Data Communication Interface Synchronous and Asynchronous Transmission. Line Configurations: Simplex, Half-duplex, Full duplex. EIA-232 Interface Standard. DTE and DCE. Null Modem.	3		2
	6. Data Link Control Flow Control: Stop-and Wait, Sliding Window. Error Detection: Parity Check, CRC Methods. HDLC: Characteristics, Frame Structure, and Operation. Data Compression: Huffman Coding and Dynamic Huffman Coding	5	2	2
	7. Multiplexing Frequency Division Multiplexing: Characteristics. Synchronous Time Division Multiplexing: Characteristics, Link Control, Digital Carrier Systems, And Statistical Time Division Multiplexing: Characteristics. ADSL and HDSL Line.	5	2	2
	8. Circuit Switching and Packet Switching Introduction: Switching Networks, Circuit Switching Networks, Circuit Switching Concepts. Routing in Circuit Switching Networks. Introduction to Control Signalling: SS7. Packet Switching: Technique, Packet Size, Compare Circuit Switching and Packet Switching. Routing: Characteristics, Routing Strategies: Fixed Routing, Flooding, Random Routing, Adaptive Routing.	5	2	2
	9. LAN Technology LAN Applications. LAN Architecture: Protocol Architecture, Topologies, MAC, LLC. Bus LAN: Characteristics, Media, and Use of Repeater in extension of BUS. Ring LAN: Characteristics. Star LAN: Characteristics, Use of Hubs and Switches. Wireless LAN: Applications, Requirements, and Technology. Bridge: Function of a Bridge, Protocol Architecture.	5	2	2

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	10. LAN Systems Ethernet (CSMA/CD): IEEE 802.3 MAC, IEEE 802.3 10 Mbps Specifications (10Base5, 10Base2, 10Base-T, 10Base-F). IEEE 802.3 100 Mbps Specifications: Introduction to Fast Ethernet and Gigabit Ethernet. Token ring: IEEE 802.5 MAC, Physical Layer specifications. FDDI: MAC, Physical Layer specifications. Wireless LAN Standard: IEEE 802.11 Physical Layer Specifications and MAC.	5		2
	Total	**42**	**8**	**20**

	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
	Lecture	42	42
	Tutorials	20	20
	Laboratory/Practical	8	4
	Presentation	-	-
	Assignment	-	-
	Mid Term Test	1	3
	Final Exam	2	18
	Sub Total	73	87
	Total SLT	160	
16.	Credit Value	4	

17. Reading Materials :

Textbooks

1. Behrouz Forouzan, (2012). Data Communications and Networking, 5th Ed. McGraw-Hill.

Reference Material (including 'Statutes' for Law)

1. William Beyda, (2004). Data Communications: From Basics to Broadband, 4th Ed. Prentice Hall.
2. William Stallings, (2013). Data & Computer Communications, 10th Ed. Prentice Hall.
3. Fred Halsal, (1996). Data Communications, Computer Networks and Open Systems, 4th Ed. Addison-Wesley.
4. Andrew S. Tanenbaum and David Wetherall, (2010). Computer Networks, 5th Ed. Prentice Hall
5. William A. Shay, (2003). Understanding Data Communications and Networks, 3rd. Ed. Cengage Learning.

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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
ABC1234	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			
DEF5678	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			

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