

**COURSE INFORMATION**

1 .	<b>Name of Course</b>	Data Communications and Networking							
2 .	<b>Course Code</b>	DCT5038							
3 .	<b>Type of Course</b> (e.g. : Core, major, elective etc.)	Core/ Major							
4 .	<b>Synopsis</b>	This course addresses the importance of data communications and networking technologies. Students will learn data communication models , data , signal , data transmission , multiplexing, error detection , error correction , data link control , media access control , Local Area Network (LAN), circuit switching and packet switching. Student also been introduce on IP , network troubleshooting and UTP cable crimping exercise.							
5 .	<b>Version</b> (State the date of theSenate's approval - previous and the current approval date)	Current: Senate Jan 2018 Previous: ADC Nov 2017							
6 .	<b>Name(s) of Academic Staff</b>	Mohd Azizi Sanwani, Nun Shwu Huey, Noor Hisham Kamis							
7 .	<b>Semester and Year Offered</b>	Trimester 1, Year 2							
8 .	<b>Credit Value</b>	4							
9 .	<b>Pre-Requisite</b>	None							
10 .	<b>Objective of the course in the programme:</b> This subject provides students with concepts of data communications and networking. To expose various types of network in terms of the technologies, hardware, usage and data transmission.								
11 .	<b>Justification for including the course in the programme:</b> The subject is offered to expose students the latest and up-to-date technology and comprehension in data communication and networking.								
14 .	<b>Transferable Skills:</b> -								
15 .	<b>Distribution of Student Learning Time (SLT)</b>								
	<b>Course Content Outline</b>	<b>**CLO</b>	<b>Teaching and Learning Activities</b>				<b>Guided Learning (NF2F)*</b>	<b>Independent Learning (NF2F)*</b>	<b>Total SLT</b>
			<b>Guided Learning (F2F)*</b>						
			<b>*L</b>	<b>*T</b>	<b>*P</b>	<b>*O</b>			
1	<b>Topic 1: Introduction to Communications</b> Communication model. Simplex, half duplex, full duplex, Topology, Network Types (LAN, WAN), Protocols and Protocol Architecture (TCP/IP and OSI).	1	3	1			1	2	7
2	<b>Topic 2: Data and Signals</b> Transmission terminology: Analog and Digital Signals, Composite Signals, Frequency Spectrum and Bandwidth. Performance (Throughput, Latency, Propagation Time, Transmission Time, Queuing Time, Bandwidth-Delay Product), Transmission Impairment	1	3	1			1	2	7
3	<b>Topic 3: Digital Transmission</b> Line Coding (Unipolar Encoding, Polar Encoding (NRZ, RZ, Manchester, Differential Manchester)), Bipolar Encoding (AMI) Sampling (Pulse Amplitude Modulation, Pulse Code Modulation), Transmission Mode (Parallel, Serial (Synchronous, Asynchronous, Isochronous))	1	4	2				2	8
4	<b>Topic 4: Analog Transmission</b> Digital to Analog Conversion, Digital to Analog Modulation (Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Quadrature Amplitude Modulation), Analog to Analog Conversion (Amplitude Modulation, Frequency Modulation, Phase Modulation)	1	3	1				2	6
5	<b>Topic 5: Multiplexing And Spreading</b> Multiplexing, Analog Multiplexing (FDM, WDM), Digital Multiplexing (TDM), Spread Spectrum (Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum)	1	3	2			1	3	9

6	<b>Topic 6: Transmission Media</b> Guided transmission – twisted pair, coaxial cable, fiber optics. Unguided transmission – infrared, radio, microwave, satellite	1	3	1			1	2	7
7	<b>Topic 7: Error Detection and Correction</b> Types of Errors (Single-Bit Errors, Burst Error), Error Detection: Redundancy method (Parity Check, Cyclic Redundancy Check, Checksum), Error Correction: Hamming Code	1	4	2				2	8
8	<b>Topic 8: Data Link Control</b> Flow Control and Error Control, Stop-and-Wait ARQ, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to-Point Protocol (PPP), Link Control Protocol, PAP, CHAP, NCP	1	4	2			1	2	9
9	<b>Topic 9: Media Access Control (MAC)</b> Multiple Access Protocols, Random Access Method (MA, CSMA, CSMA/CD, CDMA/CA), Controlled-Access Method (Reservation, Polling, Token Passing), Channelization Protocols (FDMA, TDMA, CDMA)	1	3	2				2	7
10	<b>Topic 10: LAN System</b> Ethernet, Traditional Ethernet, Bridged Ethernet, Switched Ethernet, Full-Duplex Ethernet, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, wireless LAN (IEEE 802.11, Bluetooth)	1,2	3	1			1	2	7
11	<b>Topic 11: Connecting LANs</b> Connecting Devices (Hubs, switch, router), Spanning tree algorithm, Virtual LANs	1,2	3	2			1	2	8
11	<b>Topic 12: Circuit Switching and Packet Switching</b> Introduction: Switching network, circuit switching networks, circuit switching concept. Packet switching principles compare circuit switching and packet switching, Permanent Virtual Circuit, Switched Virtual Circuit, Frame Relay, Asynchronous Transfer Mode	1	3	2			1	2	8
12	<b>Lab 1: Connecting to network</b> Basic windows command to determine the IP address, MAC address for a computer and trace the internet connectivity (ping, tracer, ipconfig )	3			2			1	3
13	<b>Lab 2: Building Cable for Ethernet</b> Building straight-through and crossover UTP cables	3			2			1	3
14	<b>Lab 3: Network Addressing</b> Convert between number systems (decimal, binary, hexadecimal), determine the number of hosts on a network, and determine the network number and number of host based on subnet mask.	3			2			1	3
15	<b>Lab 4: Set up Peer to Peer network</b> Connect Ethernet cable, configure IP setting, use simulator to trace packet in the network.	3			2			1	3

**Total SLT 103**

#### SUMMATIVE ASSESSMENT

1. Continuous Assessment		Percentage %	Total SLT
Project		15%	10
Assignment		5%	5
Lab Exercise		5%	12
Quizzes		5%	3
Midterm Test		20%	5
<b>Total SLT for Continuous Assessment</b>			<b>35</b>
2. Final Assessment		Percentage %	Total SLT
Final Exam		50%	F2F 2 ILT 20
<b>Total SLT for Final Assessment (F2F + NF2F)</b>			<b>22</b>
<b>Grand Total</b>		<b>100%</b>	<b>160</b>

\*\*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):

Packet Tracer, Computer Lab

17 . Main References:

Forouzan, B. A. (2013). Data communications and networking. New York: McGraw-Hill.

18 . Additional References:

William, S. (2013). Data & Computer Communications (10 ed.).  
William, S. (2012). Business Data Communications (7 ed.).