

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	High Speed Networks	
2.	Course Code	THN 3221	
3.	Status of Course [Applies to (cohort)]	Specialisation Core for B.IT (Hons) Data Communications and Networking	
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	TCN2141 Computer Networks	
7.	Name(s) of academic/teaching staff	Anang Hudaya Muhamad Amin Nazrul Muhaimin Ahmad Wee Kuok Kwee	
8.	Semester and Year offered	Trimester 2, Year 3	
9.	<p>Objective of the course in the programme :</p> <p>To introduce the high speed networks that has spurred the development of new applications. To identify the design issues related to the Internet protocol (IP), entire TCP/IP protocol suite and network technologies dominating the high-speed scene.</p>		
10.	<p>Justification for including the course in the programme :</p> <p>The emergence of high-speed networks is inevitable and so does the need to understand them. This course also explains various performance and analysis issues involved in understanding the need of high-speed data transmission. Networking professionals, designers, and engineers have the need to understand the newest technologies, trends, and standards to build leading-edge products and services.</p>		
11.	Course Learning Outcomes :		
		Domain	Level
	LO1: Define the various high-speed networking technologies and their design issues	Cognitive	Level 1
	LO2: Perform the Queuing Analysis theory to estimate the performance parameter for network traffic volume	Affective	Level 5
	LO3: Compare and contrast the congestion control mechanism and traffic management used in high-speed network environment	Cognitive	Level 6
LO4: State the Quality of Service (QoS) in IP Networks and evaluate their performances	Cognitive	Level 6	

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12.	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1							X		
	LO2	X						X	X	X
	LO3							X	X	
	LO4	X						X	X	
13.	Assessment Methods and Types :									
	Method and Type	Description/Details					Percentage			
	Final Exam	Written examination					60			
	Test	Written examination					20			
	Assignment	Written report, implemented programs, individual project					20			
14.	Mapping of assessment components to learning outcomes (LOs)									
	Assessment Components	%	LO1	LO2	LO3	LO4				
	Final Exam	60	75	75	75	75				
	Test	20	25	25						
	Assignment	20			25	25				
15.	Details of Course									
	Topics					Mode of Delivery				
						Lecture		Tutorial		
	1. Introduction The need for speed and Quality of Service. Emergence of High-speed LANs. Corporate WANs. Storage Area Networks. IP based Internet. Congestion in Data networks. Effect of Congestion. Ideal Performance. Practical Performance. Congestion Control. Traffic Management.					2		1		
	2. High Speed LANs and Switching Technology Fast Ethernet and Gigabit Ethernet. ATM LANs protocols. High speed switching networks. Virtual circuit networks. Datagram networks. Internetworking using VLAN. Addressing and routing, network layer protocols, unicast and multicast routing.					2		1		

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3. Storage Area Networks Storage and networking concepts. Fibre channel SAN topologies. IP SAN technology. Management of SAN	2	1
4. Optical Networks – WDM Networks WDM technology. Control and signaling schemes in WDM networks. IP over WDM. Protection and restoration on WDM Networks.	2	1
5. Optical Networks – SONET Networks SONET technology. SONET Transport network architectures. IP over SONET. Survivability in SONET Systems- Automatic Protection Switching (APS). Restoration techniques on SONET networks	2	1
6. Network performance measurement and modelling Queuing analysis: queue behaviour, single-server queues, multi-server queues, queues with priorities, network queues, other queuing models. Internet traffic: self-similarity, Ethernet traffic, World-Wide-Web traffic.	4	2
7. Congestion control and traffic management Effects of congestion, congestion and control, traffic management, congestion control in packet-switching networks, TCP traffic control: TCP flow and congestion control.	4	2
8. Internet routing Graph theory concepts, least cost paths, interior routing protocols: internet routing principles, distance-vector protocol - RIP, link-state protocol – OSPF, exterior routing protocols: path-vector protocols – BGP and IDRP, multicasting.	6	3
9. Quality of service (QoS) in IP networks Integrated service architecture (ISA), queuing discipline, differentiated services, resource reservation protocol (RSVP), Multi-protocol label switching (MPLS), Real-time transport protocol (RTP).	4	2
Total	28	14
Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
Lecture	28	28
Tutorials	14	14
Laboratory/Practical		
Presentation	-	-
Assignment	-	12
Mid Term Test	1	5
Final Exam	2	16
Sub Total	45	75
Total SLT	120	
16. Credit Value	3	

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17.	Reading Materials :
	Textbooks
	1. Data Communications and Networking Behrouz Forouzan, , 4th Edition. McGraw-Hill. 2007
	Reference Material (including 'Statutes' for Law)
	1. Computer Networks, 5th ed.; Tanenbaum, Andrew S. and David J. Wetherall; Prentice Hall, 2010. ISBN: 0-13- 212695-8
	2. Computer Networking, A top-down approach featuring internet; James F Kurose and Keith W. Ross; 5 th Edition; Prentice Hall, 2010; ISBN 0-13-6079679
	3. Computer Networks and Internets; 5th. Edition; Douglas E.Comer; Prentice Hall 2008 ISBN 0-13-123627-3

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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 Outcomes)	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