

1. Title of subject	Computer Networks
2. Subject code	TCE2321
3. Status of subject	Major
4. Credit Hour	3 28 Hours of Lectures 28 Hours of Lab
5. Semester	Trimester 3 (Gamma Level)
6. Pre-Requisite	Data Communication & Networking (TCE2311)
7. Methods of Teaching	28 Hours Lecture 28 Hours of Lab
8. Assessment	Coursework: 40 % - Test 20 % - Assignment 20 % Final Exam: 60 %
9. Teaching staff (Proposed)	Hiew Bee Yan
10. Objective of subject	To understand computer networks and the integral role they play. Students will acquire the knowledge and skill to recognize network hardware and realize the benefits of network software.
11. Synopsis of subject	This course will expose the students to the working details of Computer Networks. It will explain the inner working theories of the networks. The technologies like ISDN, ATM, SONET and Frame Relay will be discussed. Subject ini bertujuan memberi pendedahan terperinci mengenai teknik yang digunakan didalam rangkaian komputer. Ia menerangkan prinsip dan teori rangkaian komputer. Pelajar akan didedahkan dengan rangkaian ISDN, ATM, SONET dan Frame Relay.
12. Learning Outcomes	By the end of the subject, students should be able to: <ul style="list-style-type: none"> • design and plan various Local Area Networks (LAN) and Wide Area Networks (WAN). • Understand the TCP/IP protocols • Analyze the operation of the TCP/IP networks.

	Programmes Outcomes	Degree of contribution
	Ability to apply soft skills in work and career related activities	5
	Good understanding of fundamental concepts	40
	Acquisition and mastery of knowledge in specialized area	25
	Acquisition of analytical capabilities and problem solving skills	15
	Adaptability and passion for learning	5
	Cultivation of innovative mind and development of entrepreneurial skills	5
	Understanding of the responsibility with moral and professional ethics	5
13. Details of subject	Topics Covered	Hours
1.	Internetworking: Data link layer issues Local Internetworking. Spanning Tree protocol (STP). STP Bridging. Remote Bridging, Devices: Repeater, Bridge, Router, Switches, Gateways. Building Blocks of a Router. Use of Network Processors in building reprogrammable routers. Virtual LANs. Point -to-Point Protocol (PPP).	5
2.	Internetworking: Network layer Store and forward Packet Switching. Connectionless and Connection Oriented Services. Virtual Circuit and Datagram Services. Tunneling, Internetwork Routing. Fragmentation. Routing Algorithms.	4
3.	Internet and TCP/IP: Network Layer issues Internet Structure, TCP/IP Overview. IP protocol, IP Addresses. Internet Control Protocols. Routing Protocols. Multicasting. IPV6. Mobile IP. QoS: Requirement, Techniques, Integrated Services, Differentiated Services, Label Switching.	5
4.	Internet and TCP/IP: Transport Layer issues Transport Protocol: Addressing, Connection establishment, release and management. TCP: Protocol, Header, connection, connection management. UDP, RTP.	4
5.	Internet and TCP/IP: Applications Domain Name System. Electronic Mail. World Wide Web. Multimedia Over Internet.	3
6.	WAN technologies WAN Infrastructure, WAN Services: X.25, SONET, ISDN, Frame Relay, & SMDS.	3

	7.	Network Management, Security and Performance Network Management (SNMP), Network Security: Cryptography, Symmetric-Key Algorithm, Public Key Algorithm, Digital Signature, IPSec, FireWalls. Network Performance issues.	4
Laboratory		<ol style="list-style-type: none"> 1. Introducing IXP1200. 2. Packet Counting. 3. Packet Filtering. 4. Packet Forwarding. 5. General IOS Commands. 6. General routing techniques and commands. 7. Building VLANs. 8. Build DNS/DHCP clients. 9. Basic UNIX commands to handle Networking Software. 10. Using Protocol Analyzer/tcpdump for TCP or IP packet dissections. 	
		Total Contact Hours	28
14. Text	Text Book	T. S. Tanenbaum, Computer Networks, Prentice Hall.	
	Reference books	<ol style="list-style-type: none"> 1. E. Ramos, A. Schoroeder and A. Beheler. Computer Networking Concepts, Macmillan. 2. Gallo & Hancock, Computer Comm. And networking Technologies, Thomson Learning, 3. Douglas E. Comer, Network Systems Design Using Network Processors. Prentice Hall. 	