

Bachelor of Computer Sciences (Hons) in Computer Networking

1.	Name of Course					Computer Networks				
2.	Course Code					CCNT2544				
3.	Name(s) of academic staff									
4.	Rationale for the inclusion of the course/module in the programme					Faculty This module is one of the core subjects in computer science. It is important that students have a strong foundation in the principles of digital communication between computer systems in general and in the context of local area, wide area networks and Internet.				
5.	Semester and Year offered					2/2				
6.	Total Student Learning Time (SLT)		Face to Face				Total Guided and Independent Learning			
	L = Lecture T = Tutorial P = Practical O= Others		L	T	P	O	Independent = 112 Total =168			
	42				28					
7.	Credit Value					4				
8.	Prerequisite (if any)					CNT0001 Data Communication & Telecommunication System				
9.	Objectives: - introduce students to the importance of data networks and the Internet in supporting business communications and everyday activities - introduce students to the devices and services that are used to support communications across an Internetworking - introduce students to the network protocol models and the layers of communications in data networks - introduce students to the role of protocols in data networks									
10.	Learning outcomes: Upon completion of this subject, students should be able to: - Build simple LAN topologies by applying basic principles of cabling, performing basic configurations of network devices such as routers and switches, and implementing IP addressing schemes. - Apply the concept of networking to facilitate the organizations. - Identify the current networking technology in industry - Help the organization to develop networking infrastructure that is of high quality and consistent with organizational business goals.									
11.	Transferable Skills: - Analyze the operation of a range of commonly used network technologies. - Communicate effectively about computer communications systems, with specialists and non-specialists.									

12.	Teaching-learning and assessment strategy A variety of teaching and learning strategies are used throughout the course, including: • Classroom lessons. Lectures and Power Point presentations • Laboratory sessions: Practice exercises • brainstorming; • student-Lecturer discussion • collaborative and co-operative learning; • Independent study. Assessment strategies include the following: • Ongoing quizzes • Midterm tests • Performance Assessment (project, Assigned exercises) • Lecturer Observation																																																																																									
13.	Synopsis: This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. It uses the OSI and TCP layered models to examine the nature and roles of protocols and services at the application, network, data link, and physical layers. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum. Labs use a “model Internet” to allow students to analyze real data without affecting production networks. Packet Tracer (PT) activities help students analyze protocol and network operation and build small networks in a simulated environment																																																																																									
14.	Mode of Delivery: • Classroom lessons. Lectures and Power Point presentations • Laboratory sessions: Practice exercises																																																																																									
15.	Assessment Methods and Types: The assessment for this course will be based on the following: <table> <tr> <td>Coursework</td><td>50%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>• Quizzes</td><td></td><td>10%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>• Project and assignments</td><td></td><td>20%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>• Mid-Semester Exam</td><td></td><td>20%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>Final Examination</td><td><u>50%</u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td></td><td>100%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>												Coursework	50%												• Quizzes		10%											• Project and assignments		20%											• Mid-Semester Exam		20%											Final Examination	<u>50%</u>													100%											
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18.	Content outline of the course/module and the SLT per topic					
		Details	SLT			
	L		P	Indep.	Total	
	Topic 1	Fundamental Concepts - Communicating in a Network-Centric World - Communication – An Essential Part of Our Lives - The Network as a Platform - The Architecture of the Internet - Trends in Networking	6	4	16	26
	Topic 2	Communications Over the Networks - The Platform for Communications - LANs, WANs and Internetworks - Protocols - Using Layered Models - Networking Addressing	6	4	16	26
	Topic 3	OSI Application Layer Functionality - Applications – The Interface Between the Networks - Making Provisions for Applications and Services - Application Layer Protocols and Services Examples	6	4	16	26
	Topic 4	OSI Transport Layer / Network Layer - Roles of the Transport Layer - The TCP Protocol – Communicating with Reliability - Managing TCP Sessions - The UDP Protocol – Communicating with Low Overhead - IPv4 - Networks – Dividing Devices into Groups - Routing – How Our Data Packets are Handled - Routing Processes: How Routes are Learned	6	4	16	26
	Topic 5	Addressing the Network – IPv4 - IPv4 Addresses - Addresses for Different Purposes - Assigning Addresses - Is It On My Network? - Calculating Addresses - Testing the Network Layer	6	4	16	26
	Topic 6	Data Link Layer - Data Link Layer – Accessing the media - Media Access Control Techniques - Media Access Control Addressing and Framing Data - Putting it All Together	6	4	16	26

19.	Topic 7	OSI Physical Layer • The Physical Layer - Communication Signals • Physical Signaling and Encoding: Representing • Physical Media – Connecting Communication Ethernet • Overview of Ethernet • Ethernet - Communication through the LAN • The Ethernet Frame • Ethernet Media Access Control	6	4	16	26
		Total	42	28	112	182
	Laboratory	<u>Laboratory Details</u> Exercises based on topics covered in each lecture. Experimental work must include the following • Introduce networking tool and devices e.g. cables, hup, bridge and router • Introducing IXP1200 network processors • Introduction to Protocol Analyzer/tcpdump • Counting, Filtering and Forwarding Packet. • General IOS Commands. • Multiplexer • Client-server simulation • Routers simulation • Simple Router configuration commands. • General routing techniques and commands. • Building simple LAN and VLANs.				
20.	Main references supporting the course: • James F. Kurose, Keith W. Ross, Computer Networking: A Top-Down Approach (5th Edition), Addison Wesley, 2009					
	Additional references supporting the course: 1. W.Stalling, Data and Computer Communication, 6th Ed., Prentice Hall, 2000 2. Behrouz A. Forouzan, Data Communications and Networking, 2nd Ed. Mc Graw Hill, 2001 3. Cisco Networking Academy Program. First Year Companion Guide. Cisco Press,2001 4. Fred Halsall, Data Communications, Computer Networks and Open System, 4th Ed., Addison Wesley, 1997. 5. William A. Shay, Understanding Data Communication and Networks, 2nd Ed., ITP, 1999. 6. Gerd Keiser, Local Area Networks, 2nd Ed, McGraw Hill, 2002					
21.	Other additional information All materials will be available to the students online.					