Subject Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tutorial	Total
ECC602	Computer Communication Networks	03	--	--	03	--	--	03

Course Code	Course Name	Examination Scheme							
		Theory Marks				Exam Duration (Hrs.)	Term Work	Practical and Oral	Total
		Internal Assessment			End Sem. Exam.				
		Test1	Test2	Avg.					
ECC602	Computer Communication Networks	20	20	20	80	03	--	--	100

Course pre-requisite:

ECC: 405– Principles of communication engineering

ECC: 501-Digital communication

Course Objectives:

1. To introduce networking architecture and protocols.

2. To understand and recognize the layer-wise functions, services, data formats, protocols, hardware devices and addresses in the TCP/IP architecture

3. To build an understanding of application layer protocols.

4. To apply different addressing and routing schemes.

Course Outcomes:

After successful completion of the course student will be able to:

1. Analyze network topologies, hardware devices, addressing schemes and the protocol stacks

2. Compare various transmission media and broadband technologies

3. Analyze the flow control, error control and the medium access control techniques

4. Judge network layer addressing and routing schemes

5. Analyze connection oriented and connectionless services

6. Apply the knowledge of application layer protocols

Module No.	Unit No.	Topics	Hrs.
1.0		**Introduction to Network Architectures, Protocol Layers, and Service models**	**06**
	1.1	Applications of computer networks. Network types: LAN, MAN, and WAN, Network topologies.	
	1.2	Protocols and standards, need of layered protocol architecture, OSI reference model.	
	1.3	TCP/IP architecture: protocol suite, comparison of OSI and TCP/IP	
	1.4	Layer wise network hardware devices (NIC, Repeaters, Hubs, Bridges, Switches, Routers, Gateway and their comparison)	
	1.5	Addressing: physical / logical /port addressing/socket addressing.	
2.0		**Physical Layer**	**04**
	2.1	Guided transmission media: comparison among coaxial, optical fiber and twisted pair cables.	
	2.2	Unguided transmission media	
	2.3	Transmission impairments	
	2.4	Broadband standards: Cable modem, DSL, and HFC	
3.0		**Data Link Layer**	**07**
	3.1	Data link services: Framing, Flow control, Error control	
	3.2	ARQ methods: transmission efficiency, Piggybacking	
	3.3	High Level Data Link Control (HDLC): HDLC configurations, Frame formats, HDLC bit stuffing and de-stuffing, Typical frame exchanges.	
	3.4	Medium Access Control Protocols: ALOHA, Slotted ALOHA, CSMA, CSMA/CD	
4.0		**Network Layer**	**12**
	4.1	Introduction to telephone networks and circuit switching principles.	
	4.2	Introduction to data networks and packet switching principles.	
	4.3	Network layer services and functions.	
	4.4	Internet Protocol: Principles of Internetworking, requirements, IPv4 packet, IPv4 addressing (classful and classless (CIDR))	
	4.5	Routing in Packet Switching Networks: Characteristics, Routing strategies	
	4.6	Routing algorithms: Link state Routing, Distance vector Routing and Path vector routing, Routing protocols: RIP, OSPF, BGP and EIGRP.	
	4.7	Subnetting, supernetting, VLSM, and NAT	
	4.8	Introduction to ICMP, ARP, RARP	
	4.9	IPv6 (IPv6 Datagram format, comparison with IPv4, and transition from IPv4 to IPv6).	
	4.10	Quality of service	
5.0		**Transport Layer**	**06**
	5.1	Connectionless and Connection–oriented services at transport layer, Transmission Control Protocol (TCP): TCP Services, TCP Segment, TCP three way handshake	
	5.2	User datagram Protocol (UDP), UDP Services, UDP Datagram	
	5.3	TCP and UDP checksum calculation	
	5.4	Flow control, error control and congestion control	

6.0		**Application Layer**	04
	6.1	Introduction to Application layer Protocols: HTTP, FTP, DNS, SMTP, TELNET, SSH, DHCP.	
		Total	39

Text books:

1. Data Communications and Networking – Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks -- Andrew S Tanenbaum, 5th Edition, Pearson Education, 2013.
3. J J. F. Kurose and K. W. Ross," Computer Networking: A Top-Down Approach", Addison Wesley, 5th Edition, 2010

Reference books:

1. Alberto Leon Garcia, "Communication Networks", McGraw Hill Education, Second Edition, Fourth Edition, 2008.
2. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education, 2015.
3. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning
4. Data and Computer Communications, William Stallings, 10th Edition, Pearson Education, 2014.

Internal Assessment (IA):

Internal Assessment (IA) consists of two class tests of 20 marks each. IA-1 is to be conducted on approximately 40% of the syllabus and IA-2 will be based on remaining contents (approximately 40% syllabus but excluding contents covered in IA-I). Duration of each test shall be one hour. Average of the two tests will be considered as IA marks.

End Semester Examination (80-Marks):

Weightage to each of the modules in end-semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total 06 questions, each carrying 20 marks.

2. Question No: 01 will be compulsory and based on entire syllabus wherein 4 to 5 sub-questions will be asked.

3. Remaining questions will be mixed in nature and randomly selected from all the modules.

4.Total 04 questions need to be attempted.