Course Code	USA20502J	Course Name	COMPUTER NETWORKS	Course Category	C	Professional Core Course	L	T	P	C
							4	0	2	5

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Applications		Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to,
CLR-1 :	*Understand the evolution of computer networks using the layered network architecture*
CLR-2 :	*Understand the addressing concepts and learn networks devices*
CLR-3 :	*Design computer networks using subnetting and routing concepts*
CLR-4 :	*Understand the error types, framing, flow control*
CLR-5 :	*Understand the various Medium Access Control techniques and also the characteristics of physical layer functionalities*
CLR-6 :	*Know the algorithms behind the protocols that helps data transfer*

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLO-1 :	*Acquire the basics of computer network and its architecture*	2	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 :	*Acquire the knowledge of various networks devices and addressing methods*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 :	*Design the network routing methods*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 :	*Find the error type that may happen during data transportation*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	*Understand the physical layer functions and components*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 :	*Speak on the topology chosen for a architecting a network that an organization demands*	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		18	18	18	18	18
S-1	SLO-1	*Evolution of Computer Networks*	*Addressing Types*	*Network layer functionalities*	*Introduction- Error Types*	*Physical layer*
	SLO-2	*The Internet*	*Physical , Logical addresses*	*Delivery vs Forwarding*	*Types of Error*	*Overview of physical layer*
S-2	SLO-1	*The Internet today*	*Port, specific addresses*	*Unicast routing protocols*	*Error Control Mechanism*	*Functionalities*
	SLO-2	*Data communications*	*IPV4 addresses*	*Intra domain routing*	*Error Detection*	*Analog and Digital*
S-3	SLO-1	*Components*	*Notations*	*Inter domain routing*	*Error Correction*	*Data, signals*
	SLO-2	*Networks*	*Classful addressing*	*Multicast routing protocols*	*Error Detection vs Error Correction*	*Transmission impairment*
S-4	SLO-1	*Physical structures*	*Categories of Classful addressing*	*Application of Multicast routing*	*Parity*	*Attenuation*

				protocols		
	SLO-2	Categories of Networks	Categories	Distance vector routing	Checksum	Distortion, Noise
S 5-6	SLO-1	Lab 1: Introduction of packet racer	Lab 4:IP addressing and subnetting(VLSM)	Lab 7: Implementation of static routing	Lab 10: Implementation of EIGRP configuration	Lab 13: Implementation of Single-Area OSPF link costs and interface
	SLO-2					
S-6	SLO-1	Network Models	Categories of addressing	Application of Distance vector routing	Hamming code	Performance metrics
	SLO-2	Protocols	Classless addressing	Node instability issues	Application of Hamming code	Bandwidth, Delay
S-8	SLO-1	Standards	Categories of Classless addressing	RIPv1	Correction vs Detection	Throughput, Jitter
	SLO-2	Standards Organizations	Prefix usage	RIPv2	Framing	Wireless 802.11
S-9	SLO-1	Layered Tasks	Network Address Translation (NAT)	Difference of RIPV1 and RIPV2	Flow control	Addressing mechanism
	SLO-2	Hierarchy	Types of NAT	Link state routing	Error control	Transmission Media
S-10	SLO-1	OSI Model	NAT Terminology	Principle of Link state routing	ARQ	Twisted pair
	SLO-2	Layered Approach	Translation table	Dijkstra's Algorithm	ARQ types	Coaxial
S 11-12	SLO-1	Lab 2: Implementation of various Topology creation	Lab 5: Configuring Interfaces	Lab 8: Implementation of Default routing	Lab 11:Implementation of EIGRP bandwidth and adjacencies	Lab 14:Implementation of Multi-Area OSPF with stub areas and authentication
	SLO-2					
S-13	SLO-1	Peer-Peer Approach	IPV6 addresses	Applications of Dijkstra's Algorithm	Random access	Fibre
	SLO-2	Layers in the OSI Model	Types, Notation	OSPF	ALOHA	Architecture of IEEE 802
S-14	SLO-1	OSI Reference Model	VLSM	EIGRP	CSMA	IEEE 802.15
	SLO-2	Comparison of Layers	Masking	Path vector routing	CSMA/CD	Architecture
S-15	SLO-1	TCP/IP Protocol Suite	CIDR	Applications of Path vector routing	CSMA/CA	IEEE 802.15.4
	SLO-2	TCP/IP Reference Model	Address Aggregation	Stabilized routing table creation for AS	Collision Detection VS Collision Avoidance	Architecture
S-16	SLO-1	Comparison with OSI Model	Networking devices	BGP	Controlled access	IEEE 802.16
	SLO-2	Comparison of the OSI and TCP/IP Reference Models	Router,Switch,Hub,Bridges	BGP sessions	Channelization	Architecture
S 17-18	SLO-1	Lab 3: Implement the categories of network(LAN,MAN,WAN)	Lab 6: Basic router configuration, creating passwords	Lab 9: Implementation of RIPv1,v2	Lab 12: Implementation of EIGRP authentication and timers	Lab 15: Redistribution Between EIGRP and OSPF
	SLO-2					

Learning Resources	1. *BehrouzA.Forouzan,(2010), "Data Communications and Networking", 5th Edition* 2. *ToddLammle,(2011), "CCNA Study Guide", Seventh Edition*	3. *WilliamStallings,(2010), "Data and Computer Communications", Ninth Edition*

Learning Assessment

Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Short Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr.G.Muruganandam, Group Project Manager, HCL Technologies, Chennai	Dr.S.Gopinathan, Professor, University of Madras, Chennai	Dr.S.Kanchana, SRMIST
Mr.M. Hemachandar, Tech Lead, Wipro Limited, Chennai		Dr.S.P.Angelin Claret