Course Code	18CSE453T	Course Name	NETWORK ROUTING ALGORITHMS	Course Category	E	Professional Elective	L	T	P	C
							3	0	0	3

Pre-requisite Courses	18CSC302J	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science and Engineering	Data Book / Codes/Standards		Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Understand how addressing and routing are tied together and different architectural components are related to routing.
CLR-2 :	Gain knowledge on the need for routers, its functionality and different architectures.
CLR-3 :	Understand fundamental basis of various algorithms in centralized and distributed point of view.
CLR-4 :	Apply the knowledge of IP addressing in various routing algorithms.
CLR-5 :	Understand the various types of key routing protocols used in wireless networks.
CLR-6 :	Gain knowledge on past experiences and prepare for next generation networks and routing

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
		LevelofThinking (Bloom)	ExpectedProficiency (%)	Expected Attainment(%)	EngineeringKnowledge	ProblemAnalysis	Design&Development	Analysis,Design, Research	ModernTool Usage	Society&Culture	Environment& Sustainability	Ethics	Individual & TeamWork	Communication	ProjectMgt.&Finance	LifeLongLearning	PSO-1	PSO-2	PSO– 3
CLO-1 :	Acquire the knowledge of how data transfer happens in conventional networks	2	80	85	H	M	-	-	L	-	-	-	-	M	-	H		-	-
CLO-2 :	Comprehend Router Architectures and IP Address Lookup Algorithms	2	75	80	H	H	M	M	L	-	-	-	-	-	L	H	-	-	-
CLO-3 :	Compare routing techniques and protocols	2	85	80	H	H	L	M	M	-	-	-	M	-	L	H	-	-	-
CLO-4 :	Examine how different dimensions of routing differ for different types of network	2	80	75	H	H	H	H	H	L	-	M	M	-	-	H	-	-	-
CLO-5 :	Apply various routing algorithms in wireless network scenario.	2	75	85	H	H	H	H	M	-	-	-	M	-	-	H	-	-	-
CLO-6 :	Understand various routing paradigms in next generation	2	80	85	H	H	H	M-	M	L	-	-	-	-	-	H	-	-	-

Duration (hour)		8	9	9	9	10
S-1	SLO-1	Network Routing: An Introduction to Routing algorithms	Router Architectures: Basic Forwarding Functions	Bellman-Ford algorithm	Routers, Networks, and Routing Information: Some Basics	Routing in Wireless Networks: Internet based mobile ad-hoc networking
	SLO-2	Functions of Router	Routing table versus forwarding table	Distance Vector Approach	Routing Table, Communication of Routing Information	Classifications of routing protocols
S-2	SLO-1	IP addressing- Classful Addressing	Types of router	Dijkstra's Algorithm	Routing Information Protocol, Version 1 (RIPv1)	Table-Driven Routing Protocols: Destination Sequenced Distance-Vector Routing Protocol
	SLO-2	Classless Addressing	Elements of Router	Comparison of Bellman-Ford and Distance Vector Approach	Routing Information Protocol, Version 2 (RIPv2)	Cluster-Head Gateway Switch Routing Protocol
S-3	SLO-1	Protocol architecture stack – OSI Reference Model	Packet Flow	Shortest Path Computation with Candidate Path Caching	Interior Gateway Routing Protocol (IGRP)	On-Demand Routing Protocols: Dynamic Source Routing Protocol
	SLO-2	IP Protocol Stack Architecture	Packet Processing	Widest Path Computation with Candidate Path Caching	Enhanced Interior Gateway Routing Protocol (EIGRP), Route Redistribution	Ad Hoc On-Demand Distance-Vector Routing Protocol
S-4	SLO-1	Network Topology Architecture	Shared CPU architecture, Shared forwarding Engine Architecture	Widest Path Algorithm	OSPF: Protocol Features	Hybrid Routing Protocols: Core Extraction Distributed Ad Hoc Routing Protocol
	SLO-2	Network Management Architecture	Shared Nothing Architectures, Clustered Architectures	k-Shortest Paths Algorithm	OSPF Packet Format	Zone Routing Protocol
S-5	SLO-1	Public Switched Telephone Network	Impact of Addressing on lookup	Routing Protocol, Routing Algorithm, and Routing Table	Integrated IS-IS	Routing Protocols With Efficient Flooding Mechanisms : Preferred Link-Based Routing Protocols
			Longest Prefix Matching	Routing Information Representation and Protocol Messages	Similarities and Differences Between IS-IS and OSPF	Optimized Link State Routing
S-6	SLO-1	Communication Technologies	Naïve Algorithms, Binary Tries	Distance Vector Routing Protocol	IP Traffic Engineering: Traffic, Stochasticity, Delay, and Utilization	Hierarchical Routing Protocols
					Applications' View	Power-Aware Routing Protocols

S-7	SLO-1	*Standard Committees – International Telecommunication Union*	*Multi-bit Tries*	*Link State Routing Protocol*	*Traffic Engineering: An Architectural Framework*	*Toward Next Generation Routing:Quality of Service Routing*
	SLO-2	*Internet Engineering Task Force, MFA Forum*	*Compressing multi-bit strides*		*Traffic Engineering: A Four-Node Illustration*	
S-8	SLO-1	*Type Length Value*	*Search By Length Algorithms*	*Path Vector Routing Protocol*	*BGP Operations, configuration, faces of BGP*	*Multiprotocol Label Switching(MPLS)*
	SLO-2	*Network Protocol Analyzer*	*Search By value approaches*		*BGP Decision Process*	*Generalized MPLS*
S-9	SLO-1		*Hardware Algorithms*	*Network Flow Modeling: Single-Commodity Network Flow*	*Internal BGP Scalability*	*Routing and Traffic Engineering with MPLS*
	SLO-2		*Comparing Different Approaches*	*Multicommodity Network Flow: Three-Node Example*	*Protocol Message Format*	
S-10	SLO-1 SLO-2					*PSTN Call Routing Using the Interne*

Learning Resources	1. *D.Medhi and K.Ramasamy, Network Routing : Algorithms, Protocols and Architectures, MorganKaufmann Publishers, First Edition2007.* 2. *C.Siva Ram Murthy and B.S.Manoj, Adhoc Wireless Networks, Pearson Education,2007.* 3. *D.Medhi and K.Ramasamy, Network Routing : Algorithms, Protocols and Architectures, Morgan Kaufmann Publishers, Second Edition2017.*	4. *SteenStrubM,RoutinginCommunicationnetworks,PrenticeHallInternational,1995.* 5. *InternetworkingTechnologiesHandbook,Inc.CiscoSystems,ILSGCisco*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	*40 %*	-	*30 %*	-	*30 %*	-	*30 %*	-	*30%*	-
Level 2	Apply Analyze	*40 %*	-	*40 %*	-	*40 %*	-	*40 %*	-	*40%*	-
Level 3	Evaluate Create	*20 %*	-	*30 %*	-	*30 %*	-	*30 %*	-	*30%*	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech 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.T.Bernald , Senior Consulatant , TCS Chennai. bernald.t@tcs.com (waiting for approval)	*Dr. S.Anbuchelian, Anna University. anbuchelian@annauniv.edu*	1. *Dr.FemildaJosephin J S,SRMIST* 2. *Mr.RajeshBabu,SRMIST* 3. *Mr. J.Godwin,SRMIST*