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| **Course Code** | 18CSC302J | **Course Name** | COMPUTER NETWORKS | **Course Category** | *C* | *Professional Core* | L | T | P | C |
| 3 | 0 | 2 | 4 |

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| **Pre-requisite Courses** | *Nil* | | **Co-requisite Courses** | *Nil* | | **Progressive Courses** | *Nil* |
| **Course Offering Department** | | *CSE* | | | **Data Book / Codes/Standards** | *Nil* | |

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| **Course Learning Rationale (CLR):** | | *The purpose of learning this course is to:* | |  | **Learning** | | |  | **Program Learning Outcomes (PLO)** | | | | | | | | | | | | | | |
|  |  |
| **CLR-1 :** | *Describe the importance of various Internet protocols like ARP, RARP, ICMP, Multicasting and multi routing, SCTP* | | |  | 1 | 2 | 3 |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **CLR-2 :** | *Understand the transport layer protocols , application layer protocol and its characteristics* | | |  | Level of Thinking (Bloom) | Expected Proficiency (%) | Expected Attainment (%) |  | Engineering Knowledge | Problem Analysis | Design & Development | Analysis, Design, Research | Modern Tool Usage | Society & Culture | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | PSO - 1 | PSO - 2 | PSO – 3 |
| **CLR-3 :** | *Learn and Understand IPV6 technologies* | | |  |  |
| **CLR-4 :** | *Work with client server sockets and develop related applications to communicate with each other.* | | |  |  |
| **CLR-5 :** | *Understand the wide area network protocols* | | |  |  |
| **CLR-6 :** | *Learn the basics of DSL,ATM,HDLC,MPLS* | | |  |  |
|  |  | | |  |  |
| **Course Learning Outcomes (CLO):** | | | *At the end of this course, learners will be able to:* | |  |
| **CLO-1 :** | *Identify the basics of different types of network and transport layer protocols* | | | | *3* | *80* | *70* |  | *L* | *H* | *-* | *H* | *L* | *-* | *-* | *-* | *L* | *L* | *-* | *H* | *-* | *-* | *-* |
| **CLO-2 :** | *Design and implement the socket programming* | | | | *3* | *85* | *75* |  | *M* | *H* | *-* | *M* | *L* | *-* | *-* | *-* | M | *L* | *-* | *H* | *-* | *-* | *-* |
| **CLO-3 :** | *Enumerate the types of application layer protocols* | | | | *3* | *75* | *70* |  | *M* | *H* | *-* | *H* | *L* | *-* | *-* | *-* | *M* | *L* | *-* | *H* | *-* | *-* | *-* |
| **CLO-4 :** | *Analyze and compare the IPv4 and IPv6 protocols* | | | | *3* | *85* | *80* |  | *M* | *H* | *-* | *H* | *L* | *-* | *-* | *-* | *M* | *L* | *-* | *H* | *-* | *-* | *-* |
| **CLO-5 :** | *Familiarize with wide area technologies* | | | | *3* | *85* | *75* |  | *H* | *H* | *-* | *H* | *L* | *-* | *-* | *-* | *M* | *L* | *-* | *H* | *-* | *-* | *-* |
| **CLO-6 :** | *Describe the working of DSL,ATM,PPP,* | | | | *3* | *80* | *70* |  | *L* | *H* | *-* | *H* | *L* | *-* | *-* | *-* | *L* | *L* | *-* | *H* | *-* | *-* | *-* |

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| Duration (hour) | | 15 | 15 | 15 | 15 | 15 |
| **S-1** | SLO-1 | IP header | Byte ordering | DNS | IPV6 Overview | DSL |
| SLO-2 | IP fragmentation | Byte ordering conversion functions | DNS in the Internet, | IPV6 Features | Other DSL Technology |
| **S-2** | SLO-1 | ARP | System calls | DNS Resolution | IPV6 Addressing Modes | DSL Benefits |
| SLO-2 | RARP | Sockets | DNS Messages | IPV6 Address Types | Cable Technology |
| **S-3** | SLO-1 | ICMP –introduction | System calls used with Sockets | TELNET | Introduction | Compare DSL Vs Cable |
| SLO-2 | ICMP-Messages | Iterative and concurrent server | *SSH* | Address Space Allocation | Frame Relay, VPN |
| **S 4-5** | SLO-1 | Study of necessary header files with respect to socket programming. | UDP Echo Client Server Communication | Full Duplex Chat Using TCP/IP | ARP implementation Using UDP | Implementation of VPN |
| SLO-2 |
| **S-6** | SLO-1 | Debugging tools | Socket Interface | FTP | Global Unicast Addresses | ATM Introduction |
| SLO-2 | ICMP package | Structure and Functions of Socket | TFTP | Auto configuration | ATM Cell Format |
| **S-7** | SLO-1 | UDP Datagram | Remote Procedure Call | WWW Architecture | Renumbering | ATM Layer |
| SLO-2 | UDP characteristics | RPC Model, Features | WWW Documents | IPV6 Routing Protocols | AAL Layer |
| **S-8** | SLO-1 | TCP Header | TCP Client Server Program | HTTP | Introduction | ATM Application |
| SLO-2 | TCP connection establishment process | Input, Output Processing Module | HTTP Request and Reply | IPV6 Packet Format | PPP |
| **S 9-10** | SLO-1 | Study of Basic Functions of Socket Programming | Concurrent TCP/IP Day-Time Server | Implementation of File Transfer Protocol | Study of IPV6 Addressing &Subnetting | Communication Using HDLC |
| SLO-2 |
| **S-11** | SLO-1 | TCP Error Control | UDP Client Server Program | DHCP Operation | Comparison between IPV4 and IPV6 Header | PPP Services, Components |
| SLO-2 | TCP Congestion Control | UDP Control block table & Module | DHCP Configuration | IPV4 to IPV6 Tunneling | PPP frame and byte stuffing |
| **S-12** | SLO-1 | TCP Flow Control | UDP Input & Output Module | *SMTP* | IPV4 to IPV6 Translation Techniques | HDLC |
| SLO-2 | *Multicasting* | SCTP Sockets | *POP3* | *NAT Protocol Translation* | HDLC Transfer Modes, Frame |
| **S-13** | SLO-1 | *Multicasting and Multicast Routing Protocol* | SCTP Services and Features, Packet Format | *IMAP* | *IPV6 Mobility* | *Types of HDLC Frame* |
| SLO-2 | *Stream Control Transmission Protocol* | SCTP Client/Server | *MIME* | *Protocols Changed to Support IPV6* | MPLS |
| **S 14-15** | SLO-1 | *Simple TCP/IP Client Server Communication* | Half Duplex Chat Using TCP/IP | *Remote Command Execution Using UDP* | *Implementation of NAT* | Communication Using PPP |
| SLO-2 |

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| **Learning**  **Resources** | 1. *Behrouz A. Forouzan, “TCP IP Protocol Suite ” 4th edition, 2010, McGraw-HillISBN: 0073376043* 2. *Douglas E. Comer, Internetworking with TCP/IP, Principles, protocols, and architecture,Vol 1 5th Edition,2006 ISBN: 0131876716, ISBN: 978-0131876712* | 1. *Richard Stevens, Unix Network Programming, vol.1, 3rd edition, 2003, McGraw-HillISBN 0-07-246060-1* |

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| **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 | *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, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

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| **Course Designers** |  |  |  |  |  |  |
| Experts from Industry | | | | Experts from Higher Technical Institutions | | Internal Experts |
| 1.Thamaraiselvam.S, Zoho Corporation. thamaraiselvams@gmail.com | | | | 1.Dr.Uma,Anna University ,umaramesh@auist.net | | 1.Dr.K.Venkatesh,SRMIST,2.Dr.G.Usha,SRMIST |
| *2.Mithun,Cognizant, Mithun.SS@cognizant.com* | | | | 2. Dr.KunvarSingh, NIT Trichy,kunwar@nitt.edu | | 3.Dr.J.Kalaivani,SRMIST,4.Mr.GodwinPon,SRMIST |

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| **Course Code** | 18CSS202J | **Course Name** | COMPUTER COMMUNICATIONS | **Course Category** | *S* | *Engineering Sciences* | L | T | P | C |
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| **Pre-requisite Courses** | *Nil* | | **Co-requisite Courses** | *Nil* | | **Progressive Courses** | *Nil* |
| **Course Offering Department** | | *Computer Science and Engineering* | | | **Data Book / Codes/Standards** | *Nil* | |

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| **Course Learning Rationale (CLR):** | | | *The purpose of learning this course is to:* | |  | **Learning** | | |  | **Program Learning Outcomes (PLO)** | | | | | | | | | | | | | | |
|  |  |
| **CLR-1 :** | *Understand the basic services and concepts related to Internetwork* | | | |  | 1 | 2 | 3 |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **CLR-2 :** | *Understand the layered network architecture* | | | |  | Level of Thinking (Bloom) | Expected Proficiency (%) | Expected Attainment (%) |  | Engineering Knowledge | Problem Analysis | Design & Development | Analysis, Design, Research | Modern Tool Usage | Society & Culture | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | PSO - 1 | PSO - 2 | PSO – 3 |
| **CLR-3 :** | *Acquire knowledge in IP addressing* | | | |  |  |
| **CLR-4 :** | *Exploring the services and techniques in physical layer* | | | |  |  |
| **CLR-5 :** | *Understand the functions of Data Link layer* | | | |  |  |
| **CLR-6 :** | *Implement and analyze the different Routing Protocols* | | | |  |  |
|  | |  | | |  |  |
| **Course Learning Outcomes (CLO):** | | | | *At the end of this course, learners will be able to:* | |  |
| **CLO-1 :** | *Apply the knowledge of communication* | | | | | *2* | *80* | *70* |  | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* |
| **CLO-2 :** | *Identify and design the network topologies* | | | | | *3* | *85* | *75* |  | *H* | *-* | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *M* | *-* | *-* |
| **CLO-3 :** | *Design the network using addressing schemes* | | | | | *3* | *75* | *70* |  | *H* | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *M* | *-* | *M* |
| **CLO-4 :** | *Identify and correct the errors in transmission* | | | | | *1* | *85* | *80* |  | *H* | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* |
| **CLO-5 :** | *Identify the guided and unguided transmission media* | | | | | *1* | *85* | *75* |  | *H* | *-* | *-* | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *-* |
| **CLO-6 :** | *Design and implement the various Routing Protocols* | | | | | *3* | *80* | *70* |  | *H* | *H* | *H* | *H* | *H* | *-* | *-* | *-* | *-* | *-* | *-* | *-* | *M* | *-* | *M* |

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| Duration (hour) | | 12 | 12 | 12 | 12 | 12 |
| **S-1** | SLO-1 | *Evolution of Computer Networks, Network categories* | *IPv4 Addressing, Address space* | *Line coding: Unipolar scheme* | *Framing, Flow Control Mechanisms* | *Forward Techniques, Forwarding Process* |
| SLO-2 | *Data Transmission Modes, Network topologies* | *Dotted Decimal Notation. Classful Addressing* | *Polar schemes, Bipolar schemes* | *Sender side Stop and Wait Protocol, Receiver side Stop and Wait Protocol* | *Routing Table* |
| **S-2** | SLO-1 | *Circuit Switching and Packet Switching* | *Subnet Mask* | *Amplitude shift keying, Frequency shift keying* | *Goback N ARQ, Selective Reject ARQ* | *Intradomain Routing and Interdomain Routing* |
| SLO-2 | *Protocols and standards* | *Subnetting* | *Phase shift keying, Pulse code Modulation, Delta Modulation* | *CRC, Checksum* | *Static Routing and Dynamic Routing* |
| **S**  **3-4** | SLO-1 | *Lab 1:* ***IP Addressing*** | *Lab 4:****Router Configuration (Creating Passwords, Configuring Interfaces)*** | *Lab 7: RIP v1* | *Lab 10:* ***EIGRP Authentication and Timers*** | *Lab 13:* ***Examining Network Address Translation (NAT)*** |
| SLO-2 |
| **S-5** | SLO-1 | *Layers in the OSI model, Functions of Physical layer, data link layer* | *Special Addresses* | *Multiplexing: FDM* | *Types of Errors* | *Distance Vector Routing, Problem Solving* |
| SLO-2 | *Functions of Network layer, Transport layer* | *Special Addresses* | *Multiplexing: FDM* | *Types of Errors* | *Link state Routing* |
| **S-6** | SLO-1 | *Functions of Session, Presentation layer and Application layer* | *Classless Addressing* | *TDM* | *Forward Error correction* | *Problem solving* |
| SLO-2 | *TCP/IP protocol suite ,Link layer protocols* | *Problem Solving* | *WDM* | *CSMA, CSMA/CD* | *Path vector Routing* |
| **S**  **7-8** | SLO-1 | *Lab 2: Subnetting (VLSM)* | *Lab 5: Basic Switch Configuration: Vlan* | *Lab 8: RIP v2* | *Lab 11: Single-Area OSPF Link Costs and Interface* | *Lab 14: BGP Configuration* |
| SLO-2 |
| **S-9** | SLO-1 | *Network layer protocols* | *Private Address, NAT, Supernetting* | *Guided Media: Twisted Pair, Coaxial Cable Fiber optic cable* | *Hamming Distance* | *RIP v1,RIP v2* |
| SLO-2 | *Transport layer protocols* | *Hub, Repeaters, Switch* | *Unguided media: Radio waves* | *Correction Vs Detection* | *OSPF* |
| **S-10** | SLO-1 | *Serial and Parallel Transmissions* | *Bridge* | *Microwaves* | *HDLC* | *EIGRP* |
| SLO-2 | *Addressing* | *Structure of Router* | *Infrared* | *PPP* | *BGP* |
| **S**  **11-12** | SLO-1 | *Lab 3: LAN Configuration using straight through and cross over cables* | *Lab 6: Static and Default Routing* | *Lab 9: EIGRP Configuration, Bandwidth, and Adjacencies* | *Lab 12: Multi-Area OSPF with Stub Areas and Authentication* | *Lab 15: Configuring Static and Default Routes* |
| SLO-2 |

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| **Learning**  **Resources** | 1. *Behrouz A. Forouzan, “Data Communications and Networking” 5th ed., 2010* 2. *BhushanTrivedi," Data Communication and Networks" 2016* | 1. *William Stallings, Data and Computer Communications,9th ed., 2010* 2. *Todd Lammle, CCNA Study Guide, 7th ed. 2011* |

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| **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 | *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, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

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| **Course Designers** |  |  | |  |  |  | |  | |
| Experts from Industry | | | Experts from Higher Technical Institutions | | | | Internal Experts | | |
| *1. Dr.Viswanadhan, Teken BIM Technologies, viswanathan\_alladi@yahoo.com* | | | *1.Dr. J. DhaliaSweetlin, Anna University,jdsweetlin@mitindia.edu* | | | | *1. Mrs. T. Manoranjtham , SRMIST* | | |
| *2. Dr.Devi Jayaraman , Virtusa, devij@virtusa.com* | | | 2. Dr. B. Latha, Sairam Engineering College, hod.cse@sairam. edu.in | | | | *2. Mr. J. Godwin Ponsam, SRMIST* | | *Dr. J.S. FemildaJosephin, SRMIST* |

<https://drive.google.com/drive/u/1/folders/1tIFQr3k7JoXIrWNzlsFUJCBoNnvXqWA3>

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| **Course Code** | **18CSE453T** | **Course Name** | **NETWORK ROUTING ALGORITHMS** | **Course Category** | *E* | *Professional Elective* | L | T | P | C |
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| **Pre-requisite Courses** | *18CSC302J* | | **Co-requisite Courses** | *Nil* | | **Progressive Courses** | *Nil* |
| **Course Offering Department** | | *Computer Science and Engineering* | | | **Data Book / Codes/Standards** | *Nil* | |

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| **Course Learning Rationale (CLR):** | | | *The purpose of learning this course is to:* | |  | **Learning** | | |  | **Program Learning Outcomes (PLO)** | | | | | | | | | | | | | | |
|  |  |
| **CLR-1 :** | *Understand how addressing and routing are tied together and different architectural components are related to routing.* | | | |  | 1 | 2 | 3 |  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **CLR-2 :** | *Gain knowledge on the need for routers, its functionality and different architectures.* | | | |  | Level of Thinking (Bloom) | Expected Proficiency (%) | Expected Attainment (%) |  | Engineering Knowledge | Problem Analysis | Design & Development | Analysis, Design, Research | Modern Tool Usage | Society & Culture | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | PSO - 1 | PSO - 2 | PSO – 3 |
| **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:* | |  |
| **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* | *-* | *-* | *-* |

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| 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: Centralized View* | *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: Distributed View* | *Routing Table, Communication of Routing Information* | *Classifications of routing protocols* |
| **S-2** | SLO-1 | *IP 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 | *On Architecture: Service Architecture* | *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* | *Packet Flow* | *Shortest Path Computation with Candidate Path Caching* | *Interior Gateway Routing Protocol (IGRP)* | *On-Demand Routing Protocols: Dynamic Source Routing Protocol* |
| SLO-2 | *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 |  |  |  |  | *PSTN Call Routing Using the Interne* |
| SLO-2 |  |  |  |  |

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| **Learning**  **Resources** | 1. *D.Medhi and K.Ramasamy, Network Routing : Algorithms, Protocols and Architectures, Morgan Kaufmann Publishers, First Edition 2007.* 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 Edition 2017.* | 1. *Steen Strub M, Routing in Communication networks, Prentice Hall International, 1995.* 2. *Internetworking Technologies Handbook, Inc. Cisco Systems, ILSG Cisco* |

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| **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 | *40 %* | *-* | *30 %* | *-* | *30 %* | *-* | *30 %* | *-* | *30%* | *-* |
| Understand |
| Level 2 | Apply | *40 %* | *-* | *40 %* | *-* | *40 %* | *-* | *40 %* | *-* | *40%* | *-* |
| Analyze |
| Level 3 | Evaluate | *20 %* | *-* | *30 %* | *-* | *30 %* | *-* | *30 %* | *-* | *30%* | *-* |
| Create |
|  | 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.,

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| **Course Designers** |  |  |  |  |  |  |
| Experts from Industry | | | | Experts from Higher Technical Institutions | | Internal Experts |
| *Mr.T.Bernald , Senior Consulatant , TCS Chennai.* [***bernald.t@tcs.com***](mailto:bernald.t@tcs.com) *(waiting for approval)* | | | | *Dr. S.Anbuchelian, Anna University. anbuchelian@annauniv.edu* | | 1. *Dr.FemildaJosephin J S, SRMIST* |
|  | | | |  | | 1. *Mr.RajeshBabu, SRMIST* |
|  | | | |  | | 1. *Mr. J.Godwin, SRMIST* |