

COURSE Details

Computer Networks (ECSE208L)

Course Type:	Core
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L	T	P	Credits
3	1	2	5

Pre-requisites: NA

Course Learning Outcomes:

CLO1: Explain the functionality of the different layers of network models with in network architecture.

CLO2: Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies, sub netting and routing mechanism.

CLO3: Illustrate network model protocols: data link, network, transport and application layer protocols.

Module 1 (Contact hours: 9)

Introduction to Computer Networks concepts: Goals and Applications of Networks, Network structure and architecture, OSI reference model; TCP/IP Protocol suite, Layering principles, Network Topology Design, connecting devices, Physical Layer Transmission Media; Line coding scheme, Basic idea of modulation and multiplexing, Switching methods.

Module 2 (Contact hours: 12)

Local Area Networks: LAN topologies: Bus topology, Ring topology, Token passing rings, FDDI; Star topologies, Asynchronous transfer mode, Ethernet, IEEE standards 802.3, 802.5. Wireless LANs: IEEE 802.11 and Bluetooth. Reliable Data Delivery: Error detection and Correction, Error control (retransmission techniques, timers), Flow control (Acknowledgements, sliding window); Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols, CSMA, CSMA/CD, Overview of IEEE standards.

Module 3 (Contact hours: 9)

End-to-end Delivery, routing and Forwarding: Routing versus forwarding, Static and dynamic routing, Unicast and Multicast Routing. Distance-Vector; Link-State, Shortest path computation, Dijkstra's algorithm, Network Layer Protocols (IP, ICMP); IP addressing, sub netting and super netting (CIDR), IPV4 and IPV6, Address mapping-ARP, RARP, BOOTS, and DHCP.

Module 4 (Contact hours: 12)

Process-to-process Delivery: design issues, UDP and TCP segment formats, connection establishment and termination; Principles of congestion control, Approaches to Congestion control, Quality of service, Flow characteristics, Techniques to improve QoS, Brief introduction to session and presentation layer.

Network applications and security: Naming and address schemes (domain name system, IP addresses, Uniform Resource Identifiers, etc.), HTTP as an application layer protocol, Remote login, Electronic mail, SMTP, FTP Commands and Replies, WWW and SNMP, Security in computer networks: principles of cryptography, symmetric key, public key, authentication protocols, digital signatures, firewalls, Security in different layers: secure E-mail, SSL, IP security.

Lab Experiments

Study of different types of networks cables and practically implement the cross-wired cable and straight through cable using clamping tool. Configure a network topology, connect different networks, static routing and dynamic routing, virtual LAN, RIP and OSPF using packet tracer, Network troubleshooting and analysis using Wireshark, Creating the simple network configuration and runs the simulation scenario using NS-2.

Text Books :

- 1) *B. A. Forouzan, Data communication and Networking (4th Edition), McGraw Hill, 2006. ISBN- 978-0073250328.*
- 2) *Andrew S. Tanenbaum and David J. Wetherall, Computer Networks (5th Edition), Prentice Hall, 2010. ISBN- 978-9332518742.*

Reference Book :

- 1) *W. Stallings, Computer Networking with Internet Protocols and Tech (1st Edition), Pearson Education India, 2003. ISBN- 978-8131709351.*

MOOCs

- 1) <https://www.coursera.org/learn/computer-networking>
- 2) <https://www.edx.org/course/it-support-networking-essentials>

Evaluation Components:

Components of Course Evaluation	Percentage
Mid Term Examination	20
End Term Examination	40
Quiz	15
Lab Continuous Evaluation	15
End Term Lab Examination	10