



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology in Computer Science and Engineering	Year of Regulation	2019-20
Department	Computer Science and Engineering	Semester	V

Course Code	Course Name	Credit Structure				Marks Distribution				
		L	T	P	C	INT	MID	END	Total	
CS 305	Computer Networks	3	0	0	3	50	50	100	200	
Course Objectives	To develop the student's ability to understand the basic concept of networking, packet switching and circuit switching etc.	Course Outcomes	CO1	Able to understand the brief of internet and also the concept of circuit switching and packet switching.						
	To develop the student's ability to understand the application layer of the network model along with the ability to perform socket programming.		CO2	Able to understand the purpose of application layer and various application layer protocols such as DNS, FTP, SMTP.						
	To provide the students with some knowledge and analysis skills associated with transport layer protocols TCP and UDP.		CO3	Able to understand various transport layer protocol like UDP, TCP, and various mechanisms to control TCP congestion.						
	To develop the student's ability to understand the network layer of network model like IPv4 addressing NAT etc.		CO4	Able understand the IPV4 addressing and forwarding mechanism and solve relevant problems.						
			CO5	Able to understand the routing algorithms and protocols and solve relevant problems.						
			CO6	Able to understand the concepts of network security and management, and the future trends of networking.						

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	2	0	0	0	0	1	0	2	0	0	0	2	1	1	1
2	CO2	2	2	2	1	2	0	0	2	0	2	0	1	2	2	1
3	CO3	3	2	2	3	0	0	2	1	0	1	1	1	2	1	1
4	CO4	1	1	0	1	0	0	0	2	1	1	0	2	3	1	3
5	CO5	0	1	1	1	2	3	0	2	1	1	1	1	1	2	1
6	CO6	2	0	3	0	1	1	1	1	1	2	1	1	3	3	3

SYLLABUS

No.	Content	Hours	COs
I	Basics of Internet: Internet Service Providers (ISPs); protocols and standards; Network edge - access networks: dial-up, DSL, cable, FTTH, Ethernet, WiFi, WiMax; Network core - circuit switching: multiplexing; packet switching: traffic, congestion; delays; traffic intensity; throughput; protocol layering;	04	CO1
II	Application Layer: Architecture – client-server, peer-to-peer, hybrid; DNS: brief, hierarchical database; Internet transport services; The Web and HTTP - What actually happens, HTTP request and response, web cache; Process communication; Socket programming; File transfer: FTP; Electronic mail: SMTP, POP3, IMAP, Web-based e-mail;	05	CO2
III	Transport Layer: Real Life Analogy; Multiplexing and De-multiplexing; TCP and UDP sockets; Web Servers and TCP; Why UDP?; TCP UDP Examples; UDP Segment; TCP Segment; Flow Control - Stop and Wait, Go-Back-N, Selective Repeat; Transmission Control Protocol; TCP Connection Establishment - Three-Way Handshaking, Data Transfer, Connection Termination; SYN Flooding Attack; TCP Congestion Control - congestion window, congestion detection, Slow Start: Exponential Increase, Congestion Avoidance: Additive Increase, Additive Increase Multiplicative Decrease; TCP Variants - Tahoe and Reno;	06	CO3
IV	Network Layer – Part 1: Functions; Packet Switching - Virtual Circuit, Datagram; What's inside a router? - Input Processing, Switching, Output Processing; IPV4 Address - Classful Addressing, Classless Addressing - address mask, block allocation, subnetting; Special Addresses; IP Datagram, Fragmentation; Dynamic Host Configuration Protocol - properties, protocol steps; Network Address Translation;	08	CO4
V	Network Layer – Part 2 (Routing Algorithms and Protocols): Distance Vector Routing; Link State Routing; Path Vector Routing; Routing Information Protocol; Open Shortest Path First; Border Gateway Protocol; Multicast routing protocol; Wireless routing protocol;	09	CO5
VI	Security and Network Management: Cryptography and Network Security; Internet Security: IPsec, SSL/TLS and PGP; SNMP;	02	CO6
VII	Future Trends: Internet-of-Things (IoT); Software Defined Networking (SDN)	02	CO6
Total Hours		36	

Essential Readings

1. J. F. Kurose, K. W. Ross, "Computer Networking: A Top-Down Approach", Pearson Publication, 6th Edition, 2013.
2. B. Forouzan, "Data Communication and Networks", McGraw-Hill Publication, 5th Edition, 2012.
3. A. S. Tanenbaum, D. J. Wetherall, "Computer Networks", Pearson Publication, 5th Edition, 2011.

Supplementary Readings

1. W. Stalling, "Data and Computer Communications", Pearson Publication, 8th Edition, 2007.
2. L. L. Peterson, B. S. Davie, "Computer Networks: A Systems Approach", Morgan Kaufmann Publishers, 5th Edition, 2012.
3. A. L. Garcia and I. Widjaja, "Communication Networks Fundamental Concepts and Key Architectures", Tata McGraw-Hill Publication, 2nd Edition, 2004.