National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	**Master of Computer Applications**		Year of Regulation	**2024-25**
Department	**Computer Science and Engineering**		Semester	**III**

Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
CA507	**Computer Networks**		3	0	0	3	50	50	100	200

Course Objectives		Course Outcomes	CO's	Statement	Bloom's Taxonomy
To develop the student's ability to understand the basic concept of networking, packet switching and circuit switching etc.			CA507.1	Able to identify and interpret the basics of the internet and evaluate answers by applying the concepts of circuit switching and packet switching	Evaluate
To develop the student's ability to understand the application layer of the network model along with the ability to perform socket programming.			CA507.2	Able to infer the purpose of application layer and articulate various application layer protocols such as DNS, FTP, SMTP.	Apply
To provide the students with some knowledge and analysis skills associated with transport layer protocols TCP and UDP.			CA507.3	Able to explain the purpose of transport layer, make use of transport layer protocols - UDP & TCP, and evaluate various congestion control mechanisms	Evaluate
To develop the student's ability to understand the network layer of network model like IPv4 addressing NAT etc.			CA507.4	Able to outline the functions of the network layer, experiment with IPV4 addressing and determine solutions of relevant problems.	Evaluate
			CA507.5	Able to demonstrate routing and forwarding process and make use of different routing algorithms.	Apply
			CA507.6	Able to understand the concepts of network security and management, and the future trends of networking.	Understand

COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CA507.1	2					1		2				2	1	1	1
CA507.2	2	2	2	1	2			2		2		1	2	2	1
CA507.3	3	2	2	3			2	1		1	1	1	2	1	1
CA507.4	1	1		1				2	1	1		2	3	1	3
CA507.5		1	1	1	2	3		2	1	1	1	1	1	2	1
CA507.6	2		3		1	1	1	1	1	2	1	1	3	3	3
CA507	2.00	1.50	2.00	1.50	1.67	1.67	1.50	1.67	1.00	1.40	1.00	1.33	2.00	1.67	1.67

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;	05	**CA507.1**
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;	06	**CA507.2**
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	**CA507.3**
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	**CA507.4**
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	**CA507.5**
VI	**Security and Network Management:** Cryptography and Network Security; Internet Security: IPSec, SSL/TLS and PGP; SNMP;	04	**CA507.6**
VII	**Future Trends:** Internet-of-Things (IoT); Software Defined Networking (SDN)	04	
	Total Hours	42	

Essential Readings

1. J. F. Kurose, K. W. Ross, "Computer Networking: A Top-Down Approach", Pearson Publication, 7th Edition, 2016.

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.