School of Computer Science

M. Sc. (Information Technology) Programme

Subject Code & Name: MITSEC106 - Concepts of Internet and Networking

Teaching And Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
1	-	1	2	25%	25%	25%	25%

Programme Name	M. Sc. (Information Technology)
Semester	1
Course Code	MITSEC-106
Course Title	Concepts of Internet and Networking
Course Content Type (Th. / Pr.)	Th. + Pr.
Course Credit	1+1
Sessions + Lab Per Week	2
Total Teaching/ Lab Hours	15+30
*** 2 Lab = 1 session**	

Learning Objectives
Upon successful completion of this course, students will be able to:

- Understand the fundamental concepts of computer networks, Internet and data communication
- Identify different types of networks, topologies, transmission modes and switching techniques.
- Describe the TCP/IP and OSI Model and functions of different networking layers.
- Explain networking devices and major protocols using in different layers of networking.
- Analysing IP addressing schemes, subnetting and routing concepts.

Learning Outcomes

After successful completion of the course, students will be able to:

- Describe important internet and networking concepts such as WWW, URL, browser, server, and search engine.
- Differentiate types of networks such as LAN, WAN, MAN, PAN and VPN.
- Compare different network topologies including star, bus, ring, mesh, tree, and hybrid.
- Explain the TCP/IP and OSI reference model and role of each layer in communication.
- Understand the working of various networking protocols.
- Identify networking devices and media such as router, switch, hub, modem, RJ45, Fiber optics, coaxial, and twisted pair cables.
- Analyse routing algorithms, IP classes, subnet masks, and IPv4 vs IPv6 addressing.

CLO – PLO Mapping Matrix

CLO/ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9
CLO1	3	2	2	1	–	–	–	1	2
CLO2	3	2	2	2	–	–	1	1	2
CLO3	3	3	2	2	–	–	–	1	2
CLO4	3	3	2	3	1	1	–	2	2

CLO5	3	3	3	3	1	1	1	2	2
CLO6	3	2	3	2	–	–	1	1	2
CLO7	3	3	3	3	1	2	1	2	3

Detailed Contents		
Unit	**Topic/Sub Topic**	**Teaching Hours**

I
 	
Basics of Data Communication, Internet and Networking
	Data Communication:
	• Introduction to Data Communication
	• Components of Data Communication System
	• Communication Modes: Simplex, Half-Duplex, Full-Duplex
	Computer Networks
	• Definition and concept
	• Types of Computer Networks: LAN, MAN, WAN, PAN, CAN
	• Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid
	• Transmission Media:
	  ○ Guided Media (Twisted Pair, Coaxial Cable, Optical Fiber)
	  ○ Unguided Media (Radio Waves, Microwave, Infrared, Satellite)
	• Network Devices:
	  ○ Hub, Switch, Bridge, Repeater, Router, Gateway, Modem
	Basics of Internet
	• Definition and Concept
	• Basic terminology:	

	○ Internet, WWW, URL, website, web browser, web server, search engine, ISP, DNS • Evolution and Growth of the Internet • Internet Architecture • Internet Service Providers · IP Addressing: ○ IPv4 Address Structure ○ IPv6 Fundamentals ○ Public and Private IP Addresses ○ Subnetting Basics • Routing Concepts and Routing Tables	
II **Network Architecture and Protocols**	**Network Architecture** • Definition and concept • OSI Reference Model • TCP/IP Reference Model • Comparison of OSI and TCP/IP Models • Functions of Layers in OSI Model **Network Protocols** • HTTP/HTTPS • FTP • SMTP • Telnet • DNS	

Reference Books

1. Computer Networks 4th Edition - Andrew Tanenbaum
2. Computer Networking: A Top-Down Approach Featuring the Internet By James F.Kurose , Keith W.Ross

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3. Data Communication & Networking 4th Edition By Behrouz A.Forouzan

Web References:

1. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
2. https://standards.ieee.org/featured/ieee-802/
3. https://www.geeksforgeeks.org/computer-networks/computer-network-tutorials/

L:: Lecture, **T::** Tutorial, **P::** Practical

CCE:: Continuous & Comprehensive Evaluation

(CCE theory includes Mid Semester Examination, Assignment, MCQ Quizzes, Seminar, Reflective Notes, Class Participation, Case Analysis and Presentation, Slip Tests (Announced/ Surpirsed), Attendance etc. or any combination of these)

PWE: Practical Work Examination

(PWE includes Laboratory Practical Work, Project Work, Viva simulation exercise work etc.)

SEE:: Semester End Evaluation

Sample Programming Exercises:

1. Use Windows networking commands (ipconfig/ifconfig, ping, tracert/traceroute, netstat, nslookup) and interpret their outputs.
2. Configure a simple LAN using Cisco Packet Tracer and verify communication using the Ping command.
3. Design and simulate different network topologies (Bus, Star, Ring, Mesh, Tree and Hybrid) using Cisco Packet Tracer.
4. Configure static routing between multiple networks in Cisco Packet Tracer.
5. Configure and verify DHCP service for automatic IP address allocation.
6. Configure DNS service in a simulated network and verify name resolution.
7. Design and simulate a small network with appropriate IP addressing, routing, and Internet connectivity using Cisco Packet Tracer.