



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsamunda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmada

Established by Tribal Development Department, Govt. of Gujarat

School of Computer Science

P.G.D.C.A. (Post Graduate Diploma in Computer Applications) Programme

Subject Code & Name: PGDCA105-1- Networking and Internet

Teaching And Evaluation Scheme:

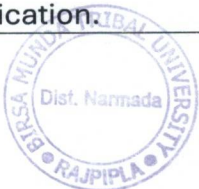
Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
4	-	-	4	50%	-	50%	-

Programme Name	P.G.D.C.A.
Semester	1
Course Code	PGDCA105-1
Course Title	Networking and Internet
Course Content Type (Th. / Pr.)	Th.
Course Credit	4
Sessions + Lab Per Week	4
Total Teaching/ Lab Hours	60
* 2 Lab = 1 session	

Learning Objectives

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

- Remember and Understand the fundamental concepts of data communication, computer networks, Internet technologies, network topologies, transmission media, and networking devices.
- Explain the architecture and operation of networking models, including the OSI and TCP/IP reference models, and describe the functions of various networking protocols used in Internet communication.



- Apply IP addressing schemes, subnetting techniques, routing concepts, and networking principles to solve basic communication and connectivity problems.
- Analyse network communication processes, security threats, wireless networking technologies, and the role of network security mechanisms in protecting digital infrastructure.
- Evaluate Internet services, cloud computing models, emerging networking technologies, and their impact on modern computing environments and organizational operations.
- Develop the ability to identify, select, and utilize appropriate networking solutions, Internet services, and cloud-based technologies for real-world applications.

Learning Outcomes

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

- Describe the concepts of data communication, computer networks, Internet architecture, networking terminology, transmission media, and network devices.
- Differentiate various network types, topologies, communication modes, and compare the OSI and TCP/IP networking models along with their functional layers.
- Apply IPv4 and IPv6 addressing concepts, subnetting techniques, routing principles, and Internet protocols to establish and manage network communication.
- Analyse network security requirements, identify common cyber threats and attacks, and evaluate the effectiveness of security mechanisms such as firewalls, IDS, IPS, antivirus software, and VPNs.
- Utilize wireless networking technologies, Internet services, and cloud computing models for communication, collaboration, and information sharing in modern digital environments.
- Assess emerging technologies such as IoT, SDN, Network Virtualization, Edge Computing, and Smart City infrastructures, and propose suitable networking solutions for contemporary applications.

CLO-PLO Mapping Matrix:

CLOs/ PLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6
CLO1	3	1	2	3	2	2
CLO2	3	2	2	3	2	2
CLO3	3	3	3	3	2	2
CLO4	3	2	3	3	3	3
CLO5	3	2	3	3	3	3
CLO6	3	3	3	3	3	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	15
	II Network Architecture and Protocols	15
	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	
III Network Security and Wireless Networking	Network Security Fundamentals • Introduction to Network Security • Need and Importance of Network Security • Security Goals: Confidentiality, Integrity, Availability (CIA Triad) • Common Security Threats and Attacks ◦ Malware ◦ Viruses and Worms ◦ Trojan Horses ◦ Phishing ◦ Spoofing ◦ Denial of Service (DoS) Security Mechanisms • Firewalls • Antivirus and Anti-malware Software • Intrusion Detection Systems (IDS) • Intrusion Prevention Systems (IPS) • Virtual Private Networks (VPN) Wireless Networking • Introduction to Wireless Networks • Wi-Fi Technology and Standards • Bluetooth Technology • Mobile Networks (3G, 4G, 5G) • Wireless Security Concepts • Wireless Access Points and Hotspots	15
IV Internet Services, Cloud Computing and Emerging Technologies	Internet Services • Electronic Mail (E-mail) • Web Hosting Concepts • Search Engines and Search Techniques • Cloud-Based Internet Services • Video Conferencing Technologies • Social Networking Platforms Cloud Computing Fundamentals • Introduction to Cloud Computing • Characteristics of Cloud Computing • Service Models: ◦ IaaS	15

	○ PaaS ○ SaaS • Deployment Models: ○ Public Cloud ○ Private Cloud ○ Hybrid Cloud Emerging Networking Technologies • Internet of Things (IoT) • Software Defined Networking (SDN) • Network Virtualization • Edge Computing • Smart Devices and Smart Cities • Future Trends in Networking	
Reference Books		
1. Tanenbaum, A. S. (2003). <i>Computer networks</i> (4th ed.). Prentice Hall 2. Kurose, J. F., & Ross, K. W. (2005). <i>Computer networking: A top-down approach featuring the Internet</i>. Pearson Education. 3. Forouzan, B. A. (2007). <i>Data communications and networking</i> (4th ed.). McGraw-Hill.		
Web Resources		
1. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm 2. https://standards.ieee.org/featured/ieee-802/ 3. https://www.geeksforgeeks.org		

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/ Surprised), 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