

1. Name of the Faculty: Ved Prakash Bhardwaj	Course Code:
2. Course : Data Communication and Computer Networks	L: 3
3. Program : B.Tech-CSE	T: 0
4. Target : Level-2	P: 0
	C: 3

COURSE PLAN

Target	50% (marks)
Level-1	40% (population)
Level-2	50% (population)
Level-3	60% (population)

1. Method of Evaluation

UG	PG
Quizzes/Tests, Assignments (30%)	Quizzes/Tests, Assignments, seminar (50%)
Mid Examination (20%)	End semester (50%)
End examination (50%)	

*The internal assessment may be kept as per Program (UG/PG)

- 2 Assignments/Tests/Quizzes

Note: The concern faculty can conduct more than 2 assessment activities as per their convenience.

2. Passing Criteria

Scale	PG	UG
Out of 10 point scale	SGPA – “6.00” in each semester CGPA – “6.00” Min. Individual Course Grade – “C” Course Grade Point – “4.0”	SGPA – “5.0” in each semester CGPA – “5.0” Min. Individual Course Grade – “C” Course Grade Point – “4.0”

*for PG, passing marks are 40/100 in a paper

*for UG, passing marks are 35/100 in a paper

3. Pedagogy:

- Face to face (Context based learning)
- Online lectures (adaptive teaching)
- Problem Solving
- Class Test/Quiz/Assignments
- Concept diary (needs to be maintained by students-short and concise notes which include course concepts that he/she has understood.)

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4. References:

Text Books	Web resources	Journals	Reference books
Data Communications and Networks, Behrouz A. Forouzan, 2/e Tata Mcgrawhill, 2000	https://nptel.ac.in/courses/106/105/106105081/		Computer Networks 4/e, Andrew S. Tanenbaum, Pearson education, 2003

GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site(<https://learn.upes.ac.in>) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. Check your blackboard regularly
5. Go through study material
6. Check mails and announcements on blackboard
7. Keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. **Cell Phones and other Electronic Communication Devices:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a pass word to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

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This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail [to your concerned faculty](#). Please use an appropriate subject line to indicate your message details.

There will no doubt be many more activities in the coming weeks. So, to keep up to date with all the latest developments, please keep visiting this website regularly.

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RELATED OUTCOMES

1. The expected outcomes of the Program are:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and

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	write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. The expected outcomes of the Specific Program are: (upto3)

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques
PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	Branch Specific

3. The expected outcomes of the Course are: (minimum 3 and maximum 6)

CO 1	Discuss concepts of data communication and layered model of networks.
CO 2	Describe concepts of flow and error control in networks.
CO 3	Demonstrate various addressing schemes and routing strategies.
CO 4	Describe various functionalities at transport and application layer.

4. Co-Relationship Matrix

Indicate the relationships by 1- Slight (low) 2- Moderate (Medium) 3-Substantial (high)

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Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CO1	1	1	1	1								2	1		
CO2	2	2	2	2								2	1		
CO3	2	3	1	2								2	1		
CO4	1	2	2	2								2	1		
Average	1.5	2	1.5	1.75								2	1		

5. Course outcomes assessment plan:

components Course Outcomes	Assignment	Test/Quiz	Mid Semester	End Semester	Any other
CO 1	✓	✓	✓	✓	<input type="checkbox"/>
CO 2	✓	✓	✓	✓	<input type="checkbox"/>
CO 3	✓	✓	✓	✓	<input type="checkbox"/>
CO 4	✓	✓	<input type="checkbox"/>	✓	<input type="checkbox"/>

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BROAD PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Remarks
		From	To	No. of Sessions	
1.	Data communication			4	
2.	PHYSICAL LAYER			5	
3.	Data Link Layer			6	
4.	Network Layer			3	
5.	Routing Strategies			7	
6.	Transport Layer and Application Layer			11	

Sessions: Total No. of Instructional periods available for the course

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SESSION PLAN**UNIT-I**

Lecture No.	Topics to be Covered	CO Mapped
1	Introduction to networks, Theoretical Model for Communication	CO1
2	Analog and digital signal, Bandwidth, Noise, Channel Capacity, Data Rate,	CO1
3	Transmission Impairments, Guided Transmission Media, Wireless Transmission Media, Line of Sight Transmission	CO1
4	Concept of circuit, Message, Packet Switching with their timing diagram, Comparison of Switching Techniques	CO2

SESSION PLAN**UNIT-II**

Lecture No.	Topics to be Covered	CO Mapped
5	Evolution of computer network, layered network architecture, OSI Model,	CO2
6	ATM, Three Tier Architecture, System Network Architecture, Topology, Line Discipline,	CO2
7	ISDN, Frame Relay	CO2
8	Fast Ethernet	CO2

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9	Gigabit Ethernet, FDDI, TCP/IP Model	CO2
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SESSION PLAN

UNIT-III

Lecture No.	Topics to be Covered	CO Mapped
10	Error Detection & Correction Techniques, Hamming Code,	CO3
11	CRC, Parity Check	CO3
12	ARQ Techniques (Stop and wait Protocol), Go Back N Protocol, Selective Repeat Request, HDLC	CO3
13	TDM, FDM, CDMA,	CO3
14	ALOHA: Pure, Slotted ALOHA, CSMA, CSMA/CD	CO3
15	IEEE 802 standards for LAN & WAN: 802.3, 802.4, 802.5, 802.6, 802.2 and Their Comparison	CO3

SESSION PLAN

UNIT-IV

Lecture No.	Topics to be Covered	CO Mapped
16	Network Layer Service, Datagram and VC services,	CO4

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17	IP Datagram format and Types of Services,	CO4
18	Datagram Encapsulation and Fragmentation, IP Addressing: Subnetting and Supernetting	CO4

SESSION PLAN

UNIT-V

Lecture No.	Topics to be Covered	CO Mapped
19	Routing: Link State Routing, Distance Vector Routing,	CO4
20	Hierarchical Routing, Multicast Routing,	CO4
21	RIP, OSPF, BGP	CO4
22	IPv4: Frame Formats,	CO4
23	Introduction to ICMP,	CO4
24	DHCP, and NAT, IPv6: Frame Formats,	CO4
25	Network Management: SNMP and RMON models	CO4

SESSION PLAN

UNIT-VI

Lecture No.	Topics to be Covered	CO Mapped
26	Transport Layer Services, Relationship with network	CO5

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	and application layer	
27	Multiplexing and De multiplexing, UDP	C05
28	TCP: Header, Segment Structure, Services,	C05
29	Connection Establishment and Termination, Flow Control and Window Size Advertising,	C05
30	TCP timeout and re-transmission, Congestion control,	C05
31	TCP Fairness, Delay Modelling,	C05
32	Application Layer Protocols: HTTP	C05
33	FTP	C05
34	SNMP, DNS	C05
35	Assignment/Test/Quiz	C01, C02, C03
36	Assignment/Test/Quiz	C04, C05