

R.T.M. Nagpur University, Nagpur
FOUR YEAR B.E. COURSE
(Revised Curriculum as per AICTE Model Curriculum)
Computer Science and Engineering
B.E. Second Year Proposed Scheme

Fourth Semester:-

S N	Subject	Teaching Scheme			Evaluation Scheme			Credits	Category
		L	T	P	CA	UE	Total		
1	Discrete Mathematics and Graph Theory	03	-	-	30	70	100	03	PCC-CS
2	Data Structure and Program Design	03	01	-	30	70	100	04	PCC-CS
3	Database Managements Systems	03	01	-	30	70	100	04	PCC-CS
4	Computer Networks	03	-	-	30	70	100	03	PCC-CS
5	Theory of Computation	03	01	-	30	70	100	04	PCC-CS
6	System Programming	03	-	-	30	70	100	03	PCC-CS
7	Data Structure and Program Design-Lab	-	-	02	25	25	50	01	PCC-CS
8	Database Managements Systems-Lab	-	-	02	25	25	50	01	PCC-CS
9	Computer Workshop-II (Python)	-	-	02	25	25	50	01	PCC-CS
10	Constitution of India (Audit Course)	02	-	-	-	-	-	Audit	MC
Total		20	03	06			750	24	

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE
SEMESTER: FOURTH (C.B.C.S.)
BRANCH: COMPUTER SCIENCE & ENGINEERING

Subject: Computer Networks

Subject Code: BECSE404T

Load	Credits	Total Marks	Internal Assessment Marks	University Marks	Total
03 Hrs (Theory)	03	100	30	70	100

Aim: To understand communication and networking concepts and various protocols used in Computer Network.

Prerequisite(s): Basics of data communication and networking concepts.

Course Objectives:

1	To study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
2	To study the fundamentals and basics of Physical layer, and will apply them in real time applications.
3	To study data link layer concepts, design issues, and protocols.
4	To Gain core knowledge of Network layer routing protocols and IP addressing.
5	To study process-to-process communication and Congestion control mechanism.
6	To study about domain name, Application layer and network management.

Course Outcomes:

At the end of this course Student are able to:

CO1	Describe the functions of each layer in OSI model along with basic networking concepts.
CO2	Explain physical layer functionality and its working along with transmission media with real time applications.
CO3	Describe the functions of data link layer and explain the protocols used in data link layer.
CO4	Classify the routing protocols and analyze how to map IP addresses. Identify the issues related to transport layer, congestion control
CO5	Describe Quality of Service, DNS, Application layer protocols & Network security issues.

Unit I:

Introduction to Data Communication:

Data Communication Components, Data Representation, data flow (Simplex, Half-Duplex and Full-Duplex mode), Network Criteria, Type of connection, physical topology, Categories of Network (LAN, MAN, WAN,PAN), study of OSI reference model.

Unit II:

Physical Layer and Media:

Analog and digital Data, Analog and digital signals, TRANSMISSION MODES: Serial and Parallel transmission, Asynchronous and Synchronous Transmission. COMMUNICATION MEDIA: guided media and unguided.

Unit III:

Data Link Layer:

Types of errors, framing (character and bit stuffing), Protocols: for noiseless channels (Simplex, Stop and wait), for noisy channels (Stop and wait ARQ, Go back-N ARQ, Selective repeat ARQ), Point-to-Point (PPP), Multiple Access Protocol: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, CSMA/CA.

Unit IV:

Network Layer:

IPv4 Addresses, IP addressing Methods with sub-netting and super-netting, **Routing Protocols:** Distance Vector, Link State, Path Vector.

Transport Layer:

Duties of transport layer, Process-to-process delivery, Congestion control: Data Traffic, Congestion control Category (Open loop, closed loop),

Unit V:

Quality of Service: Introduction to QoS, Techniques to improve QoS: Leaky bucket algorithm, Token bucket algorithm.

Application Layer:

Domain Name System, Functions of Network management system, Voice over IP, Firewall

Text Books:

- B. A. Forouzan – “Data Communications and Networking (3rd Ed.)” – TMH
- A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI
- W. Stallings – “Data and Computer Communications (8th Ed.)” – PHI/ Pearson Education

Reference Books:

- Kurose and Rose – “Computer Networking -A top down approach featuring the internet” – Pearson Education
- Introduction to Data Communications and Networking by Wayne Tomasi-Pearson Edition
- Comer – “Internetworking with TCP/IP, vol. 1, 2, 3(4th Ed.)” – Pearson Education/PHI