Pandit Deendayal Energy University

School of Technology

Department of Computer Science & Engineering

Odd Semester 2023-2024

Computer Networks

Course file

Name of the course:	Commuter Networks
Course Code:	20CP301T
Program:	B. Tech.
Department:	Computer Science and Engineering
Semester:	5th semester
Academic Year:	2023-2024
Name of Course Coordinator:	Dr. Manish Paliwal
Name of Other Faculty Members:	Dr. Santosh Bharti. Dr. Ketan Sabale, Dhara Joshi, Nitin Padariya

[A]	Teaching Scheme, Lab Experiments, Prerequisites, List of Books and Reference Books.
[B]	Lesson Plan
[C]	Academic Calendar, Faculty Timetable, Class Timetable
[D]	Course Outcomes (COs)
[E]	Mapping of Course Outcomes with Program Outcomes (POs)
[F]	Evaluation Scheme and Rubrics
[G]	Class Notes, Handouts, Course Material, etc.
[H]	Course Presentations (PPTs)
[I]	Tutorials, Assignments, Case Studies, Quiz, etc.
[J]	Course related ICT: Weblinks, Software, E-books, Relevant NPTEL and MOOC, Video lectures, Blogs, Virtual Labs, Animations, Simulations etc.
[K]	Laboratory Manuals
[L]	List of International / National Journals related to the Course
[M]	List of well-known Conferences related to the Course
[N]	List of Classic Journal Papers / Articles / Review Papers related to the Course
[O]	List of Renowned Industries / Organizations / working in the Course related areas
[P]	List of Renowned Scientists / Academicians working in the Course related areas
[Q]	Copies of the MSE and ESE Question Papers and Answer Sheets
[R]	Attendance Record
[S]	Records of the Continuous Assessment (Assignment, Quiz, Laboratory Work, etc.)
[T]	Details of Remedial Classes (with evidences)
[U]	Details of Expert Lectures / Industrial Visits/Events (Only related to the Course)
[V]	List of Slow and Advanced Learners, activity planned and executed
[W]	Direct Assessment (Result of mid, end and internal assessment components)
[X]	Indirect Assessment (Exit Survey/ Post Test)
[Y]	Final Attainment of COs and POs and Interpretation
[Z]	Actions to be taken if COs and POs are not achieved

Date:

Signature of Subject Teachers | **Signature of Department Coordinator (IQAC)** | **Signature of Head of the Department**

A. Teaching Scheme, Lab Experiments, Prerequisites, List of Books and Reference Books.

Teaching Scheme

20CP301T					Computer Network			
Teaching Scheme					Examination Scheme			
L	T	P	C	Hrs./Week	Mid Sem	End Sem	IA	Total
3	0	0	3	3	25	50	25	100

Course Syllabus

UNIT 1 DATA LINK LAYER **11 Hrs.**

Introduction to computer network and internet, Layered architecture (OSI and TCP/IP), Framing, Error Control, Media Access Control (ALOHA, CSMA Bases), Ethernet 802.3, Token Ring 802.5, Reliability Issue, Sliding Window.

UNIT 2 NETWORK LAYER **10 Hrs.**

Internetworking and Routing: Best effort Service, Switching, Virtual Circuit, IP Addressing, Routing Issue, Distance Vector and Link State Routing, OSPF, BGP.

UNIT 3 TRANSPORT LAYER **12 Hrs.**

End to end delivery issues, Reliable data transfer, Congestion control, Traffic engineering and Quality of Service, TCP and UDP.

UNIT 4 APPLICATION LAYER **06 Hrs.**

DNS, FTP, HTTP, SMTP, socket Programming, Peer to Peer file sharing.

Max. 13 Hrs.

Pre-requisites course:

1.

Text /Reference Books:

1. Andrew S Tenenbaum, “Computer Networks” Pearson Education.
2. Behrouz A Forouzan, “Data Communication and Networking”, McGraw Hill
3. William Stalling, “Data and Computer Communication”, Pearson Education
4. James Kurose and Keith Rose, “Computer Networking: A Top Down Approach” Pearson Education

B. Lesson Plan

Division 3

Sr. No.	Topics To Be Covered	Planned Date	Conduction Date	Mapped CO
1	Introduction to computer network and internet	24 July 2023		CO1
2	Layered architecture (OSI and TCP/IP)	25 July 2023		CO2
3	Framing	26 July 2023		CO2
4	Error Control	01 Aug 2023		CO2
5	Media Access Control- ALOHA	02 Aug 2023		CO2
6	CSMA Bases	03 Aug 2023		CO2
7	Ethernet 802.3	07 Aug 2023		CO1
8	Token Ring 802.5	08 Aug 2023		CO1
9	Reliability Issue	09 Aug 2023		CO2
10	Sliding Window	14 Aug 2023		CO2
11	Sliding Window	16 Aug 2023		CO2
12	Internetworking and Routing	21 Aug 2023		CO3
13	Best effort Service	22 Aug 2023		CO3
14	Switching	23 Aug 2023		CO3
15	Virtual Circuit	28 Aug 2023		CO3
16	IP Addressing	29 Aug 2023		CO3
17	Routing Issue	04 Sep 2023		CO3
18	Distance Vector Routing	05 Sep 2023		CO3
19	Link State Routing.	06 Sep 2023		CO3
20	OSPF	18 Sep 2023		CO3
21	BGP	19 Sep 2023		CO3
22	End to end delivery issues	20 Sep 2023		CO5
23	End to end delivery issues	25 Sep 2023		CO5
24	Reliable data transfer	26 Sep 2023		CO5
25	Reliable data transfer	27 Sep 2023		CO5
26	Congestion control.	03 Oct 2023		CO4
27	Congestion control.	04 Oct 2023		CO4
28	Traffic engineering	09 Oct 2023		CO4
29	Traffic engineering	10 Oct 2023		CO4
30	Quality of Service	11 Oct 2023		CO4
31	TCP	16 Oct 2023		CO5
32	TCP	17 Oct 2023		CO5
33	UDP	18 Oct 2023		CO5
34	DNS	23 Oct 2023		CO6
35	FTP	25 Oct 2023		CO6
36	HTTP	30 Oct 2023		CO6
37	SMTP	31 Oct 2023		CO6
38	Socket Programming	01 Nov 2023		CO6
39	Peer to Peer file sharing	06 Nov 2023		CO6

C. Academic Calendar, Faculty Timetable, Class Timetable

Academic Calendar 2023-24 (Odd Semester)

PANDIT DEENDAYAL ENERGY UNIVERSITY
Academic Calendar: 2023-24

Odd Semester: UG Sem.1/3/5/7 & PG Sem. 1/3 (FoET) & UG Sem. 1/3/5/7 & PG Sem 1/3 (FoLS)	
Particulars	Date
Semester Registration & Commencement of classes-FoET & FoLS- 1st Sem	17th July (Mon) 2023
Semester Registration, Department Orientation & Commencement of classes for 3/5/7 Sem – FoET & FoLS	24th Jul (Mon). 2023
Evaluation of Rural Internship/CSSI & Evaluation of Industry Orientation, & Evaluation of Industrial Internship	7th (Mon)-11th (Fri)Aug. 2023
Independence Day Celebration	15th Aug. (Thes) 2023
Attendance Review-1 (After 4 week)	17th (Thur)-18th (Fri) Aug. 2023
Internal Assesment-1 (Quiz, Test, Assignment etc.)** Student mentoring week – 1	21st (Mon)-25th (Fri)Aug. 2023
Mid Semester Examination / Project Phase 1 Review	11th Sept. (Mon) 2023 Onwards
Attendance Review-2 (After 8 week)	14th (Thur)-15th (Fri)Sept 2023
Parent Teacher Meeting (Saturday)	23rd Sept.(Sat) 2023
Last date of showing evaluated answer books of Mid Semester Examination	27th Sept. (Wed) 2023
Declaration of Mid Semester Exam Result	6th Oct. (Fri) 2023
360 Degree Feedback from Students by School Admin	9th (Mon)-13th (Fri)Oct. 2023
Attendance Review-3 (After 12 week)	12th (Thur)-13th (Fri)Oct 2023
Rangtaal – Navratri Celebration	13th Oct.(Fri) 2023
Internal Assesment-2 (Quiz, Test, Assignment etc)** Student mentoring week – 2	25th (Wed)-31st (Tues)Oct. 2023
Tesseract – The Science & Technical Fest	03(Fri)-04(Sat)-05(Sun) Nov. 2023
Declaration of Detention list of students (during 13th Week)	By 20th Oct (Fri) 2023
Diwali Vacation	13th (Mon)-17th (Fri) Nov. 2023
Classes End	21st (Tues) Nov. 2023
Practical Examinations, submission of Term Work and Seminars	22nd Nov.(Wed) 2023 Onwards
Dissertation presentation for UG and PG for FOLS	22nd Nov.(Wed) 2023 onwards
End Semester Examinations - FoET& FoLS	28th Nov.(Tues) 2023 Onwards
Last date of Submission of Marks of End sem. Exam	15th Dec. (Fri) 2023
Rural Internship for FoLS students	During Dec 2023
Project Phase I Exam for PG program of FoET & Progress Review for Ph. D.	18th (Mon)-22nd (Fri)Dec. 2023
Winter Break	26th (Tues)-29th (Fri)Dec. 2023
Alumni Day	29th Dec (Fri) 2023

Faculty Timetable

Manish Paliwal
Computer Science &Engineering

Autumn Semester 2023 w.e.f : 24th July 2023

Day	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
Monday		G1G2 (23CP403T) F-302, CP(7) - L		G5G6 (20CP301T) F-504, CP(5) - L			G5 (20CP301P) E112-113, CP(5) - P				
Tuesday			G7G8 (23CP403T) F-402, CP(7) - L	G5G6 (20CP301T) F-504, CP(5) - L							
Wednesday							G5G6 (20CP301T) F-504, CP(5) - L		G8 (23CP403P) F-202, CP(7) - P		
Thursday				G2 (23CP403P) F-202, CP(7) - P					G7 (23CP403P) F-203, CP(7) - P		
Friday				G1 (23CP403P) F-202, CP(7) - P			G1 (20CP301P) E112-113, CP(5) - P				

Location Abbr.	Location Name
E112-113	E, Wireless Computing Lab
F-202	F, AI-ML LAB
F-203	F, Security &Comp. Lab
F-302	F, Lecture Hall
F-402	F, Lecture Hall
F-504	F, Lecture Hall

Subject Abbr.	Subject Name
20CP301T	Computer Network
20CP301P	Computer Network - Lab
23CP403P	Internet of Things Lab
23CP403T	Internet of Things

Class Timetable

Division 3

Pandit Deendayal Energy University
School of Technology
B.Tech - Computer Engineering
Semester : 5 (3)

Autumn Semester 2023 w.e.f : 24th July 2023

Day	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
Monday		G5G6 (23CP301T) D008, SOVY-L		G5G6 (20CP301T) F-504, MAPL-L		G (OE3) F-404, OE4F-L	G6 (20CP301P) E112-113, KSL-P		G1 (23CP302P) F-104, SVS-P		
		G1G2 (23CP305T) F-504, PCH-L					G5 (20CP301P) E112-113, MAPL-P		G1 (23CP301P) F-203, RUZ-P		
		G3G4 (23CP301T) E203, VIMI-L							G4 (23CP301P) F-401, VIMI-P		
		G1G2 (23CP301T) E204, RUZ-L							G1G2 (23CP305P) E112-113, PCH-P		
		G1G2 (23CP302T) F-401, SVS-L							G7 (23CP301P) E216, SOVY-P		
Tuesday		G1G2 (23CP302T) F-401, SVS-L	G5G6 (20CP302T) F-504, SVS-L	G5G6 (20CP301T) F-504, MAPL-L		G (OE3) F-404, OE4F-L	G5G6 (CDC) F-402, CDCT-L	G5G6 (20CP304T) F-404, HAK-L	G5 (23CP306P) F-202, KMS-P		
		G1G2 (23CP301T) E204, RUZ-L							G6 (20CP304P) F-103, ARL-P		
		G3G4 (23CP301T) E203, VIMI-L									
		G1G2 (23CP305T) F-504, PCH-L									
		G5G6 (23CP301T) D007, SOVY-L									
Wednesday		G5G6 (20CP302T) F-504, SVS-L	G5G6 (20CP303T) F-504, KBT-L	G5G6 (20CP303T) F-504, KBT-L		G (OE3) F-404, OE4F-L	G5G6 (20CP301T) F-504, MAPL-L	G5G6 (20CP304T) E005, HAK-L	G5 (20CP304P) E216, HAK-P		
									G6 (20CP302P) F-504, SVS-P		
Thursday		G5 (23CP301P) F-202, VIMI-P		G5G6 (20CP303T) F-504, KBT-L		G5G6 (20IF201T) E004, RSX-L	G6 (23CP306P) F-203, RJSC-P		G5G6 (20IF201P) E-PDV-SIE, CHJH-P		
		G8 (23CP301P) E215, SOVY-P				G5G6 (20IF201T) E004, I4-E-L	G5 (20CP302P) F-401, SVS-P		G5G6 (20IF201P) E-AML-SIE, MBK-P		
		G2 (23CP301P) F-203, RUZ-P				G5G6 (20IF201T) E004, I4-M-L			G5G6 (20IF201P) C203, GAM-P		
						G5G6 (20IF201T) E004, I4V1-L			G5G6 (20IF201P) C206, MNP-P		
Friday		G6 (23CP301P) E213, VIMI-P		G5G6 (20CP302T) F-504, SVS-L		G5G6 (20IF201T) E004, RSX-L	G5G6 (23CP306T) F-403, RIMO-L	G5G6 (CDC) F-403, CDCT-L			
		G9 (23CP301P) E216, SOVY-P				G5G6 (20IF201T) E004, I4-E-L					
		G3 (23CP301P) F-203, RUZ-P				G5G6 (20IF201T) E004, I4-M-L					
						G5G6 (20IF201T) E004, I4V1-L					

Faculty Abbr.	Faculty Name
ARL	Ashka Raval
CDCT	CD Cell Trainer
CHJH	Chandan Kumar Jha (Visiting Fac)
GAM	Garima Mishra
HAK	Hargeet Kaur
I4-E	Industrial 4.0 Electrical Faculty
I4-M	Industrial 4.0 Mechanical Faculty
I4V1	Industry4.0 Faculty_ICT_1
KBT	Krishna Brahmabhatt
KMS	Komal Singh
KSL	Ketan Sable
MAPL	Manish Paliwal
MBK	M B KIRAN
MNP	Manan Patthak-VF
OE4F	OE Fac
PCH	Payal Chaudhari
PCH	Payal Chaudhary
RIMO	Ritiksha Modi (ADF)
RJSC	Rinkle Jain
RSX	Rajat Saxena
RUZ	Rutvij H Jhaveri
SOVY	Soham Vyas
SVS	Shivangi Surati
VIMI	Vipul Mishra

Subject Abbr.	Subject Name
20CP301T	Computer Network
20CP302P	System Software & Compiler Design - Lab
20CP302T	System Software & Compiler Design
20CP303T	Software Engineering
20CP304T	Information Security
20CP301P	Computer Network - Lab
20CP304P	Information Security - Lab.
20IF201P	Industry 4.0 Lab
20IF201T	Industry 4.0
23CP301P	Advanced Python Programming - Lab.
23CP301T	Advanced Python Programming
23CP302P	Computer Graphics - Lab.
23CP302T	Computer Graphics
23CP305P	Advanced Java - Lab
23CP305T	Advanced Java
23CP306P	Introduction to Web Technology - Lab
23CP306T	Introduction to Web Technology
CDC	CDC
OE3	OE Sem 5

Office Hours:

Day: Tuesday

Time: 3 PM – 5 PM

Venue: F – 205

D. Course Outcomes (COs)

On completion of the course, student will be able to

CO1 – Identify the components requires to build different types of networks.

CO2 – Discuss the functionality at each layer for the given application

CO3 - Illustrate the topological and routing strategies for an IP based networking infrastructure.

CO4 – Analyze traffic congestion methods in networks.

CO5 – Explain the flow of information from one node to other in simple network.

CO6 – Discuss various chat application using socket programming.

E. Mapping of Course Outcomes with Program Outcomes (POs)

Course Articulation Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
1	3	1	-	-	1	1	-	1	2	1	1	3	3	1	3
2	3	2	-	-	2	1	-	1	2	1	1	3	3	1	3
3	3	2	2	1	1	1	-	1	2	1	1	3	3	1	3
4	3	3	1	1	1	1	-	1	2	1	1	3	3	1	3
5	3	2	1	-	1	1	-	1	2	1	1	3	3	1	3
6	3	2	1	1	1	1	-	1	2	1	1	3	3	1	3

Program Articulation Matrix

PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
3	2	0.83	0.50	1.17	1	0	1	2	1	1	3	3	1	3

Correlation levels 1, 2 and 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

F. Evaluation Scheme and Rubrics

Assessment Method	Assessment Tool	Description	Marks	Mapping with CO	Contribution to CO's
Direct	Mid Semester Examination	Unit 1 and Unit 2	50	CO-1 & CO-2	It contributes to 25% weightage of Direct Assessment to CO attainment.
	Internal Evaluation	Test (10 Marks), Assignment (05 Marks) and Quiz (10 Marks)	25	All CO's	It contributes to 25% weightage of Direct Assessment to CO attainment.
Direct	End Semester Examination	**Topics to be covered:** Unit 1, Unit 2, Unit 3 and Unit 4	100	All CO's	It contributes to 50% weightage of Direct Assessment to CO attainment.

G. Class Notes, Handouts, Course Material, etc.

Class Notes are uploaded on MS Teams when the topic is finished in class.

H. Course Presentations (PPTs)

I. Tutorials, Assignments, Case Studies, Quiz, etc.

J. Course related ICT: Weblinks, Software, E-books, Relevant NPTEL and MOOC, Video lectures, Blogs, Virtual Labs, Animations, Simulations etc.

Materials from national and international levels like NPTEL, MIT etc., are shared related to the course domain.

1. NPTEL: https://onlinecourses.nptel.ac.in/noc22_cs19/preview
2. MIT: https://ocw.mit.edu/courses/6-829-computer-networks-fall-2002/

Video Lectures Series:

Computer Networks Full Course - Ravindrababu Ravula

https://www.youtube.com/watch?v=UXMIxCYZu8o&list=PLEbnTDJUr_IegfoqO4iPnPYQui46QqT0j

K. Laboratory Manuals

Laboratory Manual is attached at the end of this course file.

L. List of International / National Journals related to the Course

Following are the reputed international journals related to the course:

1. COMPUTER NETWORKS: ELSEVIER
2. JOURNAL OF NETWORK AND COMPUTER APPLICATIONS
3. IEEE ACCESS
4. IET NETWORKS

M.List of well-known Conferences related to the Course

Following are the list of well-known conferences related to the course:

1. ACM Conference on Computer and Communications Security (CCS)
2. IEEE International Conference on Computer Communications
3. ACM Special Interest Group on Data Communication
4. IEEE International Conference on Communications

N. List of Classic Journal Papers / Articles / Review Papers related to the Course

1. Personalized federated learning framework for network traffic anomaly detection
2. Toward feasible machine learning model updates in network-based intrusion detection
3. Secure medical data management with privacy-preservation and authentication properties in smart healthcare system
4. Graph-based deep learning for communication networks: A survey

O. List of Renowned Industries / Organizations / working in the Course related areas

Following are the institutes/ organizations that are working in the course related areas:

1. CISCO
2. Juniper Networks
3. Wireless Information Networking Group (WiNG) – NITK
4. Criterion Networks

P. List of Renowned Scientists / Academicians working in the Course related areas

1. Dr. Ashwin Gumaste, Professor, Computer Science and Engineering, Indian Institute of Technology, Bombay.
2. Dr. Bhaskaran Raman, Professor, Computer Science and Engineering, Indian Institute of Technology, Bombay
3. Dr. U. A. Deshpande, Professor, Computer Science and Engineering, Visvesvaraya National Institute of Technology –Nagpur
4. Dr. Sameer Kulkarni, Assistant Professor, Computer Science and Engineering, Indian Institute of Technology, Gandhinagar

Q. Copies of the MSE and ESE Question Papers and Answer Sheets

R. Attendance Record

S. Records of the Continuous Assessment (Assignment, Quiz, Laboratory Work, etc.)

T. Details of Remedial Classes (with evidences)

Attendance of Remedial Class

U. Details of Expert Lectures / Industrial Visits/Events (Only related to the Course)

Not applicable for this course.

V. List of Slow and Advanced Learners, activity planned and executed

W. Direct Assessment (Result of mid, end and internal assessment components)

X. Indirect Assessment (Exit Survey/ Post Test)

Y. Final Attainment of COs and POs and Interpretation

Z. Actions to be taken if COs and POs are not achieved