GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/ Spec.	Computer Science & Engineering Computer Science & Engineering (Big Data and Analytics) Computer Science & Engineering (Cyber Security) Computer Science & Engineering (Artificial Intelligence and Machine Learning)
Semester	II	Version	1.0.0.0
Course Code	2ESC1116	Course Name	BASICS OF COMMUNICATION SYSTEM
Effective from Academic Year	2026-27	Effective for the batch admitted in	July 2026
Course Category	ESC		

Teaching, Learning, and Examination Scheme

Teaching & Learning Scheme							Examination scheme (Marks)					
Hours (per week)				Cr	SL	TSL	Theory			Practical		
L	TU	P	TTH				CE	SEE	Total	CE	SEE	Total
3	0	2	5	4	45	120	50	50	100	25	25	50

L: Lecture, TU: Tutorial, P: Practical, TTH: Total Teaching Hours/Week, Cr: Credit, SL: Min. Self Learning/Term Work Hours/Sem, TSL: Min. Total Teaching & Learning Hours/Sem, CE: Continuous Evaluation, SEE: Semester End Examination,

Pre-requisites

Digital Electronics

Course Outcomes

COs	After completing the Course, students will be able to
CO1	Understand the basics of communication system and its components.
CO2	Understand analog and digital communication techniques.
CO3	Learn the various network topologies, network types, and architectures
CO4	Design various wired networks with active and passive components.

Theory Syllabus

Unit	Content	Hrs
1	**Network Fundamentals** Data Communications, Networks, Data Representation, Data Flow, Network Criteria, Physical Structures, Network Models, Network Topologies, Intranet, The Internet, Protocols and Standards, Components of a computer network (Repeater, Hub, Switch, Bridge, Router), Gateway	6
2	**Transmission Media** Guided Media – Twisted Pair, Coaxial, and Fiber-Optic Cable, Unguided Media – Radio Waves	4
3	**Network Architecture** Layered Tasks, Sender, Receiver, and Carrier Hierarchy, The OSI Model, Layers in the OSI Model, TCP/IP Protocol suit, Addressing – Physical, Logical, Por,t and Specific Addresses	5
4	**Basics of IP Addressing** IPv4 address types, IP addressing schemes (Classful and classless IP Addressing), Subnetting (subnet mask, network address, broadcast address), IP Configuration	6
5	**Data and Signals** Analog and Digital Signals, Periodic and Non-periodic Signals, Sine Wave, Phase, Wavelength, Time and Frequency Domains, Composite Signals, Bandwidth, Bit Rate, Bit Length, Transmission of Digital Signals, Transmission Impairment, Data Rate Limits, Performance – Bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter	6
6	**Analog Transmission** Digital-to-Analog Conversion, Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Quadrature Amplitude Modulation, Analog-to-Analog Conversion, Amplitude Modulation, Frequency	6

	Modulation	
7	**Digital Transmission** Digital-to-Digital Conversion, Line Coding, Line Coding Schemes, Scrambling, Analog-to-Digital Conversion, PCM	6
8	**Bandwidth Utilization: Multiplexing and Spreading** Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Synchronous and Statistical Time-Division Multiplexing, Spread Spectrum (FHSS, DSSS)	6

Practical Content
Practical will be based on topics like basic networks, network commands, AM-Fm system, sampling theorem, digital techniques and line coding techniques.

Text Books	
1	Data Communication and Networking By – Behrouz A Forouzan

Reference Books	
1	Data and Computer Communication By – William Stalling
2	Computer Networks By – Andrew S Tanenbaum

ICT/MOOCs Reference	
1	Course Name:Basics of Communication Systems https://nptel.ac.in/courses/108104091

Mapping of Cos, POs, and PSOs

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3
CO1	2	1	1	1	2	2	0	2	1	2	2	2	1	2
CO2	2	1	1	1	2	0	0	1	0	1	1	2	2	3
CO3	3	2	3	2	3	3	2	3	2	3	3	3	2	3
CO4	2	2	1	0	1	0	0	2	1	2	2	1	1	2

Unit	Unit Title	Aligned COs	Learning Hours	BTL Level
1	Network Fundamentals	1,3	6	R,U
2	Transmission Media	1,2	4	R,U
3	Network Architecture	1,2,3,4	5	U,A,N
4	Basics of IP Addressing	1,2	6	R,U,A
5	Data and Signals	2,4	6	R,U,E
6	Analog Transmission	2,4	6	U,A,N,E
7	Digital Transmission	2,4	6	U,A,N,E
8	Bandwidth Utilization: Multiplexing and Spreading	1,4	6	A,N,E

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- L=Lecture, TU=Tutorial, P= Practical/Lab., TW= Term work, DT= Direct Teaching, Lab.= Laboratory work CE= Continuous Evaluation, SEE= Semester End Examination
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- As per NCrF/NEP 2020, Minimum Self-Learning or Term Work Hours per Semester should be calculated in such a way that 1 Credit should have minimum 30 Hours of Teaching and Self Learning Engagement per semester