

**NIRMA UNIVERSITY**  
**Institute of Technology**  
**B. Tech. in Electrical Engineering**  
**Semester – VI**

L	T	P	C
3	0	0	3

<b>Course Code</b>	<b>2EEDE06</b>
<b>Course Title</b>	<b>Analog and Digital Communications</b>

**Course Outcomes (COs):**

At the end of the course, students will be able to –

1. apply concepts of analog and digital communications
2. choose and decide relevant communication protocol
3. select and apply specific communication protocol for electrical application

**Syllabus:**

**Teaching Hours: 45**

**Unit-0: Introduction to Analog and Digital Communications** **01**

**Unit-1: Basics of Analog Communications** **09**

Concept of modulation and demodulation amplitude modulation, angle modulation - phase modulation & frequency modulation. Representation of narrowband noise; receiver model, signal to noise ratio (SNR), noise figure, noise temperature, noise in AM & FM receivers

**Unit-2: Digital Communication** **10**

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) Minimum Shift Keying (MSK) –Phase Shift Keying (PSK) – BPSK – QPSK – 8 PSK – 16 PSK – Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM)

**Unit-3: Communication Protocols** **15**

Local Area Network, Internet Protocol, Wireless and Mobile networks, Broadband over powerline, HomePlug™, IEEE 802.15.4 (Zigbee™), ZWave™, GSM, CDMA, Modbus, Canbus, I2C, Power consumption in various protocols, Security in various protocols, Fiber optics

**Unit-4: Applications in Electrical Engineering** **10**

Smart grid, V2G and G2V, PLCC, SCADA and HMI, Condition Monitoring, Smart Substations, Smart Homes, Smart Vehicles

**Self-Study:**

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

**Suggested Readings:**

1. Behrouz Forouzan, Introduction to Data Communication and Networking, Tata McGraw Hill
2. William Stallings, Data and Computer Communication, PHI

3. Schweber W.L, Data Communication, Tata McGraw Hill
4. Andrew S Tanenbaum, Computer Networks, PHI
5. B.P. Lathi, Zhi Ding, Modern Digital and Analog Communication, Oxford University Press
6. Various IEEE Communication Standards and Protocols, Literature available from institutions / industries working in the field of condition monitoring, electric vehicles, smart grids, IoT

L = Lecture, T = Tutorial, P = Practical, C = Credit

w.e.f. academic year 2020-21 and onwards