

**JYOTI NIVAS COLLEGE AUTONOMOUS**  
**SYLLABUS FOR 2024-25 Batch Onwards**  
**(According to SEP -2024 Regulations)**  
**Programme: B.Sc.**  
**FOURTH SEMESTER SYLLABUS**  
**Title: ADVANCED COMMUNICATION**

**Course Code: ELE-CT-4**

**No. of Hours: 52**

**Course Objectives:**

- To understand the communication system block diagram, Propagation of EM waves, parameters of Antenna & Transmission Lines.
- To study analog, digital modulation and pulse communication.
- To get familiarize with satellite and Radar Systems.
- To understand working of optical fibre communication.

**Learning Outcomes:**

- Able to analyse EM propagation, radiation mechanism in antenna and types of Noise.
- Analyse analog and digital modulation and pulse communication
- Have the basic understanding of working of transponder and ground station.
- Understand the light propagation through fibre and various losses in OFC.

**UNIT I: Introduction to Communication**

**13 Hrs**

Communication- means and modes. Block diagram of an electronics communication system, Electromagnetic Spectrum-Terrestrial Propagation of EM Waves-Surface Waves, Space Waves and Sky Wave Propagation. Transmission Lines-Types-Equivalent Circuit of Transmission Line-Primary and Secondary Constants. (only Qualitative). Antenna Radiation Mechanism, Antenna Parameters- Directive gain, Radiation resistance, Efficiency, Bandwidth, Beam width. Resonant and non-resonant antenna, Yagi-Uda Antenna- construction and applications. Types of Noise - Internal and External Noise, Signal to Noise Ratio, Noise Figure.

**UNIT II Analog and Digital Modulation**

**13 Hrs**

**Amplitude Modulation** representation, modulation index, instantaneous voltage, frequency spectrum, power relations. Limitations of AM.

**Frequency Modulation**- representation, modulation index, frequency spectrum, bandwidth requirements, frequency deviation and carrier swing.

**Pulse Modulation**- Types, PAM, PWM and PPM. Detailed discussion of PCM with its advantages, disadvantages and applications.

**Digital Communication:** Block diagram of digital communication, Advantage and disadvantages of digital transmission systems.

**Characteristics of data transmission circuits**-Shannon limit for information capacity. Bit Rate and Baud, bandwidth requirements, data transmission speed, noise, cross talk, echo suppressors, distortion and equalizer.

**Digital Modulation** — Types (ASK, FSK, PSK, QPSK, 16QAM and 64 QAM), definition and waveforms and applications of each. MODEM, modes.

## **UNIT III Satellite communication and Radar Systems**

**13Hrs**

### **SATELLITE COMMUNICATION**

Introduction, need, types of orbits, geosynchronous satellite orbits, advantages of geostationary satellites. Satellite visibility, Block diagram of satellite transponder, Uplink and downlink systems, simplified block diagram of satellite earth station, path loss. Multiplexing-TDMA, FDMA, CDMA.

### **RADAR SYSTEMS**

RADAR – Principle, frequencies and power used in RADAR, maximum unambiguous range, detailed block diagram of pulsed RADAR system, RADAR range equation-derivation, factors influencing maximum range, block diagram of MTI, effect of ground on RADAR antenna characteristics

## **UNIT IV: Optical Fiber Communication**

**13 Hrs**

Introduction, need for OFC. Block diagram of OFC system. Fiber optic cables, light propagation through fibre – step index fibre, graded index fibre, Snell's law, numerical aperture (derivation), numerical examples. Types of optical fibre cables, light sources – requirements, LEDs and semiconductor laser diodes. Photo detectors – PN, PIN and avalanche photodiodes. Losses in optical fibres – Rayleigh scattering, absorption, leaky modes, bending, joint junction losses. Advantages and disadvantages of OFC over metallic cables.

### **TEXT BOOKS**

1. Electronic Communication Systems, Kennedy & Davis, IV th Edition-TMH-1999.
2. Electronic Communication Systems-Wayne Tomasi, Vth Edition- Pearson Education-2006
3. Introduction to RADAR systems – Skolnik- McGraw Hill. Edition 2001.
4. Optical Fibre Communication- Gerd Keiser, 3rd Edition, McGraw Hill.
5. Modern Digital and Analog Communication Systems-P. Lathi, 4th Edition, Oxford University Press.

### **REFERENCE BOOKS**

1. Electronic Communications, Dennis Roddy & John Coolen- IV th Edition-PHI-1997.
2. B. P. Lathi and ZhiDing, "Modern Digital and Analog Communication Systems", Oxford University Press,4thEdition, 2010
3. An Engineering Approach on Computer Networking”, S. Keshav, Addison Wesley.

## **Title: ADVANCED COMMUNICATION LAB**

### **LIST OF EXPERIMENTS (Any 10 Experiments to be performed.)**

1. Amplitude modulation and demodulation.
2. Frequency modulation.
3. Pre- Emphasis and de emphasis
4. Saw tooth wave generator using IC555.
5. Schmitt Trigger using IC555.
6. Audio cross over network.
7. Band eliminator filter.
8. PAM
9. PWM
10. Study of ASK generation and Detection
11. Study of FSK generation and Detection.
12. Numerical Aperture of OFC.

**JYOTI NIVAS COLLEGE AUTONOMOUS**  
**Curriculum for B.Sc. ELECTRONICS**  
**(According to SEP – 2024 Regulations)**

**Unit wise Distribution of Questions**

**Third Semester**

**Title: Embedded C and Digital Design Using Verilog**

Course Code: ELE-CT-3

No. of Hours: 52 Hrs

	Unit wise distribution of Questions		
UNIT	PART A	PART B	PART C
1	3	2	1
2	3	2	1
3	3	2	1
4	3	2	1

**Elective Paper:**

Title: ROBOTICS

Course Code: ELE-P1

No. of Hours: 30 Hrs.

	Unit wise distribution of Questions		
UNIT	PART A	PART B	PART C
1	3	4	1
2	4	3	1

**Fourth Semester**

**Title: ADVANCED COMMUNICATION**

Course Code: ELE-CT-4

No. of Hours: 52 Hrs

	Unit wise distribution of Questions		
UNIT	PART A	PART B	PART C
1	3	2	1
2	3	2	1
3	3	2	1
4	3	2	1

**Elective Paper:**

**Title: Microcontroller 8051**

Course Code: ELE-P2

No. of Hours: 30 Hrs.

	Unit wise distribution of Questions		
UNIT	PART A	PART B	PART C
1	4	3	1
2	3	4	1

# JYOTI NIVAS COLLEGE AUTONOMOUS

## Curriculum for B.Sc. ELECTRONICS

(According to SEP – 2024 Regulations)

### III and IV Semester B. Sc Electronics

**Theory Question Paper Pattern: 80 Marks**

SLNO.	Type	No of Questions	Marks	Total
1	Short Answer type questions (Part A)	10/12	2	20
2	Descriptive questions (Part B)	5/8	6	30
3	Problem/Analysis (Part C) (Single/Multiple Questions)	3/4	10	30
	<b>Total Marks</b>			<b>80</b>

**Internal Assessment marks allotment for Theory: 20 Marks**

SLNO.	Type	Marks
1	Assignments/Seminars/Reports/Exhibitions/Projects/Active participation in Electronics Technical Competitions	10
2	Internal Test (Minimum of two)	10
	<b>Total Marks</b>	<b>20</b>

**Scheme for Practical Exam: 40 Marks**

#### III Semester LAB: Embedded C and Digital Design using Verilog.

SLNO.	Particulars	Marks
1.	Writing two programs	12
2.	Performance, Execution /Results / output (Any one Program Execution)	15
3	Viva Voice	03
	<b>Total</b>	<b>35</b>
4.	Practical Record Book	05
	<b>Total Marks</b>	<b>40</b>

#### IV Semester LAB: Advanced Communication Lab

SLNO.	Particulars	Marks
1.	Write up-Circuit diagram, Tabular column, Formulae	12
2.	Performance, Tabulation, Results	15
3	Viva Voice	03
	<b>Total</b>	<b>35</b>
4.	Practical Record Book	05
	<b>Total Marks</b>	<b>40</b>

**Internal Assessment marks allotment for Practicals :10Marks**

SLNO.	Type	Questions
1	Assignments/Seminars/Reports/Projects/Active /any 3 Simulation Experiment performance completed	05
2	Internal Tests	05
	<b>Total Marks</b>	<b>10</b>