FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: **Bachelor of Technology (Electrical Engineering)**

Semester: **V**

Course Code: **202060521**

Course Title: **Principles of Electronics Communication**

Course Group: **Open Elective**

Course Objectives: This course provides an understanding of the fundamental concept of analog and digital communication systems. Study various modulation and demodulation techniques and its applications. Further it explores the application domain of telecommunication, Optical, Satellite, Cellular mobile and wireless technologies.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		
Lecture	Tutorial	Practical		Internal	External	Internal	External	Total
2	0	2	3	50/18	50/17	25/9	25/9	150/53

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction:** Overview of Communication system, Evolution of Communication System, Elements of Communication systems, Types of electronic communications, Baseband signals and baseband transmission, Bandwidth requirements, Communication channels.	4
2	**Modulation & Demodulation Schemes:** Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels. Analog Modulation (AM), Frequency modulation (FM), Pulse Modulation - PAM, PWM, PCM, Digital Modulation Techniques - ASK, FSK, PSK, QPSK modulation, and demodulation schemes.	6

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3	**Telecommunication Systems:** Telephones Telephone system, Paging systems, Internet, Telephony. **Networking and Local Area Networks:** Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.	**6**
4	**Satellite Communication:** Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems. **Optical Communication:** Optical Principles, Optical Communication Systems, Fibre optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.	**6**
5	**Cellular and Mobile Communications:** Cellular telephone systems, AMPS, GSM, CDMA and WCDMA. **Wireless Technologies:** Wireless LAN, PANs and Bluetooth, Zig Bee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.	**6**
		28

List of Practicals / Tutorials:

1	To Study Amplitude Modulation and Demodulation using Kit and measure Modulation Index. Simulate Amplitude Modulation in MATLAB and plot the AM wave and its frequency spectrum.
2	To Study Frequency Modulation and Demodulation using Kit and MATLAB simulation.
3	To Study Sampling and Reconstruction of signal using kit (ST-2102), and MATLAB simulation for sampling theorem.
4	To Study Pulse Modulation (PAM, PWM, PPM) using kit (ST-2110) and Pulse Code Modulation (PCM) using (ST- 2103) kit.
5	To Study ASK, FSK and BPSK Modulation Schemes using kit (ST-2106 and ST-2107) and observe their Power Spectral Density on MSO.
6	To Study DTMF Telephone Trainer Kit (2654).
7	(a) Introduction to basic IP commands. (b) To implement Network Topology on Cisco Packet Tracer.
8	Study experimental set up for establishment of Analog satellite Link - with and without an Emulator.
9	To study Fibre Optic Link: (a) To Setting up of Fibre optic Analog link using ST-2501. (b) To study setting up of Fibre optic Digital link ST-2501.
10	To verify AT commands and introduction to GSM trainer kit ST-2133
11	To Study Time Division Multiplexing [TDM] and Frequency Division Multiplexing [FDM] using kit.

Reference Books:

1	H. Taub and D. L. Schilling, **Principles of Communication Systems**, Tata McGraw Hill, 2011.
2	P. E. Harold, Stern Samy and A. Mahmond, **Communication Systems**, Pearson Edition, 2004.

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3	Louis E. Frenzel, **Principles of Electronic Communication Systems**, McGraw Hill publications, 3rd Edition, 2008.
4	S. Haykin**, Communications Systems**, John Wiley and Sons, 2001.
5	G. Kennedy and B. Davis, **Electronic Communication Systems**, McGraw Hill, 2002.

Supplementary learning Material:	
1	NPTEL and Coursera Video lectures

Pedagogy:
Direct classroom teaching
Audio Visual presentations/demonstrations
Assignments/Quiz
Continuous assessment
Interactive methods
Seminar/Poster Presentation
Industrial/ Field visits
Course Projects

Internal Evaluation:
The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
10	30	10	15	20	15	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand communication systems and its terminologies.	**20**
CO-2	Describe the theory of amplitude, angle, pulse and digital modulation techniques	**20**
CO-3	Understanding of fibre optic technology and satellite communication.	**30**
CO-4	Understanding of cellular and mobile technologies.	**30**

Curriculum Revision:	
Version:	2.0

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Drafted on (Month-Year):	June -2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025

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