## CS010 404 SIGNALS AND COMMUNICATION SYSTEMS

**Teaching scheme Credits: 4**

**Module 1 (15 hrs):-**

Introduction to Signals:- Continuous Time Signals- Discrete Time Signals- Signal Operations- Properties of Signals(Periodicity and Symmetry), Frequency Domain Representation of Continuous Time Signals-Continuous Time Fourier Series(CTFS)- Definition- properties- Examples, Continuous Time Fourier Transform(CTFT)- Definition- Properties – Examples- Concept of Frequency Spectrum, Sampling- The Sampling Theorem(proof not required)- Quantisation.

**Module 2 (12 hrs):-**

Communication Systems:- Architecture of a Typical Communication System – Basic problems in Signal Transmission - Noise – Types of Noise- Internal and External Noise, Cross Talk- Typical parameters of Communication Systems- Signal propagation Delay, Signal to Noise Ratio, Attenuation, Bandwidth Communication Channels:- Twisted Pairs- Coaxial Cables- Fiber Optic Cables- Capacity of a Noisy Channel- Shannon Hartley Theorem.

**Module 3: (15 Hrs):-**

Modulation- Need for Modulation

Analog Modulation- Types of analog modulation- Amplitude Modulation, Frequency modulation, Phase modulation, Pulse Modulation Schemes- Pulse Amplitude modulation(PAM), Pulse Width Modulation(PWM), Pulse Position Modulation(PPM), Pulse Code Modulation(PCM),Delta modulation, Sample problems based on different modulation methods.

Digital modulation;- Amplitude Shift Keying(ASK), Frequency Shift keying(FSK),Phase Shift Keying(PSK), Quadrature Amplitude modulation (QAM), Differential Phase Shift Keying(DPSK).

**Module 4: (8 Hrs):-**

Multiplexing:-Time Division Multiplexing(TDM)- Frequency Division Multiplexing(FDM)- Wavelength Division multiplexing(WDM).
Switching:- Circuit, Packet and Message Switching Schemes, Case Study:- SONET( Basic ideas only)- Datagrams and virtual Circuits.
Digital Transmission:- Analog to Digital Converter(ADC), Serial and parallel Transmission- Simplex, Half Duplex and Full Duplex Transmissions.

**Module 5: (10 Hrs):-**

Error Correction and Detection;- Line Coding Schemes- Block Coding- Convolution Coding- Hamming Codes
Transmission Codes:- Different Character Codes- ASCII, EBCDIC, Baudot Code, Bar Coding, Parity Coding.