Course Code (L): Signal Systems and Communication Lab

Programme: B.Tech. (ECE and CCE) **Year:** 2nd Year **Semester:** II
Course: Core for ECE & CCE Students **Credits:** 2 **Hours:** 30

Course Context and Overview (100 words):
The laboratory experiments have been designed to provide practical understanding of signal representation and communication systems. The experiments are covered closely in synchronization with the courses, namely Principles of Communication and Signal, Systems & Control. The students will learn how to apply the Fourier series and Fourier transforms, analysis to observe the signal characteristics in the frequency domain. The students are also familiar with the basic modulation techniques,viz, linear and angular, demodulation techniques, and the associated blocks which will help them to design communication systems in the future. Phase locked loop is one of such blocks which has wide application in communication systems and the students applied this to frequency modulation (FM) technique.

Prerequisites Courses: Mathematics I, Mathematics II, Basic Programming

Course Outcomes (COs):

On completion of this course, the students will have:
CO1: Understanding of representation of the signal in both time and frequency domain
CO2: Designing the modulator and demodulator circuits for linear modulation techniques
CO3: Designing the modulator and demodulators for angle modulation techniques
CO4: Analyze the communication systems behaviour at different frequency in the software domain by using MATLAB.
CO5: Designing the important circuits e.g. band-pass filter, phase locked loop (PLL), voltage controlled oscillator (VCO), varactor diode, balanced modulator, carrier cancellation circuits, etc.

Course Topics:

S.No.	**Experiments conducted in the Signal Systems and Communication Lab**
Analog Communication Lab (4 Experiments)	
1.	Frequency Domain Analysis.
2.	Verifying the properties of Fourier Series/Transform.
3.	Amplitude Modulation and Demodulation.
4.	To study Phase Locked Loop, Frequency Modulation and Demodulation.

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DSP Lab (4 Experiments)	
5.	LTI-System Analysis (Differential Equation - Convolution).
6.	Fourier Transform.
7.	Spectral Analysis.
8.	Fourier Series Representation and Synthesis of Periodic Signal.

Text Books:

1. Herbert Taub, Goutam Saha, Donald L. Schilling, Principles of Communication Systems , 4th Edition, McGraw Hill.
2. UG SSC Lab Manual (prepared by LNMIIT ECE Dept.).

Reference Books:

1. B. P. Lathi, Modern Digital and Analog Communication Systems, Fourth edition, Oxford (2010).
2. Bruce Carlson, P.B. Crilly, Communication Systems, 5th ed., McGraw-Hill, 2010.

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

Evaluation Methods:

Item	Weightage
Quiz	40% (20% till midterm, 20% post midterm)
Lab record	20% (10% till midterm, 10% post midterm)
Viva	40% (all 8 experiments to be covered)