Program : **Diploma in Electronics Engineering / Electronics and Communication Engineering**	
Course Code : **5049B**	Course Title: **Digital Communication Lab**
Semester : **5**	Credits: **1.5**
Course Category: **Program Core / Elective**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester: **45**

Course Objectives:

- To give hands on experience to implement digital modulation techniques, active filters and TDM.
- To introduce the electronic components used in digital communication.
- To enrich on various encoders for digital transmission with minimum error.

Course Prerequisites:

Topic	Course code	Course name	Semester
Knowledge on IC741 and other ICs	4047	Linear Integrated circuits lab	4
Idea on 7493 and other ICs	3048	Digital Electronics lab	3
Study of passive components and its testing	2039	Fundamentals of electrical and electronics lab	2

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Build circuits to implement digital pulse modulator.	9	Applying
CO2	Model various digital modulation techniques	9	Applying
CO3	Develop circuits to implement sequence generator, channel coding and multiplexer	9	Applying
CO4	Construct circuits to implement various active filters	12	Applying
	Lab Exam	6	

CO – PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2	3		2	3			
CO3	3	3	2				
CO4	3		3				

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Build circuits to implement digital pulse modulator.**		
M1.01	1. Construct a simple sampling circuit and observe the waveforms. 2. Reconstruct a sine wave from its samples	3	Applying
M1.02	Build a pulse code modulator circuit and observe the waveforms	3	Applying
M1.03	Develop a delta modulator and observe the input-output waveforms	3	Applying
CO2	**Model various digital modulation techniques.**		
M2.01	Model a Binary Amplitude Shift Keying (modulator & demodulator) and observe the input-output waveforms	3	Applying
M2.02	Model a Binary Frequency Shift Keying (modulator & demodulator) and observe the input-output waveforms	3	Applying
M2.03	Model a Binary Phase Shift Keying (modulator & demodulator) and observe the input-output waveforms	3	Applying
	Lab Exam – I	3	
CO3	**Develop circuits to implement sequence generator, channel coding and multiplexer**		
M3.01	Construct a two channel TDM circuit (Multiplexer and Demultiplexer) and observe the waveforms.	3	Applying

M3.02	Develop a Pseudo Random Binary Sequence(PRBS) generator and observe output	3	Applying
M3.03	Design and Construct an even parity code generator circuit to detect and correct error	3	Applying
CO4	**Construct circuits to implement various active filters.**		
M4.01	Construct an active first order low pass filter and plot its frequency response	3	Applying
M4.02	Construct an active first order high pass filter and plot its frequency response	3	Applying
M4.03	Construct an active band pass filter and plot its frequency response	3	Applying
M4.04	Open ended experiment.	3	Applying
	Lab Exam– II	3	

**** - Suggested Open Ended Projects**

(Not for End Semester Examination but compulsory to be included in Continuous Internal Evaluation. Students can-do open-ended experiments as a group of 3-5. There is no duplication in experiments in between groups. This is mainly for the purpose of continuous internal evaluation and a score of 15 marks. Students should prepare a separate report on open ended experiment of their choice.)

Example: 1.Simulation of filters using simulation software.

2. Simulate the digital modulation scheme.
3. Implement the Linear block code encoder and decoder using simulation software.
4. Develop Convolution encoder using simulation software

Text / Reference:

T/R	Book Title/Author
T1	Electronics Lab Manual Vol-2 KA Navas 4th edition
R1	Principles of Communication systems – Taub and Schilling

Online Resources:

Sl.No	Website Link
1	https://nptel.ac.in/courses/117101051/

Sample Questions to Test Outcomes

1. Generate and demodulate an ASK signal such that
    I. When modulation input is at logic 1 level, ASK amplitude must be 4V and
    II. At logic 0 level, ASK amplitude must be 8V.
2. Build a circuit to plot the frequency response of active first order band pass filter with bandwidth of 2 kHz and centre frequency of 10 kHz.