DIGITAL SIGNAL PROCESSING LAB

Course Code	20EC3651	**Year**	III	**Semester**	II
Course Category	Program Core	**Branch**	ECE	**Course Type**	Lab
Credits	1.5	**L-T-P**	0-0-3	**Prerequisites**	Signals and Systems
Continuous Internal Evaluation:	15	**Semester End Evaluation:**	35	**Total Marks:**	50

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Examine the frequency response and impulse response of discrete-time LTI systems (L3).
CO2	Interpret discrete-time signals using DFT & FFT (L3).
CO3	Design IIR and FIR digital filters for real time DSP applications (L6)
CO4	Apply Multirate signal processing concepts to various applications (L3)
CO5	Make an effective report of the experiments

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3							1	1	1		1	2	1
CO2	3							1	1	1		1	2	1
CO3			3					1	2	1		2	2	1
CO4	2							1	2	1		1	2	1
CO5								1	3	3		1	2	1
Average* (Rounded to nearest integer)	3		3					1	2	1		1	2	1

Syllabus		
Expt. No.	**Contents**	**Mapped CO**
	Part A – Using MATLAB	
I	Frequency response of a system described by a difference equation. (First order and Second order Systems)	CO1, CO5
II	Implementation of discrete time systems in time domain. (First order and Second order Systems)	CO1, CO5
III	DFT & IDFT of the given sequences. (4-Point or 8-point sequences)	CO2, CO5
IV	Properties of DFT (Linearity, Time reversal etc.)	CO2, CO5
V	Fast Fourier Transform (4-Point or 8-point sequences)	CO2, CO5
VI	Design of IIR Low Pass filter using Butterworth and Chebyshev approximations (For the given specifications)	CO3, CO5
VII	Design of IIR High Pass filter using Butterworth and Chebyshev approximations. (For the given specifications)	CO3, CO5

VIII	Design of FIR Low Pass filters using window technique. (For the given specifications)	CO3, CO5
IX	Design of FIR High Pass filter using window technique. (For the given specifications)	CO3, CO5
X	Implementation of Interpolation and Decimation. (Factor 2 or 3)	CO4, CO5
Part B – Using Code Composer Studio		
XI	Linear convolution of two sequences. (4-Point or 5-point sequences)	CO1, CO5
XII	Circular convolution of two sequences. (4-Point or 8-point sequences)	CO2, CO5
XIII	Generation of Sine wave & Square wave.	CO2, CO5

Learning Resources
Text Books
1. J. G. Proakis and D. G. Manolakis, Digital Signal Processing: Principles, Algorithms and Applications, 4th Ed., Pearson Education, 2007. 2. A.V. Oppenheim, R. W. Schafer, Discrete-Time Signal Processing, 3rd Ed. PHI, 2009.
Reference Books
1. Lonnie C Ludeman, Fundamentals of Digital Signal Processing - John Wiley & Sons, 2003 2. Sanjit K Mitra, Digital Signal Processing "A – Computer Based Approach" - Tata Mc Graw Hill 2nd Ed., 2003 3. Lawrence R Rabiner & Bernard Gold, Theory and Application of Digital Signal Processing - Prentice Hall.
e- Resources & other digital material
1. http://www.nptel.iitm.ac.in/ 2. http://www.ee.umanitoba.ca/~moussavi/dsp815/LectureNotes/index.html 3. http://www.ece.cmu.edu/~ee791 4. http://cobweb.ecn.purdue.edu/~ipollak/ee438/FALL04/notes/notes.html

---