B.Tech Electronics and Communication Engineering

COURSE PLAN: THEORY COURSE

Department:	**Electronics and Communication Engineering**			
Course Name & code:	**Digital Signal Processing**			**ECE2222**
Semester & branch:	**IV**			
Name of the faculty:	**Dr. Sampath Kumar, Dr. Rajiv Mohan David, Mr. Prashanth M. Prabhu, Dr. Akshatha K.R., Dr. Anu Shaju Areeckal**			
No of contact hours/week:	**L**	**T**	**P**	**C**
	3	**0**	**0**	**3**

Course Articulation Matrix

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	1	1											2			
CO2	1	1	1										1			
CO3	1	1											1			
CO4	1	1	1										1			
CO5	1		1										2			
Average Articulation Level	1	0.8	0.6										0.6			

ICT Tools used in delivery and assessment

Sl. No	Name of the ICT tool used	Details of how it is used
1.	Power point presentations	Images, graphs and animations are displayed

Delivery and assessment Plan of LOs

Learning Outcome (LO) mapped to the course		Delivery and assessment Plan
LO	**LO statement**	
1	Discuss Dicrete Fourier Transform (DFT)	Gets addressed during lecture delivery of stated topics in the syllabus. Many of the topics needs the some of the basic knowledge of science and mathematics.
2	Describe FFT algorithms	Addressed while deleivering lectures on design topics stated in the syllabus
3	Analyse various block diagram representaions of IIR and FIR filter realizations	Addressed during lecture delivery of stated topics in the syllabus.
4	Design IIR and FIR filters	Addressed while deleivering lectures on design topics stated in the syllabus
5	Analyse the basics of power spectrum estimation.	Addressed through design topics, self study topics

Lesson Plan

L No	Topics	Course Outcome Addressed
1	Overview and general introduction to DSP	
2	Review of Fourier representation of discrete signals	CO1
3	Frequency domain sampling and reconstruction of discrete time signals	CO1
4	Discrete Fourier Transform (DFT)	CO1
5	DFT calculations, Properties of DFT	CO1
6	Properties of DFT, Circular convolution.	CO1
7	Linear Filtering	CO1
8	Filtering of long length data using DFT, DFT as linear transform	CO1
9	FFT, DIT FFT algorithm	CO2
10	DIF FFT algorithm	CO2
11	Inverse FFT	CO2
12	FFT implementation- In-place computation, pipeline FFT	CO2
13	Goertzel algorithm.	CO2
14	Direct form, cascade and parallel structures for IIR filters	CO3
15	Direct form, cascade and frequency sampling structures for FIR filters	CO3
16	Lattice and transpose structures	CO3
17	Lattice/Ladder structures	CO3
18	IIR filter design: Impulse invariance transformation	CO4
19	Bilinear transformation and matched Z - transform	CO4
20	Butterworth filter characteristics	CO4
21	Design of Butterworth filter	CO4
22	Chebyshev filter characteristics	CO4
23	Design of Chebyshev filter	CO4
24	Spectral transformation and direct design of IIR filters	CO4
25	Linear phase FIR filter characteristics, symmetric and anti-symmetric impulse response	CO4
26	Symmetric and anti-symmetric impulse response (contd.)	CO4
27	FIR filter design using window functions	CO4
28	FIR filter design using window functions (contd.)	CO4
29	Frequency sampling design of FIR filters.	CO4
30	Effect of time domain windowing on power spectrum	CO5
31	Non-Parametric methods: Periodogram	CO5
32	Bartlet and Welch methods	CO5
33	Blackman-Tuky method	CO5
34	Principle of parametric methods	CO5
35	Parametric modelling: AR, ARMA and MA models	CO5
36	AR, ARMA and MA models (contd.).	CO5

Faculty members teaching the course (if multiple sections exist):

Faculty	Section	Faculty	Section
SAK	**A**		
RMD	**B**		
PMP	**C**		
AKR	**B**		
ASK	**VLSI**		

References:

1. Proakis J. G, Manolakis D. G. Mimitris D., "Introduction to Digital Signal Processing" Prentice Hall, India, 2007.
2. Oppenheim A.V, Schafer R. W, "Discrete Time Signal Processing", Pearson Education, 2004.
3. Ifeachar, Jervis, "Digital Signal Processing - A Practical approach", Pearson Education, Asia, 2003.
4. Rabiner L. R, Gold D. J, "Theory and applications of digital signal processing", Prentice Hall, India, 1998.
5. Sanjit Mitra K, "Digital Signal Processing - A computer based approach", TMH, 2007
6. https://www.youtube.com/watch?v=xZ4zfE11X7U

Submitted by: Dr. Sampath Kumar

(Signature of the faculty)

Date: 02/01/2025

Approved by:

(Signature of HOD)