SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN – THEORY

Department of Information Technology	LP: EC16651 Rev. No: 00 Date: 29.06.2018
B.Tech : Information Technology Regulation: 2016 Sub. Code / Sub. Name : EC16651/Digital Signal Processing Unit : I	

Unit Syllabus:

SIGNALS AND SYSTEMS 9

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – concept of aliasing-Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution – Correlation

Objective: To acquire knowledge on signal and systems

Session No *	Topics to be covered	Ref	Teaching Aids
1 2	Signals, systems and signal processing. Basic elements of a Digital signal processing and signal classification.	T1,R2,R3	BB/LCD
3	Concept of frequency in continuous time and discrete time signals, aliasing, Sampling Theorem	T1,R2,R3	BB/LCD
4	Discrete time signals-some common discrete time signals, classification.	T1,R2,R3	BB/LCD
5	Discrete time systems-block diagram representation, classification ,input output description	T1,R2,R3	BB/LCD
6 7	Convolution and Correlation	T1,R2	BB/LCD
8	Problems on convolution and correlation	T1,R2	BB/LCD
9 10	Z transform and Inverse Z transform	T1,R2	BB/LCD
11	Analysis of linear time invariant Systems	T1,R21	BB/LCD
12	LTI characterized by constant coefficient difference equations	T1,R2	BB/LCD
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: **EC16651/Digital Signal Processing**

Unit : II

Unit Syllabus :

FREQUENCY TRANSFORMATIONS 9

Introduction to DFT – Properties of DFT – relationship among z transform, DTFT and DFT - Circular Convolution - Filtering methods based on DFT – FFT Algorithms - Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT – Use and Application of DCT.

Objective: To learn about DFT & DCT, its properties, applications and two different FFT algorithms.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Introduction to Discrete Fourier Transforms	T1,R3	BB/LCD
14	Properties of DFT	T1,R3	BB/LCD
15	Relationship among z transform, DTFT and DFT	T1,R3	BB/LCD
16	Circular Convolution	T1,R2	BB/LCD
17	Filtering methods based on DFT	T1,R2	BB/LCD
18	Introduction to Fast Fourier Transforms	T1,R3	BB/LCD
19 20	Decimation in Time Algorithm.	T1,R2,R3	BB/LCD
21 22	Decimation in Frequency Algorithm.	T1,R2,R3	BB/LCD
23	Use of FFT algorithms in Linear Filtering	T1,R2,R3	BB/LCD
24	DCT- Use and Application of DCT.	T1,R2,R3	BB/LCD
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: **EC16651/Digital Signal Processing**
Unit : III

Unit Syllabus :

IIR FILTER DESIGN 9

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF,HPF, BPF, BRF) filter design using frequency translation.

Objective: To learn about different structures for IIR Systems and design of different types of IIR filters**.**

Session No *	Topics to be covered	Ref	Teaching Aids
25	Structures for the realization of discrete time systems	T1,R2	BB/LCD
26 27	Design of IIR filter from Butterworth approximation	T1,R2	BB/LCD
28 29	Design of IIR filter from Chebyshev approximation	T1,R2	BB/LCD
30	IIR filter Design using Approximation of Derivatives.	T1,R2	BB/LCD
31 32	IIR filter Design using Impulse Invariance method.	T1,R2	BB/LCD
33 34	IIR filter Design using Bilinear Transform method.	T1,R2	BB/LCD
35 36	Design of IIR LP,HP,BP filters in Frequency Domain	T1,R2	BB/LCD
Content beyond syllabus covered (if any)			

* Session duration: 50 mins

Sub. Code / Sub. Name: **EC16651/Digital Signal Processing**

Unit : IV

Unit Syllabus :

FIR FILTER DESIGN

Structures of FIR – Transversal, linear phase and polyphase realization- Linear phase FIR filter – Fourier Series - Filter design using windowing techniques, (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques

Objective: To understand Structures of FIR , Linear phase FIR filter and design FIR filter using windowing techniques, Frequency sampling techniques.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Structures and Transversal, linear phase and polyphase realization of FIR Systems.	T1,R2	BB/LCD
38 39	Linear phase FIR filter , Fourier Series	T1,R2	BB/LCD
40 41	Design of FIR filters using windows	T1,R2	BB/LCD
42 43	Problems on all windowing techniques	T1,R2	BB/LCD
44 45	Design of FIR filters by frequency sampling method	T1,R2	BB/LCD
46 47	Design of Linear Phase FIR filters.	T1,R2	BB/LCD
48	Problems in FIR filter Design	T1,R2	BB/LCD
Content beyond syllabus covered (if any): Kaiser window			

Sub. Code / Sub. Name: **EC16651/Digital Signal Processing**

Unit : V

Unit Syllabus :

FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS

Binary fixed point and floating point number representations – Comparison - Quantization noise -truncation and rounding – quantization noise power- input quantization error- coefficient quantization error – limit cycle oscillations-dead band- Overflow error- signal scaling-Scaling to prevent overflow.

Objective: To study about quantization noise, truncation and rounding off - overflow error and signal scaling

Session No *	Topics to be covered	Ref	Teaching Aids
49	Binary fixed point and floating point number representations	T1,R2	BB/LCD
50	Comparison-Quantization noise	T1,R2	BB/LCD
51	Truncation and rounding	T1,R2	BB/LCD
52 53	Quantization noise power	T1,R2	BB/LCD
54 55	Input quantization error, coefficient quantization error	T1,R2	BB/LCD
56 57	Limit cycle oscillations	T1,R2	BB/LCD
58	Dead band, Overflow error	T1,R2	BB/LCD
59 60	Signal scaling, Scaling to prevent overflow.	T1,R2	BB/LCD
Content beyond syllabus covered (if any):			

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TEXT BOOKS:

1. John G. Proakis and Dimitris G.Manolakis, —Digital Signal Processing – Principles, Algorithms & Applications, Fourth Edition, Pearson Education, Prentice Hall, 2007.

REFERENCES:

1. Emmanuel C.Ifeachor, and Barrie.W.Jervis, —Digital Signal Processing, Second Edition, Pearson Education, Prentice Hall, 2002.

2. Sanjit K. Mitra, —Digital Signal Processing – A Computer Based Approachll, Third Edition, Tata Mc Graw Hill, 2007.

3. A.V.Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.

4. Andreas Antoniou, -Digital Signal Processing, Tata McGraw Hill, 2006.

	Prepared by	Approved by
Signature		
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Designation	AP/EE AP/EE	HOD/EE
Date	2.7.2018	2.7.18
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD