COURSE PLAN AND EVALUATION PLAN

1. Course Code: EC208
2. Course Title: DIGITAL SIGNAL PROCESSING
3. L – T – P**:** **3-1-0**
4. Credits**:** **4**
5. Pre-requisite**:** **EC102**
6. Teaching Department**:** **Electronics & Communication Engg.**
7. Course Instructor**:** **Dr SUMAM DAVID S.**
8. Objectives of the Course:

At the end of the program the student must be able to

• CO1 - analyze the behavior of discrete-time signals and systems in time domain • CO2 - analyze the behavior of discrete-time systems in transform domain	• CO3 - analyze the behavior of discrete-time signals and systems in frequency domain • CO4 – design and analyze digital filters

8. Course Coverage (40 – Lecture Schedule) **:**

Module	Contents	Objectives	Lecture	Evaluation
Introduction	Introduction to DSP – Objectives of the course, motivation, course plan, evaluation method, references	• Appreciate the relevance of the course	**L1**	
Time domain analysis of discrete-time signals and systems	Basic signals, operations, and properties, introduction to sampling, aliasing Systems - properties, linear-time invariant systems, impulse response, convolution, correlation, causality and stability; Representation of LTI systems - difference equations	• Examine signal properties • Classify systems based on properties • Compute response of LTI systems • Analyse behaviour of LTI systems • Formulate difference equations of LTI systems	**L2-L10**	**Application Analysis**
	Assignment I			
Transform domain analysis of discrete time systems	Z Transform: Definition and properties, ROC, inverse Z transform, transfer function, poles and zeros, application of Z transforms to discrete-time systems, Representation of systems – signal flow graph, realisation of a z-domain TF	• Analyse systems using ZT • Relate system behavior in time and frequency domain to pole-zero plot • Represent systems using SFG	**L11-L15**	**Application Analysis**
	Assignment II			
	Midsem examination			

Frequency domain analysis of discrete-time signals and systems	FS & FT, Discrete Fourier series, Relation between continuous and discrete time spectra, aliasing, reconstruction of continuous-time signal from samples, Properties of DFS Discrete-time Fourier transform, properties and applications of DTFT, Relationship between the three domains – h(n), H(z), H(ω), Sampling in frequency domain, DFT, properties, linear convolution using DFT, FFT algorithms – DIT, DIF	• Represent periodic seq. using DFS • Represent aperiodic seq using DTFT • Analyse system behavior using DTFT • Relate FS, DFS, DTFT Analyze system behavior using DFT • Efficient computation of DFT	**L16-L30**	**Application, Analysis**
	Assignment III			
Digital Filter Design	Characteristics of digital filters, Filter Structures **FIR filter design :** window method, frequency sampling method, optimal filter design **IIR Filter Design :** H(s) →H(z), Filter design using Butterworth, Chebyshev & Elliptic approximations, Direct design of IIR filters, Finite word length effects	• Understand characteristics of digital filters and filter structures • Formulate specifications, Design, analyse & implement FIR filters • Formulate specifications, Design, analyse & implement IIR filters	**L31-L44**	**Application**
	Assignment IV			

9. Course web page : Moodle

10. Reference Books

1. J.G.Proakis and D.G.Manolakis, *Introduction to Digital Signal Processing*, 2007
2. A.V.Oppenheim and R.W.Schafer, *Discrete- time signal processing*, 2002
3. Ashok Ambardar, *Digital Signal Processing A modern Introduction*, Thomson, 2007
4. C. Sidney Burrus (Ed), *Digital Signal Processing and Digital Filter Design* (Draft), <http://cnx.org/content/col10598/1.3/ >
5. Ifeachor and Jervis, *DSP – A practical approach*, Pearson, 2002

11. **EVALUATION PLAN :**

Mid semester exam - 25% Assignments/Quiz - 25% End semester exam - 50%

Prepared by:

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Approved by

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