SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956, Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OFELECTRONICS AND COMMUNICATION ENGINEERING

TEACHING PLAN

Course Code	CourseTitle	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20EC3T03	Signals & Systems	III	ECE	6	2021-2022	25-10-2021

COURSE OUTCOMES

After completion of the course students are able to

1	Describe the signal fundamentals in terms of types and how to represent various signals(K1)
2	Explain the concept of Fourier series and Fourier transforms to determine the signal and system characteristics. (K2, K4)
3	Demonstrate the concept of sampling theorem, convolution and correlation and also signal transmission through linear systems. (K3)
4	Demonstrate the concept of ROC (Region Of Convergence) using Laplace and Z- Transforms to analyze the continuous and discrete time systems. (K3, K4)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
			UNIT-1: INTRODUCTION TO SIGNALS AND SYSTEMS			
I	**CO1: Describe the signal fundamentals in terms of types and how to represent the various signals. (K1)**	1.1	**Introduction to Signals:**Continuous time signals and Discrete time signals, Periodic and Aperiodic signals	T1, T2	1	Chalk & Talk, Smart Board and PPT
		1.2	Even and Odd signals, Energy and Power signals	T1, T2	1	
		1.3	Deterministic and Random signals-Complex Exponential and Sinusoidal signals	T1, T2	1	
		1.4	Standard Functions - Unit impulse and Unit step-Unit ramp signal	T1, T2	1	
		1.5	**Introduction to Systems:** Continuous time systems-Linear and Non- Linear	T1, T2	1	

		1.6	Discrete time systems- Linear and Non-Linear	T1, T2	1	
		1.7	Time Invariant and Time Variant systems	T1, T2	1	
		1.8	Causal and Non-causal system- BIBO system- Systems with and without memory	T1, T2	2	
		1.9	Problems	T1, T2	3	
	Total				**12**	
		UNIT-2: CONVOLUTION, CORRELATION				
II	**CO3:** Demonstrate the concept of sampling theorem, convolution and correlation and also signal transmission through linear systems. (K3)	2.1	Convolution and Correlation	T1	1	Chalk & Talk, Smart Board and PPT
		2.2	Graphical representation of convolution,	T1	1	
		2.3	,Properties of Convolution like Cumulative, Associative, Distributive,	T1	1	
		2.4	Shifting, Scaling.	T1	1	
		2.5	Convolution Integral and Convolution Sum	T1	1	
		2.6	Cross correlation	T1	1	
		2.7	Auto correlation of functions,	T1	1	
		2.8	Properties of correlation function with examples	T1	1	
		2.9	Relation between Auto correlation and energy signal,	T1	1	
		2.10	PSD.	T1	1	
		2.11	Problems	T1	2	
	Total				**12**	
		UNIT- 3: FOURIER SERIES AND SAMPLING				
III	**CO2:**Explain the concept of Fourier series and Fourier transforms to determine the signal and system characteristics. (K2, K4)	3.1	Concept pf Orthogonal functions with examples. -	T1	1	Chalk & Talk, Smart Board and PPT
		3.2	Introduction to Fourier Series	T1	1	
		3.3	Representation of Continuous-Time Periodic Signals.	T1	1	
		3.4	Deriving Fourier transform coefficients..	T1	1	
		3.5	Relation between		1	

			Trigonometric coefficients anf Exponential coefficient,	T1		
		3.6	Dirchillet conditions	T1	1	
		3.7	Sampling Theorem	T1	1	
		3.8	Time domain and frequency domain statements-	T1		
		3.9	Reconstruction of a Signal from its sample-	T1	1	
		3.10	The Effect of under sampling (Aliasing).	T1	1	
		3.12	Problems	T1	1	
				Total	**12**	
IV	**CO4:** Demonstrate the concept of ROC (Region Of Convergence) using Laplace and Z- Transforms to analyze the continuous and discrete time systems. (K3, K4) **CO2: Explain the concept of Fourier series and Fourier transforms to determine the signal and system characteristics. (K2, K4)**	**UNIT - 4 CONTINUOUS-TIME TRANSFORMS**				
		4.1	Introduction to Laplace Transform:	T1, T2	1	Chalk & Talk, Smart Board and PPT
		4.2	Unilateral and bi-lateral Laplace Transforms.	T1, T2	1	
		4.3	ROC, Constraints of ROC,	T1, T2	1	
		4.4	Laplace Transform of standard functions,	T1, T2	1	
		4.5	Properties of transforms	T1, T2	1	
		4.6	Inverse Laplace Transform.	T1, T2	1	
		4.7	Initial and Final Value theorems	T1, T2		
		4.8	**Fourier Transform:**	T1, T2	1	
		4.9	Unilateral and bi-lateral Fourier Transform	T1	1	
		4.10	Properties of Fourier transform,	T1	1	
		4.11	The Convolution Property, Parseval's Theorem,	T1	1	
		4.12	The Multiplication Property.	T1	1	
		4.13	Problems on Inverse Fourier Transform	T1	1	
		4.14	Relation between LT & CTFT	T1	1	
				Total	**14**	

V	CO4: Demonstrate the concept of ROC (Region Of Convergence) using Laplace and Z- Transforms to analyze the continuous and discrete time systems. (K3, K4)	**UNIT – 5: DISCRETE-TIME TRANSFORMS**				
		5.1	Unilateral and bi-lateral z-transform,	T2	1	Chalk & Talk, Smart Board and PPT
		5.2	ROC, Constraints of ROC,	T2	1	
		5.3	Properties of Z-transforms,	T2	1	
		5.4	Convolution Property,	T2	1	
		5.5	Z-Transform(	T2	1	
		5.6	Direct and Indirect methods	T2	1	
		5.7	Initial and Final Value theorems,.	T2	1	
		58	Relation between DTFT and Z-Transform	T2	1	
Content beyond Syllabus (if needed)		5.14	Applications of signals and sampling in communication.	T2	1	
		5.15	Filter design using Transform techniques.	T2	1	
				Total	**15**	
				CUMULATIVE PROPOSED PERIODS	**65**	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	B.P. Lathi, "Principles of Linear Systems & Signals", Oxford Press, Second Edition2005.(UNITS -I,II&III)
2.	A.V.Oppenheim, A.S.Willsky and S.H.Nawab,,Signals and Systems – 4nd Edition, Prentice-Hall India.2009 (UNITS –IV&V)

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	John G. Proakis and Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", PearsonEducation, 3rdedition, 2002
2.	1. Simon Haykin and Barry Van Veen,"Signals and Systems", John Wiley & Sons In, 2001.

Web Details	
1.	https://nptel.ac.in/courses/117/101/117101055/
2.	www.pdfdrive.com
3.	https://www.tutorialspoint.com/signals_and_systems/signals_and_systems_overview.htm
4.	www.booksboon.com
5.	www.manybooks.com
6.	https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011

		Name	Signature with Date
i.	Faculty I	Dr. B.S.Rao	
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v.	Programme Coordinator	Dr.B.S.Rao	

Principal