Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Electronics Engineering)
Class, Semester	Third Year B. Tech., Sem V
Course Code	6OE358
Course Name	Open Elective -1: Signals and Systems
Desired Requisites:	-

Teaching Scheme		Examination Scheme (Marks)			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 3			

Course Objectives

1	Develop the mathematical skills to solve problems involving signals and systems in various areas of appllications
2	To Understand signals and systems in terms of both the time and transform domains with , complementary insights into tools for analysis
3	
4	

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO1	Classify the different signals and systems	Understand
CO2	Characterize LTI systems in the time domain and frequency domain	Apply
CO3	Use MATLAB software to implement the signal processing and system analysis for different applications	Apply

Module	Module Contents	Hours
I	**Classification of Signals and Systems:** Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids, Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals, Classification of systems- CT systems and DT systems, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable.	6
II	**Analysis of CT and DT signals** Fourier series for periodic signals - Fourier Transform – properties- Laplace Transforms and properties.	8
III	**Analysis of DT signals** Baseband signal Sampling – Fourier Transform of discrete time signals (DTFT) – Properties of DTFT - Z Transform & Properties	6
IV	**Linear Time Invariant DT Systems** Impulse response – Difference equations-Convolution sum- Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.	8
V	**Application areas of Signals and Systems** Overview of applications of Signals and Systems in the fields of Speech and audio processing.Multimedia processing (image and video),Underwater acoustic, Biological signal analysis, Biometrics, control applications	7
VI	**Analysis of Signals and Systems using Simulation Tools** Introduction to MATLAB, Use MATLAB software to implement the signal processing and system analysis.	4

Textbooks

1	B.P. Lathi, "Signals, Systems & Communications"- BS Publications, 2003.
2	A.V. Oppenheim, A.S. Willsky and S.H. Nawab,"Signals and Systems"- PHI, 2nd Edn.
3	
4	

References

1	Simon Haykin and Van Veen,"Signals & Systems" -,Wiley, 2nd Edition.
2	
3	
4	

Useful Links

1	NPTEL lectures
2	https://www.mathworks.com
3	
4	

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		2												
CO3					3								2	

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)