Devi Ahilya University, Indore, India Institute of Engineering & Technology				**II Year B.E. (Electronics and Instrumentation Engg.) (Full Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
EIR4G2	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
SIGNAL & SYSTEMS	**3**	**1**	**0**	**3**	**1**	**0**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

This course aims to provide detailed description Signals and System Analysis. Fourier series and Fourier transform, Laplace and Z Transform along with respect to SISO systems and State variable analysis for MIMO systems.

Prerequisite(s): Engineering Mathematics

COURSE CONTENTS

UNIT-I Fundamentals of Signals & Systems:

All basic Continuous time signals. Energy signal and Power signal. Continuous time systems, Discrete time signals and Discrete time systems. Linear Time invariant system theory and its significance to continuous time and discrete time system analysis. Linear convolution Integral and Linear convolution sum.

UNIT-2 Fourier series and Fourier Transform:

Fourier series, Different forms of Fourier series, Dirchlet conditions, Wave symmetry, Parseval theorem. Fourier Transform; its properties and applications. Symmetry properties of Fourier transform. System analysis with Fourier transform. Ideal Filters.

UNIT-3 Laplace Transform and its applications:

Laplace Transform and its properties. Region of convergence, Laplace Transform of some common functions, Initial value and Final value theorem. Inverse Laplace Transform, Transfer function, Characteristics of transfer function, Poles and Zeros, System analysis using Laplace Transform.

UNIT-4 State Variable Techniques:

Introduction, State Variable Concept, Form of state equations, State space representation of continuous time and discrete time LTI systems, solution of state equation, state transition matrix.

UNIT -5 Discrete Time Signal/Systems and Z-Transform:

Introduction, Z-Transform definition, Region of Convergence, Z-Transform of some common sequences, properties of Z-Transform, Inverse Z-Transform, System function of discrete time, LTI Systems, Convolution Theorem, Complex Convolution Theorem.

Learning Outcomes:

On Completion of this course the students will be able to:

- The focus of this course is to familiarize the students with the concept of Fourier transform & Fourier series.
- Analyze the spectral characteristics of signals using Fourier analysis.
- Classify systems based on their properties and determine the response of LTI
- Identify system properties based on impulse response and Fourier analysis.
- Apply transform techniques to analyze continuous-time and discrete-time

BOOKS RECOMMENDED:

[1] Rodger E. Ziemer, William H.Tranter, D. Ronald Fannin, "*Signals and Systems*", Pearson 4th Edition

[2] Hwei P. Hsu (Schaum's Outline Series), "*Signals and Systems*", TMH Edition

[3] A. Anand Kumar, "*Signals and Systems*", PHI 3rd Edition

[4] A.V.Oppenheim et al, "*Signals and Systems*", 2nd Edition, Pearson 2003

[5] Smarajit Ghosh, "*Signals and Systems*", Pearson

[6] Simon Haykin , "*Signals and Systems*" 2nd edition, Wiley, 2008.

[7] B P Lathi, "*Digital and Analog Communication Systems*" 4th edition, Oxford University Press, 2000