Module Code	MA2012	Title	Differential Equations			
Credits	02	Hours/ Week	Lectures	02	Pre-requisites	MA 1022
			Lab/Tutorials	-		

Learning Objectives

- To understand Fourier approximation in various mathematical methods in physical system modeling.
- To understand the modeling of physical system using partial differential equation
- To understand transform methods in solving differential equations
- To understand the use of power series methods in solving differential equation.

Learning Outcomes

- To approximate periodic function using Fourier series
- To solve various categories of Partial differential equations appears in physical system modeling
- To apply Lap lace Transform and Fourier Transform method to solve differential equation.
- To apply series solution method to differential equation with variable coefficient

Outline Syllabus

Fourier Series approximation
Fourier coefficients, Dirichlet's condition, odd and even function, half range series. Trigonometric approximation to discrete data.

Partial Differential Equations
Classification of second-order partial differential equations. Solutions by separation of variables. Fourier series application to boundary value problems.

Laplace Transform and applications

Laplace transform of elementary functions and some basic theorems on Laplace transform. Application of Laplace transforms to solution of differential equations and system of differential equations, transfer functions, convolution theorem, concepts of stability and controllabity.

Fourier Transform and applications
Non-periodic function, Fourier transform, properties of Fourier transform and applications.

Ordinary linear differential equations with variable coefficients
Solution in series, Special function (e.g. Bessel, Legendre) - singular points,
Existence and uniqueness of the solution(elementary discussions without proof.