

Module Code	MA2063	Title	Differential Equations and Applications			
Credits	02	Hours/Week	Lectures	02	Pre-requisites	MA1013
			Lab/Tutorials	-		

Learning Outcomes

At the end of this module the student should be able to

- Solve ordinary differential equations in engineering applications.
- Apply approximate Fourier series for periodic functions in real world applications.
- Solve various categories of partial differential equations that appear in engineering system modeling.
- Apply Laplace transform and Fourier transform methods to solve differential equations in engineering applications

Outline Syllabus

Differential Equations

- First order differential equations: Variable separable, homogeneous, linear and exact equations.
- Second order differential equations.

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 transforms of elementary functions and some basic theorems on Laplace transforms.
- Application of Laplace transforms to solution of differential equations and system of differential equations.
- Transfer functions, Convolution theorem, concepts of stability and controllability.

Fourier Transform and applications

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

Note: For CS students