Lecture Plan

Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa

Name of Faculty: Prajyot Maruti Patil	**Subject:** Mathematics	
Paper code: MAT-201, Ordinary Differential Equations	**Program:** M.Sc.	**Division: -**
Academic year: 2024-25	**Semester:** I	**Total Lectures:** 60

Course Objectives:

1. This course helps in understanding basic concepts of Differential Equations. It develops the ability to solve differential equations by analytical and numerical methods

Expected Course Outcome:

1) Identify the type of a given differential equation.
2) Understand the concept and apply appropriate analytical techniques for finding the solution.
3) Prove various results concerning the methods and existence and uniqueness of solutions of differential equations.
4) Solve ordinary differential equations by using various numerical methods.

Student Learning Outcome: Student will be able to

1) Identify the type of a given differential equation and apply appropriate analytical techniques for finding the solution.
2) Solve ordinary differential equations by using various numerical methods.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	28/06/2024	29/06/2024	1	Some Basic Mathematical Models		Smart Board PDF	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
July	01/07/2024	06/07/2024	4	Direction Fields; Solutions of Some Differential Equations; Classification of Differential Equations		Smart Board PDF	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	08/07/2024	13/07/2024	3	Linear Equations; Bernoulli Equation Method of Separation of Variables			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	15/07/2024	20/07/2024	4	First Order Equations; Linear and Nonlinear Equations;		Data projector	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	22/07/2024	27/07/2024	4	Exact Equations and Integrating Factors; Initial Value Problems; The Existence and Uniqueness Theorem for			Boyce, W. E. and DiPrima, R. C.: Elementary Differential

				initial value problem. (Proof to be done)			Equations and Boundary Value Problems
July August	29/07/2024	03/08/2024	4	Homogeneous Equations with Constant Coefficients; Solutions of Linear Homogeneous Equations:			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
August	05/08/2024	10/08/2024	4	The Wronskian; Complex Roots of the Characteristic Equation; Euler-Cauchy Equations,		Smart Board	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	12/08/2024	17/08/2024	3	Repeated Roots; Reduction of Order; Nonhomogeneous Equations; Method of Undetermined Coefficients; Variation of Parameters.			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	19/08/2024	24/08/2024	4	General Theory of nth Order Linear Equations with Constant Coefficients; Homogeneous and NonHomogeneous Equations;		Smart Board PDF	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems

	26/08/2024	31/08/2024	4	The Method of Undetermined Coefficients, The Method of Variation of Parameters			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
September	02/09/2024	07/09/2024	2	Inverse D – operators		Smart Board	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	09/09/2024	14/09/2024	2	Solution of f(D)y = X where X = exp(kx), cos(kx)			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	16/09/2024	21/09/2024	4	Solution of f(D)y = X where X = exp(kx), cos(kx), sin(kx), polynomials in x and their products		Smart Board	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	23/09/2024	28/09/2024	4	{1/ (D2+ a2)}f(x), where f(x)=Sin(ax), Cos(ax)		Smart Board	Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems

September October	30/09/2024	05/10/2024	4	Euler's and Modified Euler's method; Taylor's Method;			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
October	07/10/2024	12/10/2024	4	Runge – Kutta second and fourth order methods. (Formulae and examples only)			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	14/10/2024	19/10/2024	4	Revision			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems
	21/10/2024	23/10/2024	2	Revision			Boyce, W. E. and DiPrima, R. C.: Elementary Differential Equations and Boundary Value Problems

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
Practical	Nil
Project	Nil
Semester End Exam	80