Lecture Plan

Name of the college: Government College of Arts , Science & Commerce, Sanquelim, Goa.

Name of Faculty: Prajyot Maruti Patil	**Subject:** Differential Equations II	
Paper code: MTC-108	**Program: T.Y.B.Sc.**	**Division:**
Academic year: 2024-25	**Semester: VI**	**Total Lectures: 90**

Course Objectives:
1. **To introduce the various concepts of Differential Equations.**
2. **To study Power series methods to solve Differential Equations.**
3. **To Learn Numerical Methods for Differential Equations Solutions.**

Expected Course Outcome:
1. Knowledge acquired: Students will have knowledge of nth order differential equations, Legendre polynomials, Bessel functions, Laplace transform and Numerical methods.
2. Competency developed: Students will be able to apply various concepts to solve problems.
3. Skill gained: Students will be able to analyse and solve different types of differential equations.
4. Students will be able to correlate the various concepts in Differential Equations and prove results based on it.

Student Learning Outcome:
1. Students will be able to analyse and solve different types of differential equations.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	**Week 1** **04/12/24**	**07/12/24**	0	Nil			
December	**Week 2** **09/12/24**	**14/12/24**	06	Introduction to Differential Equations	Able to identify order ,degree, etc of a D.E		Introduction to Ordinary Differential Equation by Earl A. Coddington
December	**Week 3** **16/12/24**	**21/12/24**	06	Linear first order differential equations, Riccatic's DE, second order linear DE, Non homogenous DE, Wronskian.	Able to solve first order D.E, Riccatic's DE, second order linear DE		Introduction to Ordinary Differential Equation by Earl A. Coddington
January	**Week 4** **02/01/25**	**04/01/25**	06 Liberation Day	Power series method to solve DE: DE with analytic coefficints, Chebyshev DE, Legendre DE, Legendre polynomial.	Able to solve D.E with variable coefficients		Introduction to Ordinary Differential Equation by Earl A. Coddington
January	**Week 5**		06	Properties of Legendre Polynomials, Linear DE with	Able to solve D.E		Introduction to Ordinary Differential

	06/01/25	**11/01/25**		regular singular point, Frobenius method, exceptional cases, Bessel equation of zero order.	with regular singular points		Equation by Earl A. Coddington
January	**Week 6** **13/01/25**	**18/01/25**	06	Bessel function of order alpha, properties of Bessel functions			Introduction to Ordinary Differential Equation by Earl A. Coddington
January	**Week 7** **20/01/25**	**25/01/25**	06	Properties of Bessel functions			Introduction to Ordinary Differential Equation by Earl A. Coddington
January-February	**Week 8** **27/01/25**	**01/02/25**	06	Properties of Bessel functions			Introduction to Ordinary Differential Equation by Earl A. Coddington
February	**Week 9** **03/02/25**	**08/02/25**	06	Properties of Bessel functions			Introduction to Ordinary Differential Equation by Earl A. Coddington
February	**Week 10** **10/02/25**	**15/02/25**	06	Convergence proof			Introduction to Ordinary Differential Equation by Earl A. Coddington
February	**Week 11** **17/02/25**	**22/02/25**	06	Generating functions,regular singular point at infinity			Introduction to Ordinary Differential Equation by Earl A. Coddington

February-March	**Week 12** **24/02/25**	**01/03/25**	06	Laplace Transform	Able to solve DE by using this method		Introduction to Ordinary Differential Equation by Earl A. Coddington
March	**Week 13** **03/03/25**	**08/03/25**	06	Laplace Transform			Introduction to Ordinary Differential Equation by Earl A. Coddington
March	**Week 14** **10/03/25**	**15/03/25**	06 Holi	Laplace Transform			Introduction to Ordinary Differential Equation by Earl A. Coddington
March	**Week 15** **17/03/25**	**22/03/25**	06	Numerical methods: Picards method, Euler method		Google Classroom	Introduction to Ordinary Differential Equation by Earl A. Coddington
March	**Week 16** **24/03/25**	**29/03/25**	06	modified Euler method ,Runge kutta method of second and fourth order		Google Classroom	Introduction to Ordinary Differential Equation by Earl A. Coddington
March-April	**Week 17** **31/03/25**	**05/04/25**	06 Gudi Padva, Id	Predictor corrector method ,Adams-Moultan method		Google Classroom	Introduction to Ordinary Differential Equation by Earl A. Coddington
April	**Week 18** **07/04/25**	**11/04/25**	04	Question Paper Discussion			

* Assessment Rubrics

Component	Max Marks
ISA 1	15
ISA 2	15
Practical	Nil
Project	Nil
Semester End Exam	120