

## **Dr. B. R. Ambedkar Govt. College, Jagdishpura, Kaithal**

### **Lesson Plan: 2024-25 (Odd Semester)**

**Name of Assistant Professor:** - Ms. Manju Devi

**Department:** Mathematics

**Class:** - B.Sc.(CS) (3rd Sem.)

**Subject:** - Differential Equations-I

<b>Week</b>	<b>Topic</b>
July/Fourth	Basic Concepts of Ordinary differential equations. Order and degree of ODE. Solution of D.E. of first order and first degree.
Aug./First	Solution of D.E. of first order and first degree. Exact differential equation.
Aug./Second	First order and higher degree equations solvable for x, y and p. Lagrange's Equations.
Aug./Third	Clairaut's form and singular solutions. Orthogonal Trajectories.
Aug./ Fourth	Solution of Linear DE with constant coefficients.
Aug./Fifth	Solution of Non- linear D.E. with constant coefficients.
Sept./ First	Linear D.E. of second order with variable coefficients.
Sept./ Second	Method of undetermined coefficients.
Sept./ Third	Method of Variation of parameters, Cauchy Euler Equations.
Sept./Fourth	Sol. Of simultaneous differential equations, Total diff. equations.
Oct./ First	Introduction to PDE, Concept of linear, nonlinear PDE, Complete Solution, General Solution and Singular solution.
Oct./Second	PDE of first degree and Lagrange's method to solve.
Oct./ Third	Compatible system of first order PDE.
Oct./Fourth	Charpit's Method, Special type of first order PDE's.
Oct./Fifth	Diwali Break.
Nov./ First	Jacobi's Method. Second order PDE with constant coefficient.
Nov. / Second	Second order PDE with constant coefficient.
Nov./ Third	Revision and Problems.
Nov./ Fourth	Examination.

# **Dr. B. R. Ambedkar Govt. College Jagdishpura Kaithal**

## **Lesson Plan: 2024-25 (Odd Semester)**

**Name of Assistant Professor:** - Ms. Manju Devi

**Department:** Mathematics

**Class:** - M.Sc (1st Sem.)

**Subject:** - Differential Equations-I

<b>Week</b>	<b>Topic</b>
Aug./First	Basics of Differential Equations.
Aug./Second	Linear differential systems: Definition and notations.
Aug./Third	Linear Homogeneous System and its basic Theorems.
Aug./ Fourth	Fundamental Matrix, Adjoint System.
Aug./Fifth	Non Homogeneous Linear system, Variation of constants.
Sept./ First	Linear system with constants coefficients. Reduction to smaller homogeneous systems.
Sept./ Second	Linear system with constants coefficients. Linear system with periodic coefficients, Floquet theory.
Sept./ Third	Higher order equations: linear differential equation of order $n$ , linear combination, Linear dependence and independence of solutions.
Sept./Fourth	Wronskian Theory: definition, necessary and sufficient condition for linear dependence and linear independence of solutions of homogeneous LDE.
Oct./ First	Abel's Identity, Fundamental set
Oct./Second	More Wronskian Theory Reduction of order. Non-Homogeneous LDE. Variation of parameters. Adjoint equations, Lagrange's identity, Greens Formula. Linear equation
Oct./ Third	Initial value problem and equivalent integral equation, E-approximate solution, equicontinuous set of functions. Ascoli-Arzela theorem, Cauchy peano existence
Oct./Fourth	Lipschitz Condition. Differential inequalities and uniqueness, Gronwall's inequality, Successive approximations. Picard-Lindelof Theorem.
Oct./ Fifth	Diwali Break.
Nov./ First	Continuation of solution .Maximal Interval of existence, Extension theorem, kneser's Theorem Maximal and minimal solutions, differential inequalities. A theorem of
Nov. / Second	Uniqueness theorems: Kamke's Theorem, Negumo's Theorem
Nov./ Third	Osgood Theorem, System of differential equations, the $n$ th order equation. Dependence of solutions on initial conditions and parameters. Continuity and
Nov./ Fourth	Dependence of solutions on initial conditions and parameters. Continuity and differentiability. Problem discussion

## **Dr. B. R. Ambedkar Govt. College, Jagdishpura, Kaithal**

### **Lesson Plan: 2024-25 (Odd Semester)**

**Name of Assistant Professor:** - Ms. Manju Devi

**Department:** Mathematics

**Class:** - B.Sc.(CS) (3rd Sem.)

**Subject:** - Practical

<b>Week</b>	<b>Topic</b>
July/Fourth	Problem solving for DE which are reducible to homogenous.
Aug./First	Problem solving for DE which are exact DE. Solution of first and second DE.
Aug./Second	Problem solving for linear DE with constant coefficient. Plotting of family of solution of DE of first, second and third order.
Aug./Third	Problem solving for linear DE with variable coefficient. Solution of DE using methods of variation of parameters.
Aug./ Fourth	Problem solving for DE by method of variation of parameters.
Aug./Fifth	Problem solving for DE which are reducible to homogenous.
Sept./ First	Problem solving for DE by method of undermined coefficient.
Sept./ Second	Growth and decay model ( Exponential case only)
Sept./ Third	Lake pollution model
Sept. Fourth	Problem solving for simultaneous DE.
Oct./ First	Density dependent growth model.
Oct./Second	Problem solving for different PDE using Lagrange's model.
Oct./ Third	To find the solution of linear DE of second order using built in function of maxima software.
Oct./Fourth	Problems solving for PDE with charpit, Jacobi method.
Oct./Fifth	Diwali Break
Nov./ First	To find numerical solution of first order ODE using plotdf built in function of maxima.
Nov. / Second	To find exact solution of first and second order ODE using dissolve and atvalue built in function of maxima.
Nov./ Third	To find the exact solution of first and second order ODE using ODE2 and IC1/IC2 built in function of Maxima
Nov./ Fourth	Examination

**Dr. B. R. Ambedkar Govt. College, Jagdishpura, Kaithal**

**Lesson Plan: 2024-25 (Odd Semester)**

**Name of Assistant Professor:** - Ms. Manju Devi

**Department:** Mathematics

**Class:** - B.Sc.(5th Sem.)

**Subject:** - Practical

<b>Week</b>	<b>Topic</b>
July/Fourth	Basic Programs in C
Aug./First	Theory related to Newton-Forward, Backward and Lagrange's Interpolation formulas.
Aug./Second	Write a Program to demonstrate Newton-Forward Interpolation formula.
Aug./Third	Write a Program to demonstrate Newton-Backward Interpolation formula.
Aug./ Fourth	Write a Program to demonstrate Lagrange's Interpolation formula.
Aug./Fifth	Theory related to Trapezoidal, Simpson's one-third and Simpson's three-eighth Rule.
Sept./ First	Write a Program to demonstrate Trapezoidal Rule.
Sept./ Second	Write a Program to demonstrate Simpson's one-third Rule.
Sept./ Third	Write a Program to demonstrate Simpson's three-eighth Rule.
Sept. Fourth	Theory related to Euler's and Euler's Modified method
Oct./ First	Write a Program to demonstrate Euler's method.
Oct./Second	Write a Program to demonstrate Euler's Modified method.
Oct./ Third	Theory related to Runge-Kutta Method
Oct./Fourth	Write a Program to demonstrate Runge-Kutta method.
Oct./Fifth	Diwali Break
Nov./ First	Theory related to Milne-Simpsons Method
Nov. / Second	Write a Program to demonstrate Milne-Simpsons method.
Nov./ Third	Revision
Nov./ Fourth	Examination