Indraprastha College for Women
University of Delhi

Course Name:	Generic Elective Course
Paper Title:	Numerical Methods
Unique Paper Code:	
Semester:	V
Faculty(s):	Dr Suman
Year:	2026

Work Plan			
Period	Unit No.	Learning Objective	Topics to be Covered

	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Gaussian elimination method (with row pivoting); Iterative methods: Jacobi method, Gauss−Seidel method.
	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Gaussian elimination method (with row pivoting); Iterative methods: Jacobi method, Gauss−Seidel method.
	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Gaussian elimination method (with row pivoting); Iterative methods: Jacobi method, Gauss−Seidel method.
	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Interpolation: Lagrange form, Newton form, Finite differenc operators.
	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Interpolation: Lagrange form, Newton form, Finite differenc operators.
	II	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical	Interpolation: Lagrange form, Newton form, Finite differenc operators.

		differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).		
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	First and second order numerical derivatives.	
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	First and second order numerical derivatives.	
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	First and second order numerical derivatives.	
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Trapezoidal rule, Simpson's rule for numerical integration; Ordinary differential equation: Euler's, and Runge-Kutta method.	
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of	Trapezoidal rule, Simpson's rule for numerical integration; Ordinary differential equation: Euler's, and Runge-Kutta method.	
		ordinary differential equations using Computer Algebra System (CAS).		

	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Trapezoidal rule, Simpson's rule for numerical integration; Ordinary differential equation: Euler's, and Runge-Kutta method.
	III	Acquaint students with various topics in numerical solutions of nonlinear equations in one variable, interpolation and approximation, numerical differentiation and integration, direct methods for solving linear systems, numerical solution of ordinary differential equations using Computer Algebra System (CAS).	Trapezoidal rule, Simpson's rule for numerical integration; Ordinary differential equation: Euler's, and Runge-Kutta method.
			Revision
	DISBERSAL OF CLASSES		

Unit	TOPICS
I	**Errors and Roots of Transcendental and Polynomial Equations** Errors: Roundoff error, Local truncation error, Global truncation error; Order of a meth Convergence, and terminal conditions; Bisection method, Secant method, Regula−Falsi method, Newton−Raphson method.
II	**Algebraic Linear Systems and Interpolation** Gaussian elimination method (with row pivoting); Iterative methods: Jacobi meth Gauss−Seidel method; Interpolation: Lagrange form, Newton form, Finite differe operators.
III	**Numerical Differentiation, Integration and ODE** First and second order numerical derivatives; Trapezoidal rule, Simpson's rule for numerical integration; Ordinary differential equation: Euler's, and Runge-Kutta method.
S. No.	**Name of Authors/Books/Publishers**
1.	Chapra, Steven C. (2018), Applied Numerical Methods with MATLAB for Engineers a Scientists (4th ed.). McGraw-Hill Education.
2.	Fausett, Laurene V.(2009), Applied Numerical Analysis Using MATLAB. Pearson. Indi