



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc.(P) Electronics						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
6th		Numerical Methods	3			
Teacher/Instructor(s)		MONU KUMAR				
Session		2021				

Course Objectives: The goal of this paper is to acquaint students for the study of certain algorithms that uses numerical approximation for the problems of mathematical analysis. Also, the use of Computer Algebra Systems (CAS) by which the intractable problems can be solved both numerically and analytically.

Course Learning Outcomes: After completion of this course, students will be able to:

- i) Find the consequences of finite precision and the inherent limits of numerical methods.
- ii) Appropriate numerical methods to solve algebraic and transcendental equations.
- iii) Solve first order initial value problems of ODE's numerically using Euler methods.

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
		1-4	Interpolation: Lagrange form, and Newton form.
2		5-7	Finite difference operators and backward difference interpolations.
		8-11	Gregory–Newton forward and backward difference interpolations.
		12-14	Piecewise polynomial interpolation: Linear, and quadratic.
3			
		15-19	Numerical differentiation: First and second order derivatives
		20-25	Richardson extrapolation method
		26-30	Numerical integration: Trapezoidal rule, Simpson's rule;
		31-35	Ordinary differential equations: Euler's method.
-		36-42	Modified Euler's methods: Heun's method, Midpoint method.

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	75

Details of the Course		
Unit	Contents	Contact Hours
2	Interpolation: Lagrange form, Newton form, Finite difference operators, Gregory–Newton forward and backward difference interpolations, Piecewise polynomial interpolation (Linear and quadratic).	14
3	Numerical differentiation: First and second order derivatives, Richardson extrapolation method; Numerical integration: Trapezoidal rule, Simpson's rule; Ordinary differential equation: Euler's method, Modified Euler's methods (Heun's and midpoint).	28
	Total	42

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1-	Chapra, Steven <i>Applied Numerical Methods with MATLAB for Engineers and</i>	2018.
2-	Scientists (4th ed.). McGraw-Hill Education. Fausett, Laurene V. <i>Applied Numerical Analysis Using MATLAB</i> . Pearson. India.	2009.
3-	Jain, M. K., Iyengar, S. R. K., & Jain R. K. <i>Numerical Methods for Scientific and Engineering Computation</i> (6th ed.). New Age International Publishers	2012.
4-	Bradie, Brian (2006). <i>A Friendly Introduction to Numerical Analysis</i> . Pearson Education India. Dorling Kindersley (India) Pvt. Ltd. Third Impression, 2011.	2006, 2011

Mode of Evaluation:

Internal Assessment / End Semester Exam