



# ARSD College, University of Delhi

## Model Course Handout/Lesson Plan

<b>Course Name : B.Sc. (Hons) Physics IV Sem. Lab</b>						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
IV	Generic Elective (GE-IV)	Numerical Methods (with Practicals)	0	0	4	2
Teacher/Instructor(s)		Mr. Anil Kumar Rajak and Mr. Agam Dwivedi				
Session		January-May (Even Semester) 2021-22				

### Course Description:

The primary objective of the course is to make deep understanding of various numerical methods in Maxima Software such as to find the roots of algebraic/ transcendental equations, solving the systems of algebraic equations, interpolation, numerical integration and to perform solution of first order initial value problems of Ordinary Differential Equations.

### List of Experiments:

Details of the Lab Course		
Session	Name of Experiment	Contact Hours
1	Find the root of algebraic/ transcendental equation by Bisection method	4Hrs
2	Find the root of algebraic/ transcendental equation by Secant method	4Hrs
3	Find the root of algebraic/ transcendental equation by Regula-Falsi method	4Hrs
4	Find the root of algebraic/ transcendental equation by Newton Raphson method	4 Hrs
5	Solve the system of algebraic equations by Gauss elimination method	4Hrs
6	Solve the system of algebraic equations by Gauss-Jordan method	4Hrs
7	Solve the system of algebraic equations by Gauss Jacobi method	4Hrs
8	Solve the system of algebraic equations by Gauss Seidel method	4Hrs
9	Determine interpolating polynomial by using Lagrange interpolation.	4Hrs
10	Determine interpolating polynomial by using Newton interpolation.	4Hrs
11	Numerical Integration by Trapezoidal rule.	4Hrs
12	Numerical integration by Simpsons rule	4Hrs
13	Solution of first order initial value problems of Ordinary Differential Equations by Euler method	4Hrs
14	Doubt discussion, Model Exam, Quiz/Viva	4Hrs
<b>Total</b>		<b>56 Hrs</b>

### Suggested Books:

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

**Evaluation Scheme:**

No.	Component	Duration	Marks
1.	Internal Assessment		25
	● Quiz/Viva		
	● Observation & Record		
	● Attendance		
	● Model Exam		
2.	End Semester Examination	3 Hrs	25