NUMERICAL ANALYSIS LABORATORY

II Semester: **ST**

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BSTB20	Core	0	0	4	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 40				Total Classes:40		

I. COURSE OVERVIEW:

This course deals with the numerical solutions of linear and non-linear equations by using different algorithms. These includes bi section method, newton's method, method of least squares, gauss elimination method, gauss zordan method, gauss seidal method, trapezoidal rule, simpson's rule and ranga-kutta method. This will enable the students to accostum with programming using different computer languages.

II. COURSE OBJECTIVES:

The student will try to learn:

I. The Roots of non-linear equations by Bisection method and Newton's method.
II. The system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/Gauss - Jorden Method.
III. The integrations numerically using Trapezoidal and Simpson's rules

III. COURSE OUTCOMES

After successful completion of the course, students should be able to:		
CO 1	Analyze the roots of non-linear equation using bisection and newton's method.	Analyze
CO 2	Evaluate the curve fitting by using method of least squares approximations.	Evaluate
CO 3	Determine the linear system of equations using gauss elimination, gauss seidal and gauss Jordan methods.	Analyze
CO 4	Solve the integrations numerically using trapezoidal and simpson's rule.	Apply
CO 5	Explain the numerical solution of ordinary differential equations using Euler's Method.	Analyze
CO 6	Analyze the numerical solution of ordinary differential equations by using Runge- Kutta Method.	Apply

IV. SYLLABUS

LIST OF EXPERIMENTS

Week-I	**BISECTION METHOD**
Find the Roots of Non-Linear Equation Using Bisection Method	
Week-II	**NEWTON'S METHOD**
Find the Roots of Non-Linear Equation Using Newton's Method.	

Week-III	**CURVE FITTING**
Curve Fitting by Least Square Approximations.	
Week-IV	**GAUSS ELIMINATION METHOD**
Solve the System of Linear Equations Using Gauss - Elimination Method.	
Week-V	**GAUSS SEIDAL ITERATION METHOD**
Solve the System of Linear Equations Using Gauss - Seidal Iteration Method.	
Week-VI	**GAUSS JORDEN METHOD**
Solve the System of Linear Equations Using Gauss - Jorden Method.	
Week-VII	**TRAPEZIODIAL RULE**
Integrate numerically using Trapezoidal Rule.	
Week-VIII	**SIMPSON'S RULE**
Integrate numerically using Simpson's Rules.	
Week-IX	**EULER'S METHOD**
Numerical Solution of Ordinary Differential Equations By Euler's Method.	
Week-X	**RUNGE KUTTA METHOD**
Numerical Solution of Ordinary Differential Equations By Runge- Kutta Method.	
Text Books:	
1. D.A. Bini, M. Capovani, O. Menchi, "Method of Numerical Algebra Linear", Zanichelli, 1988.	
Reference Books:	
1. R. Bevilacqua, D.A. Bini, M. Capovani, O. Menchi, MetodiNumerici, Zanichelli, 1992	
Web References:	
1. http://www.iitg.ac.in/physics/fac/charu/courses/ph508/lab5.pdf	
E-Text Books:	
1. https://www.researchgate.net/publication/275014975_A_Numerical_Analysis_Lab_Solving_System_of_Linear_Equations	