NUMERICAL COMPUTING CS325

Project Description: CL04

Max.Marks:15

Assistant Prof :Muhammad Jamil Usmani

CL04: The student would understand the fundamental concepts of Scientific Programming using programing Language(s) and software.

- ✓ Students will study algorithm first then write a code on Python / Matlab
- ✓ Select at least three Labs consisting three methods of each lab

Lab 1 Solution (Root) of nonlinear equations in one variable f(x)=0:

The Bisection method , Method of False position (Regula falsi).

Fixed Point iteration. (x=g(x)), Newton's Raphson and Secant Method.

Lab 2 Interpolation and Polynomial approximation:

Lagrange interpolation polynomial of degree one, two and three

Divided difference table and interpolating polynomial. Newton Forward and Backward difference formula

Lab 3 Numerical Integration:

Trapezoidal and Simpson's rule, Closed and open Newton-Cotes formulas.

Composite Numerical Integration: Trapezoidal, Simpson's and Midpoint formula

Lab 4 Differential Equations:

Euler's method, 2-RK method , Mid-Point formula

Modify Euler and Huen's method, 4-RK method

Lab 5 Solution of linear system AX=b:

LU decomposition method

Gauss-Seidal and Jacobi method

NOTE: Class CR will make groups and submit to teacher within two weeks. Submission/Viva/Presentation (Key dates) will announce soon after mid2