

H. N. G. University , Patan
M.C.A(5 Years Integrated Programme) – Semester - III
301: Numerical Methods

Unit: 1 **[25%]**

Errors in Numerical Analysis: -

Absolute Error, Relative Error, Percentage Error.

Numerical Solution of Non Linear Equations : -

Methods of finding solutions of Non Linear Equations

Bracketing Method:

1. Bisection Method
2. False Position Method

Open end Method:

1. Newton Raphson Method
 2. Secant Method
 3. Successive Approximation Method
- (all methods with Algorithms)

Unit: 2 **[25%]**

Solution of Simultaneous Linear Equations : -

Gauss Elimination Method (Direct Method) ,

Gauss Seidal Method (Iterative Method) ,

Difference between Direct and Iterative Method

Interpolation :-

Forward difference , Backward Difference ,
Divided Difference

Finite Differences :

- 1). Newton's Forward Difference Interpolation Formula
- 2). Newton's Backward Difference Interpolation Formula

Interpolation with Unequal Interval :

- 1). Newton's Divided Difference Interpolation Formula
- 2). Lagrange's Interpolation Formula
- 3). Lagrange's Inverse Interpolation Formula

Unit: 3 **[25%]**

Numerical Integration:

Trapezoidal Rule ,

Simpson's 1/3 rd Rule for quadratic function ,

Simpson's 3/8 th Rule for third order Polynomial .

Unit: 4 **[25%]**

Numerical Solution of Differential Equation :-

Euler's Method ,

Taylor Series Method ,

Runge Kutta Second Order Method ,

Runge Kutta Fourth Order Method .

Text Books :-

1. Computer Oriented Numerical Methods (V. Rajaraman)

Reference Book :-

1. Introductory method of Numerical Methods (S.S.Sastry)
2. Computer Oriented Numerical Methods (R.S.Saslaria)
3. Scientific and Statistical Computing (Heena Timani)