

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VI SEMESTER

MATHEMATICS

TIME: 5 Hrs/Week

CLUSTER VIII(A) –2

M 6301 – A- 2 (4)

Advanced Numerical Analysis

Max. Marks: 100

w.e.f. 2017-2018

SYLLABUS

OBJECTIVES : To enable the students to

- Know and understand Numerical Methods .
- Distinguish between Numerical differences, integration and classical difference & Integration .
- Apply the knowledge Extensively in Engineering and Statistics.

COURSE :

Unit – I

Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II :

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III :

Numerical Integration: General Quadrature formula on errors, Trapezoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, and Weddle's rules, Euler – Maclaurin Formula of summation and quadrature, The Euler transformation.

UNIT – IV:

Solutions of simultaneous Linear Systems of Equations: Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method, Method of factorization, Solution of Tridiagonal Systems,. Iterative methods. Jacobi's method, Gauss-siedal method.

UNIT – V

Numerical solution of ordinary differential equations: Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

TEXT BOOK : Calculus of Finite Differences And Numerical Analysis by Prof. P.P.Gupta and G.S. Malik – Krishna Prakashan Media (P) Ltd. Meerut (U.P) (2006)

Reference Books :

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall India (Latest Edition).(2015)
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New – Hyderabad.(2006)
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt. Ltd., New Delhi.(2009)
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.(2002)

ST.JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

VI SEMESTER

MATHEMATICS

TIME: 1 Hr / Week

CLUSTER VIII(A) -2

M 6351 – A- 2 (1)

Advanced Numerical Analysis

Max. Marks: 50

w.e.f. 2017-2018

PRACTICAL SYLLABUS

OBJECTIVES : To enable the students to

- Know and understand Numerical Methods .
- Distinguish between Numerical differences , integration and classical difference & Integration .
- Apply the knowledge Extensively in Engineering and Statistics.

COURSE :

Unit – I

Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II :

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, Stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III :

Numerical Integration: General quadrature formula on errors, Trapezoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, and Weddle's rules, Euler – Maclaurin Formula of summation and quadrature, The Euler transformation.

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