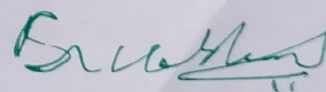


Andhra Pradesh State Council of Higher Education  
CBCS B.A./B.Sc. **Mathematics** Course Structure

w.e.f 2015 -16 (Revised in April, 2016)		VI	Linear Algebra & Linear Algebra Problem Solving Sessions	5	5	25	75	100
	VI	VII	<b>Electives: (any one)</b> VII-(A) Laplace Transforms VII-(B) Numerical Analysis VII-(C) Number Theory & Elective Problem Solving Sessions	5	5	25	75	100
		VIII	<b>Cluster Electives:</b> VIII-A-1: Integral Transforms VIII-A-2: Advanced Numerical Analysis VIII-A-3: <i>Project work</i> or VIII-B-1: Principles of Mechanics VIII-B-2: Fluid Mechanics VIII-B-3: <i>Project work</i> or VIII-C-1: Graph Theory VIII-C-2: Applied Graph Theory VIII-C-3: <i>Project work</i>	5	5	25	75	100
				5	5	25	75	100
				5	5	25	75	100



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**B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS**

**SEMESTER – VI, PAPER – VII-(B)**

**ELECTIVE–VII-(B); NUMERICAL ANALYSIS**

**60 Hrs**

**UNIT- I: (10 hours)**

**Errors in Numerical computations :** Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

**UNIT – II: (12 hours)**

**Solution of Algebraic and Transcendental Equations:** The bisection method, The iteration method, The method of false position, Newton Raphson method, Generalized Newton Raphson method. Muller's Method

**UNIT – III: (12 hours) Interpolation - I**

**Interpolation :** Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial

**UNIT – IV: (12 hours) Interpolation - II**

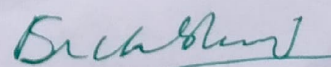
Newton's formulae for interpolation. Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

**UNIT – V : (14 hours) Interpolation - III**

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation.

**Reference Books :**

1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt.



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Ltd., New Delhi.

4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

**Suggested Activities:**

Seminar/ Quiz/ Assignments

**B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS,  
SEMESTER – VI, CLUSTER – A, PAPER – VIII-A-1  
Cluster Elective- VIII-A-1: INTEGRAL TRANSFORMS**

60 Hrs

**UNIT – 1 (12 hrs) Application of Laplace Transform to solutions of Differential Equations :-**

Solutions of ordinary Differential Equations.  
Solutions of Differential Equations with constants co-efficient  
Solutions of Differential Equations with Variable co-efficient

**UNIT – 2 (12 hrs) Application of Laplace Transform :-**

Solution of simultaneous ordinary Differential Equations.  
Solutions of partial Differential Equations.

**UNIT – 3 (12 hrs) Application of Laplace Transforms to Integral Equations :-**

**Definitions :** Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations.Application of L.T. to Integral Equations.

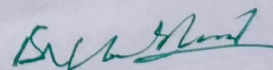
**UNIT – 4 (12 hrs) Fourier Transforms-I :-**

Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

**UNIT – 5 (12 hrs) Fourier Transform-II :-**

Convolution Definition – Convolution Theorem for Fourier transform – parseval's Identity – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

**Finte Fourier Transforms :-**

  
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Finite Fourier Sine Transform – Finite Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

**Reference Books :-**

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company Pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania, - H.C. Saxena and H.K. Dass Published by S.Chand and Company Pvt. Ltd., New Delhi.

**Suggested Activities:**

Seminar/ Quiz/ Assignments

**B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS**

**SEMESTER – VI: PAPER – VIII-A-2**

**ELECTIVE – VIII-A-2: ADVANCED NUMERICAL ANALYSIS**

**60 Hrs**

**Unit – I (10 Hours)**

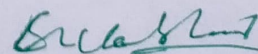
**Curve Fitting:** Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

**UNIT- II : (12 hours)**

**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 : (12 hours)**

**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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**UNIT – IV: (14 hours)**

**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 (12 Hours)**

**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.

**Reference Books :**

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

**Suggested Activities:**

Seminar/ Quiz/ Assignments



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