

ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC(CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

Faculty of Science

Bachelor of Science (B.Sc.)

SUBJECT: Mathematics

B.Sc. VI Semester

Paper- Discipline Specific Elective (DSE) Group-A,

Paper-1

Advanced Numerical Methods and Scientific Computation

Course Outcomes

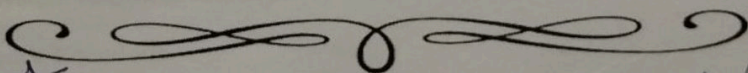
CO.No.	Course Outcomes	Cognitive Level
CO1	Understand and evaluate Hermite Interpolation, Piecewise Interpolation	U, E
CO2	Analyze and evaluate Spline Interpolation, Bivariate Interpolation and Lagrange Bivariate Interpolation.	An, E
CO3	Analyze, evaluate and apply Approximation, Find Least Square approximation	An, E, Ap
CO4	Evaluate, analyze and apply extrapolation methods, Richardson's extrapolation ordinary differential equations and Difference Equations.	E, An, Ap

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	30	70	100
Total	4		100	

Evaluation Scheme

	Marks	
	Internal	External
Theory	3 Internal Exams of 20 Marks (During the Semester) (Best 2 will be taken)	1 External Exams (At the End of Semester)



Khandus 26/7/24
Stalans
Ramin
Stain
M. D. ...
M. D. ... 26/7/24
Archi
V. L.

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Content of the Course

Theory

No. of Lectures (in hours per week) 48 Hrs.perweek

Total No. of Lectures:60Hrs.

Maximum Marks:60

Unit	Topics	No. Of Lectures
I	1. Interpolation : 1.1 Hermite Interpolation 1.2 Piecewise Interpolation 1.2.1 Piecewise Linear Interpolation 1.2.2 Piecewise Quadratic Interpolation 1.2.3 Piecewise Cubic Interpolation 1.2.4 Piecewise Cubic Interpolation using Hermite Type Data	18
II	2.1 Spline interpolation: 2.1.1 Quadratic spline interpolation 2.1.2 Cubic spline interpolation 2.1.3 Natural Spline 2.2 Bivariate interpolation 2.2.1 Lagrange Bivariate interpolation 2.2.2 Newton's Bivariate interpolation for Equispaced Points	18
III	3.1 Approximation : 3.1.1 L^p Norm for Discrete Data and Continuous Data 3.1.2 Euclidean Norm for Discrete Data and Continuous Data 3.1.3 Uniform Norm for Discrete Data and Continuous Data 3.2 Least squares Aproximation 3.2.1 Gram-Schmidt Orthogonalizing Process 3.2.2 Legendre Polynomials	22
IV	4.1 Extrapolation methods : 4.1.1 Richardson's Extrapolation 4.2 Ordinary differential equations 4.2.1 Reduction of Higher order Equations to the system of first order Differential Equations 4.2.2 System of Linear first order Differential Equations with Constant Coefficients 4.3 Difference Equations.	22

Meendus
26/7/24

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Thimmi

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M. Dube

M. Dube
26/7/24

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References

Text Books:

1. Numerical Method for scientific and Engineering computation by M.K. Jain , S.R.K. Iyenger , R.K. Jain south Edition (2003) , New Age .
2. मध्यप्रदेश हिंदी ग्रंथ अकादमी की पुस्तके।

Reference Books:

1. Saxena H.C.: Finite Differences and Numerical Analysis, S Chand, 2010.
2. S.S. Sastry: Introductory Methods of Numerical Analysis, Prentice Hall India Learning Private Limited, Fifth edition, 2012.

Mandant
26/7/24

M. Dube

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Amlana

Kumar

Spain

Beuti

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