

**SES'S L. S. RAHEJA COLLEGE OF
ARTS AND COMMERCE
(AUTONOMOUS)**



Syllabus of Numerical Methods and Discrete Structures under NEP 2020 vertical (OE) with effect from 2024-2025

Programme: Bachelor of Science in Information Technology

Department of Mathematics, Statistics and Computer

HoD/Sr. Person of the Department: Dr. Seema Ukidve

Date of approval by the BoS: 24/04/2024

Approved by the Academic Council: 29/04/2024

Approved by the Governing Body: 06/05/2024



Programme: B.Sc.(IT)			Semester : II		
Course : Numerical Methods and Discrete Structures in IT			Code: UGBSCITHIOE124		
Academic Year: 2024-2025			Batch: 2024-2027		
Teaching Scheme			Evaluation Scheme		
Lectures	Practical	Tutorials	Credits	Internal Continuous Assessment (ICA) (weightage)	Term End Examinations (TEE) (weightage)
30	Nil	Nil	2	20	30

Learning Objectives:	Course will enhance the problem-solving skills of students using extremely powerful numerical methods.
Learning Outcomes :	<ol style="list-style-type: none"> Understand numerical techniques to find the roots of non-linear equations and solution of system of linear equations. Understand the difference operators and the use of interpolation. Understand numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.
Pedagogy:	<ol style="list-style-type: none"> Interactive Lectures Flipped Classroom Case Studies and Real-World Applications Collaborative Learning Research Component

Detailed Syllabus: (per session plan)

Session Outline for “Numerical Methods and Discrete Structures in IT”

Each lecture session would be of one hour duration (30 Sessions).

Module	Module Content	Module Wise Pedagogy Used	Module Wise Duration
I	<p>Linear Programming: Linear optimization problem, Formulation and Graphical solution, Basic solution and Feasible solution.</p> <p>Numerical Analysis:</p> <p>Numerical Error and Stability: Types of errors, stability analysis in numerical algorithms.</p> <p>Solutions of Equations: Bisection method, Newton-Raphson method, Secant method.</p> <p>Interpolation and Approximation: Polynomial interpolation, spline interpolation, least squares approximation.</p> <p>Numerical Differentiation and Integration: Approximations of derivatives, numerical integration using trapezoidal and Simpson's rules.</p>		15
II	<p>Binary Trees</p> <p>Introduction, Binary Trees, Complete and Extended Binary Trees, Representing Binary Trees in Memory, Traversing</p>		15

Binary Trees, Binary Search Trees, Priority Queues, Heaps, Path Lengths, Huffman's Algorithm, General (Ordered Rooted) Trees Revisited Ordered Sets and Lattices Introduction, Ordered Sets, Hasse Diagrams of Partially Ordered Sets, Consistent Enumeration, Supremum and Infimum, Isomorphic (Similar) Ordered Sets, Well- Ordered Sets, Lattices 346 Ordered Lattices, Distributive Lattices, Complements, Complemented Lattices		
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REFERENCE BOOKS

Title	Author/s	Publisher	Edition	Year
Introductory Methods of Numerical Methods	S. S. Sastry	PHI	5th	2012
Numerical Methods for Engineers	Steven C. Chapra, Raymond P. Canale	Tata Mc Graw Hill	6th	2010
Numerical Analysis	Richard L. Burden, J. Douglas Faires	CengageLearning	9th	2011
Numerical Methods	T Veerarajan T Ramachandran	Tata Mc Graw Hill	7th	2011
Advanced Applied Mathematics	M. P. Chaudhary	Piyush Book Publication Pvt. Ltd. New Delhi, India, 2003 .ISBN:81-86548-64-5		

QUESTION PAPER PATTERN

<p>Details of Internal Continuous Assessment (ICA)</p> <p>Internal Test Marks: 10 1 internal test of 10 marks will be conducted.</p>
<p>Term End Examination Question Paper Pattern Total Marks: 30</p> <p>Q1 Answer any three out of the following Four questions (based on Module I) 5*3=15</p> <p>Q2 Answer any three out of the following Four questions (Based on Module II) 5*3=15</p>