**KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)**
**Department Of Mathematics**

| Programme | Semester | Title of The Course | Course Code: | W.E.F |
|---|---|---|---|---|
| I B.Sc.(IOT) | I | NUMERICAL ANALYSIS | R20IOTMAT101A | 2022-23 |

| Total No of Hours for Teaching – Learning | Instructional Hours for Week | | Duration of Semester End Examination in Hours | Max Marks | | Credits |
|---|---|---|---|---|---|---|
| 60 Hours | Theory | Practical | 3 Hours | CIA | SEE | 4 |
| | 4 | 2 | | 40 | 60 | |

**LEARNING OBJECTIVES**

The aim of this course is to develop numerical methods to solve algebraic equations and approximate values of the functions and to find the values of definite integrals

**COURSE OUTCOMES**

On Completion of this course the students will be able to:

- Analyse the errors and approximations in numerical methods
- Apply an appropriate numerical method to solve algebraic or transcendental equations
- knowledge of finite differences and understanding the concept of Interpolation
- To know the concept of interpolation with equal intervals.
- Knowledge of interpolation with unequal intervals.

UNIT- I: (10hours)

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

UNIT– II:(12hours)

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'sMethod.

UNIT– III:(12hours)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: (12hours)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 :(14hours)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

ReferenceBooks:


1. Numerical Analysis by S.S.Sastry, published by Prentice Hall of India Pvt.Ltd., NewDelhi.(LatestEdition)
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.Chandand Company,Pvt.Ltd.,NewDelhi.
4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K. Iyengar ,R.K.Jain.


**BLUE PRINT :**

| UNIT | SAQ | LAQ |
|---|---|---|
| I | 2 | 2 |
| II | 2 | 2 |
| III | 2 | 2 |
| IV | 1 | 2 |
| V | 1 | 2 |

# KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)
## Department Of Mathematics

| Programme | Semester: | Title of The Course | Course Code: | W.E.F |
|---|---|---|---|---|
| I B.Sc.(IOT) | II | DISCRETE MATHEMATICS | R20IOTMAT201A | 2022-23 |

| Total No of Hours for Teaching – Learning | Instructional Hours for Week | | Duration of Semester End Examination in Hours | Max Marks | | Credits |
|---|---|---|---|---|---|---|
| | Theory | Practical | | CIA | SEE | |
| 60 Hours | 4 | 2 | 3 Hours | 25 | 75 | 4+1 |

**COURSE OBJECTIVE**

- The aim of this course is to provide necessary information to Discrete Mathematics and their applications.
- To develop logical thinking and its application to computer science

**COURSE OUTCOME**

- To know the concept of Boolean Algebra and Logic Circuits.
- Will be able to write an argument using logical notation and determine if the argument is or is not valid.
- Will be able to know Group codes , parity-check and generator matrix , Hamming codes.
- Knowledge of Lattice and Poset
- Knowledge of elements of coding theory

**UNIT-1**:(12-hours): **Boolean Algebra & Logic Circuits – 1 :**

Introduction , Boolean Algebra , Unique Features , Basic Operations.

Boolean Function , De-Morgan's Theorem , Logic Gate , Sum of products and Product of sums form , Normal form , Expression of a Boolean function as a Canonical Form , Simplification of Boolean Expression by Algebraic Method .

**UNIT-2**:(12-hours): **Boolean Algebra & Logic Circuits – 2 :**

Boolean Expression from Logic and Switching Network , Implementation of Logic Expressions with Logic Gates and Switching Circuits , Functionally Complete Sets , Karnaugh Map Method for Simplification of Boolean Expression , Arithmetic Circuits .

**UNIT-3**(12-hours): **Fuzzy Sets :**

Introduction , Basic concepts , Collection of Sets , Multi Set , Countable and Uncountable Sets , Order pairs and Cartesian Product , Computer Representation of Sets , Fuzzy Sets .

**UNIT-4** (12-hours): **Posets and Lattices :**

Introduction , Partially Ordered Sets , Product and Lexicographic Order , Hasse Diagram , Special Elements of Posets , Lattice , Lattice as Algebraic System , Sublattices , Some Special Lattices , Finite Boolean Algebra .

**UNIT-5** (12-hours): **Elements of Coding Theory :**

Introduction , Definitions , Group Codes , Parity-check and Generetor Matrix , Hamming Codes .

## Prescribed Book :

A Text Book of Discrete Mathematics by Dr. Swapan Kumar Sarkar published by S-Chand & company.

**BLUE PRINT:**

| UNIT | SAQ | LAQ |
|---|---|---|
| I | 2 | 2 |
| II | 2 | 2 |
| III | 2 | 2 |
| IV | 2 | 2 |
| V | 2 | 2 |

**KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)**
**Department Of Mathematics**

| Class: | Semester: | Title of The Paper: | Paper Code: | W.E.F |
|---|---|---|---|---|
| ALL II YEARS | III | ANALYTICAL SKILLS | R20LSC301 | 2021-22 |

| Total No of Hours for Teaching - Learning | Instructional Hours for Week | | Duration of Semester End Examination in Hours | Max Marks | | Credits |
|---|---|---|---|---|---|---|
| 30 Hours | Theory | Practical | 2 Hours | CIA | SEE | 2 |
| | 3 | 0 | | 0 | 30 | |

**Course Objective:**
Intended to inculcate quantitative analytical skills and reasoning as an inherent abilityin students.

## Course Outcomes:

After successful completion of this course, the student will be able to;

- Knowledge of basic concepts of arithmetic ability, quantitative ability, logical reasoning, businesscomputations and data interpretation and obtain the associated skills.
- To know the acquire competency in the use of verbal reasoning.
- Identify and use appropriate technology to research , solve, and present solutions to problems.
- Knowledge of Solve problems pertaining to quantitative ability, logical reasoning and verbal ability inside and outsidethe campus.
- Formulate and articulate ideas

**UNIT – 1:** (10 Hours)
**Arithmetic ability:** Algebraic operations BODMAS, Fractions, Divisibility rules, LCM & GCD (HCF).

**Verbal Reasoning:** Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

**UNIT – 2:** (10 Hours)
**Quantitative aptitude:** Averages, Ratio and proportion, Problems on ages, Time-distance – speed.

**Business computations:** Percentages, Profit & loss, Partnership, simple compound interest.

**UNIT – 3:** (07 Hours)
**Data Interpretation:** Tabulation, Bar Graphs, Pie Charts, line Graphs. Venn diagrams.

## Recommended Co-Curricular Activities (03 hrs)

Surprise tests / Viva-Voice / Problem solving/Group discussion.

## Text Book:

Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.Chand Publications.

## Reference Books

Analytical skills by Showick Thorpe, published by S Chand And Company Limited, Ramnagar,New Delhi-110055

1. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
2. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw HillPublications.

**KAKARAPARTI BHAVANARAYANA COLLEGE (Autonomous)**
**Department Of Mathematics**

| Programme | Semester: | Title of The Course | Course Code: | W.E.F |
|---|---|---|---|---|
| II IOT | IV | ADVANCED NUMERICAL ANALYSIS | R20IOTMAT401A | 2022-23 |

| Total No of Hours for Teaching – Learning | Instructional Hours for Week | | Duration of Semester End Examination in Hours | Max Marks | | Credits |
|---|---|---|---|---|---|---|
| 60 Hours | Theory | Practical | 3 Hours | CIA | SEE | 6 |
| | 4 | 3 | | 25 | 75 | |

**LEARNING OBJECTIVES**

The aim of this course is to develop numerical methods to solve algebraic equations and approximate values of the functions and to find the values of definite integrals

**LEARNING OUTCOMES**

- Ability to find solutions for algebraic equations, ordinary differential equations
- Calculating the errors and approximations in numerical methods
- Analysis of finite differences
- Knowledge of matrix, Linear system of equations
- Knowledge of Taylors Series, Picards method.

Unit– I(10Hours)

CurveFitting:Least–Squares curve fitting procedures, fitting a straightline , nonlinear curve fitting, Curve fitting by a sum of exponentials

UNIT-II:(12hours)

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward differenceformula, Derivatives using central difference formula, stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a t abulated function.

UNIT-III:(12hours)

Numerical Integration: General quadrature formula on errors,Trapozoidalrule,Simpson's1/3–rule, Simpson's 3/8–rule, and Weddle's rules,Euler–Maclaurin Formula of summation and quadrature, The Euler transformation.

UNIT– IV: (14hours)

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'smethod, Gauss-siedal method.

UNIT– V (12Hours)

Numerical solution of ordinary differential equations: Introduction, Solution by Taylor'sSeries, Picard's method of successive approximations, Euler'smethod, Modified

Euler's method,Runge–Kutta methods.

ReferenceBooks:

1. NumericalAnalysisbyS.S.Sastry,publishedbyPrenticeHallIndia(LatestEdition).
2.NumericalAnalysisbyG.SankarRao,publishedbyNewAgeInternationalPublishers,New– Hyderabad.
3.FiniteDifferencesandNumericalAnalysisbyH.CSaxenapublishedbyS.ChandandCompany, Pvt.Ltd.,NewDelhi.
4.Numericalmethodsforscientificandengineeringcomputationby M.K.Jain,S.R.K.Iyengar, R.K.Jain

## BLUE PRINT :

| UNIT | SAQ | LAQ |
|---|---|---|
| I | 2 | 2 |
| II | 2 | 2 |
| III | 2 | 2 |
| IV | 1 | 2 |
| V | 1 | 2 |