

**B.Sc. FIRST YEAR MATHEMATICS SYLLABUS PAPER - I  
SEMESTER –I (w.e.f. 2020 -2021, Revised in March 2020)**

**DIFFERENTIAL EQUATIONS –  
( Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** Differential Equations introduced by Leibnitz in 1676 models almost all Physical, Biological, Chemical systems in nature. The objective of this course is to familiarize the students with various methods of solving differential equations and to have a qualitative applications through models. The students have to solve problems to understand the methods.

**Expected Outcomes:** A student completing the course is able to solve differential equations and is able to model problems in nature using Ordinary Differential Equations. This is also prerequisite for studying the course in Partial Differential Equations and models dealing with Partial Differential Equations.

**UNIT – I (12 Hours), Differential Equations of first order and first degree :**

Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

**Orthogonal Trajectories:**

**Differential Equations of first order but not of the first degree:**

Equations solvable for  $p$ ; Equations solvable for  $y$ ; Equations solvable for  $x$ ; Equations that do not contain  $x$  (or  $y$ ); Equations of the first degree in  $x$  and  $y$  – Clairaut's Equation.

**UNIT – II (12 Hours), Higher order linear differential equations-I :**

Solution of homogeneous linear differential equations of order  $n$  with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General Solution of  $f(D)y=0$

General Solution of  $f(D)y=Q$  when  $Q$  is a function of  $x$ .

$\frac{1}{f(D)}$  is Expressed as partial fractions.

P.I. of  $f(D)y = Q$  when  $Q = be^{ax}$

P.I. of  $f(D)y = Q$  when  $Q$  is  $\sin ax$  or  $\cos ax$ .

**UNIT – III (12 Hours), Higher order linear differential equations-II :**

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of  $f(D)y = Q$  when  $Q = bx^k$

P.I. of  $f(D)y = Q$  when  $Q = e^{ax}V$

P.I. of  $f(D)y = Q$  when  $Q = x^mV$

P.I. of  $f(D)y = Q$  when  $Q = x^mV$

**UNIT –IV (12 Hours), Higher order linear differential equations-III :**

Method of variation of parameters; linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation.

**UNIT – V. ANCIENT INDIAN MATHEMATICS**

**Indian Mathematics in Sanskrit: Concept and Achievements.**

**1.Zero and Infinity in Indian Mathematics.**

- i. Etymology of the word Zero and Operations with Zero
- ii. Zero in Lilavathi and Bijaganita of Bhaskaracharya-II
- iii. Universal property of infinity in Bijaganita of Bhaskaracharya-II

**II.NUMERALS IN SANSKRIT WORKS**

- i. Numbers and Numerals in Sanskrit works
- ii. Sanskrit Words as Numerals
- iii. Sanskrit Alphabets as Numerals
- iv. A Ready Reckoner
- v. Buddhist Alchemist Nagarjunas Magic squares

**III.Aryabhatiya Alphabetical Numeral system and Its Application.**

- i. Aryabhatiya Numeral system of Aryabhata-1
- ii. Sloka from Aryabhatiya and a Ready Reckoner for Aryabhatiya Numeral system
- iii. Sloka from Aryabhatiya on the Aryabhatiya Numerals denoting number of revolution of Geo-centric planets in a yuga
- iv. Table showing the order of Geo-centric planets in the increasing order of their number of revolution in a yuga in the Aryabhatiya Numerals and International Numerals.

**Prescribed Text Book :**

1. N. Krishna Murthy & others “A text book of mathematics for BA/BSc Vol –I,II & III, S. CHAND & Company LTD., New Delhi.
- 2.** Indian Mathematics in Sanskrit: Concept and Achievements by Prof. Venkatesh Murthy-Bengalore.

**Reference Books:**

1. RaiSinghania, “Ordinary and Partial Differential Equations”, S.Chand & Company, New Delhi.
- 2.** Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-universities press.
3. Scope and treatment as in“Differential Equations and Their Applications” by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition :

**B.Sc. FIRST YEAR MATHEMATICS SYLLABUS PAPER - II**  
**SEMESTER – II ( w.e.f. 2020 -2021, Revised in March, 2020)**

**SOLID GEOMETRY**

**(Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** Calculus invented by Newton and Leibnitz is a powerful analytical tool to solve mathematical problems which arise in all branches of science and engineering. The main emphasis of this course is to equip the student with necessary analytic and technical skills to handle problems of a mathematical nature as well as practical problems using calculus and differential equation. The aim should be to expose the students to basic ideas quickly without much theoretical emphasis with importance on applications.

**Excepted Outcomes:** After completing the course, students are expected to be able to apply knowledge of calculus and differential equations in the areas of their own interest.

**UNIT – I (12 hrs) :1.Three Dimensional Coordinates:** Introductions, Coordinates, Section Formula, Solved Problems, Direction Cosines, Direction Ratios.

**2.The Plane :**Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

**UNIT – II (12 hrs) : The Line :**

Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line; Intersection of three planes; Triangular Prism.

**UNIT – III (12 hrs) : Sphere-I:**

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle;

**UNIT –IV. (12 hrs): Sphere-2:**

Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes; Angle of intersection of two spheres; Conditions for two spheres to be orthogonal;

**UNIT –V. ANCIENT INDIAN MATHEMATICS**

**Indian Mathematics in Sanskrit: Concept and Achievements**

**I.Sulbha-sutra Theorem (Pythagoras Theorem) and its Application.**

i. Introduction: Sulbha-sutra Theorem (Pythagoras Theorem) and its Application.

- ii .Theorem : Square on the diagonal of a rectangle
- iii. Theorem from Manava sulbha –sutra
- iv. Theorem Square on the diagonal of a square from Baudhayana sulva-sutra
- v. Surd and their Approximate Values from Katyayana Sulva sutra
- vi. Values of Square root of 2 from Baudhayana sulva-sutra.
- Vii. Verification of sulva-sutra Values of Square root 2, Thibauts and Rodets approximations
- viii. an approximations to Square root 3
- ix. Ratio of circumference of a circle to its diameter from Sulva-sutra .
- x. Geometrical basis for Aryabhatas value of Ratio of circumference of a circle to its diameter.
- xi. Algorithm to find Aryabhatas value of Ratio of circumference of a circle to its diameter
- xii. Algorithm to Double the Number of Sides  $n$  of an Inscribed Regular Polygon.
- xiii. Sloka from Aryabhata about Nearly Accurate value of  $\pi$

**Prescribed Text Book :**

1. V Krishna Murthy & Others “A text book of Mathematics for BA/B.Sc Vol 1, Published by S. Chand & Company, New Delhi.
2. Indian Mathematics in Sanskrit: Concept and Achievements by Prof. Venkatesh Murthy-Bengalure

**Reference Book :**

1. P.K. Jain and Khaleel Ahmed, “A text Book of Analytical Geometry of Three Dimensions”, Wiley Eastern Ltd., 1999.
2. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam, K.Y. Subrahmanyam, G.R. Venkataraman published by Tata-MC Gran-Hill Publishers Company Ltd., New Delhi.

**B.Sc. SECOND YEAR MATHEMATICS SYLLABUS PAPER - III**  
**SEMESTER – III (w.e.f. 2021 -2022, Revised in March, 2020)**

**ABSTRACT ALGEBRA – (Theory and Practical 75+75=150 marks/ 60 Hrs.)**

**Objective:** Group theory is one of the building blocks of modern algebra. Objective of this course is to introduce students to basic concepts of group theory and examples of groups and their properties. This course will lead to future basic courses in advanced mathematics, such as Group theory-II and ring theory. This is a second course in modern algebra which deals with ring theory. Some basics of ring theory like rings, subrings, ideals, ring homomorphisms and their properties and. This course is an integral part of any course on Modern algebra the others being Group theory and Field Theory.

**Expected Outcomes:** A student learning this course gets idea on concept and examples of groups and their properties . He understands cyclic groups, permutation groups, normal subgroups and related results. After this course he can opt for courses in ring theory, field theory, commutative algebras, linear classical groups etc. and can be apply this knowledge to problems in physics, computer science, economics and engineering. After completing this course, this will help students to continue more courses in advanced Ring theory modules, Galois groups.

**UNIT – 1 : (10 Hrs)- GROUPS :-**

Binary Operation – Algebraic structure – semi group-Monoid – Group definition and elementary properties. Finite and infinite groups – examples – order of a group. Composition tables with examples.

**UNIT – 2 : (14 Hrs) -Sub Group:**

Complex Definition – Multiplication of two complexes. Inverse of a complex-Subgroup definition – examples-criterion for a complex to be subgroups.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

**Co-sets and Lagrange's Theorem :-**Co-sets, Definition – properties of Co-sets–Index of a subgroups of a finite groups–Lagrange's Theorem.

**UNIT – 3 :(12 Hrs)-NORMAL SUBGROUPS :-**

Definition of normal subgroup – proper and improper normal subgroup– criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub

group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

**UNIT – 4 : (10 Hrs)- HOMOMORPHISM : -**

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

**UNIT – 5 : (14 Hrs)- PERMUTATIONS AND CYCLIC GROUPS : -**

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley’s theorem.

**Cyclic Groups :-**Definition of cyclic group – elementary properties – classification of cyclic groups.

**Prescribed Text Books**

1. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others published by S.Chand & Company New Delhi.

**Reference Book:** 1.A.First course in Abstract Algebra, by J.B. Fraleigh Published by Narosa Publishing house.

2. Modern Algebra by M.L. Khanna

3. Topics in Algebra by I.N.Herstein.

**B.Sc. SECOND YEAR MATHEMATICS SYLLABUS PAPER-IV**  
**SEMESTER – IV ( w.e.f. 2021 -2022, Revised in March 2020)**  
**REAL ANALYSIS – (Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** The objective of the course is to have the knowledge on basic properties of the field of real numbers, studying Bolzano-Weierstrass Theorem, sequences and convergence of sequences, series of real numbers and its convergence etc. This is one of the core courses essential to start doing mathematics.

**Expected Outcome:** On successful completion of this course, students will be able to handle fundamental properties of the real numbers that lead to the formal development of real analysis and understand limits and their use in sequences, series, differentiation and integration. Students will appreciate how abstract ideas and rigorous methods in mathematical analysis can be applied to important practical problems.

**UNIT – I (12 hrs) : REAL NUMBERS :**

The algebraic and order properties of  $\mathbb{R}$ , Absolute value and Real line, Completeness property of  $\mathbb{R}$ , Applications of supreme property; intervals. No. Question is to be set from this portion.

**Real Sequences:** Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence.

The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchy's general principle of convergence theorem.

**UNIT –II (12 hrs) : INFINITE SERIES :**

**Series :** Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy's  $n^{\text{th}}$  root test or Root Test.
3. D'Alembert's Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.



**UNIT – III (12 hrs) : CONTINUITY :**

**Limits** : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity.

**No. Question is to be set from this portion.**

**Continuous functions** : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

**UNIT – IV (12 hrs) : DIFFERENTIATION AND MEAN VALUE THEORMS :**

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Role's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem - Generalized Mean value Theorems - Taylor's Theorem, Maclaurin's Theorem, Expansion of functions with different forms of remainders, Taylor's Maclaurins Series, power series representation of functions.

**UNIT – V (12 hrs) : RIEMANN INTEGRATION :**

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for  $R$  – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

**Prescribed Text Books:**

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and Published by S. Chand & Company Pvt. Ltd. New Delhi.

**Reference Book :-**

1. Introduction to Real Analysis” by RABERT g BARTELY and .D.R. SHERBART Published by John Wiley.

2. Elements of Real Analysis on per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi

**B.Sc. THIRD YEAR MATHEMATICS SYLLABUS – PAPER-V**  
**SEMESTER – V (w.e.f. 2022 -2023, Revised in March 2020)**  
**LINEAR ALGEBRA –(Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** This is a preliminary course for the basic courses in mathematics like, abstract algebra and linear algebra. The objective is to acquaint students with the properties of natural numbers i.e. Euclidean algorithm, congruence relation, fundamental theorem of arithmetic, etc. The basics of linear algebra i.e. vector spaces, matrices are introduced here.

**Expected Outcomes:** The acquired knowledge will help students to study further courses in mathematics like, group theory, ring theory and field theory and linear algebra. It has applications not only in higher mathematics but also in other science subjects like computer science, statistics, physics, chemistry etc.

***UNIT – I (12 hrs) : Vector Spaces-I :***

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

***UNIT –II (12 hrs) : Vector Spaces-II :***

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotients pace.

***UNIT –III (12 hrs) : Linear Transformations :***

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

***UNIT –IV (12 hrs) : Matrices:***

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

***UNIT –V (12 hrs) : Inner product spaces :***

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

***Prescribed Text Books :***

1. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and Published by S. Chand & Company Pvt. Ltd. New Delhi.

***Reference Books :-***

1. Linear Algebra by Kenneth Hoffman and Ray Kunze, Pearson Education (low priced edition), New Delhi.
2. Linear Algebra by Stephen H. Friedberg et al Prentice Hall of India Pvt. Ltd. 4<sup>th</sup> Edition 2007.
3. Linear Algebra by J.N. Sharma and A.R. Vasista of Krishna Prakashan Mandir, Meerut-250002.
4. Matrices by Shanti Narayana (S.Chand Publications).

## **B.Sc. THIRD YEAR MATHEMATICS: PAPER- VI (ELECTIVE )**

**SEMESTER – V (w.e.f. 2022 -2023, Revised in March 2020)**

### **NUMERICAL ANALYSIS –I**

**(Theory and Practical 75+75=150 marks/ 60 Hrs)**

**Objective:** Calculation of error and approximation is a necessity in all real life, industrial and scientific computing. The objective of this course is to acquaint students with various numerical methods of finding solution of different type of problems, which arises in different branches of science such as locating roots of equations, finding solution of nonlinear equations, systems of linear equations, differential equations, Interpolation, differentiation, evaluating integration.

**Expected Outcome:** Students can handle physical problems to find an approximated solution. After getting trained a student can opt for advance courses in Numerical analysis in higher mathematics. Use of good mathematical software will help in getting the accuracy one need from the computer and can assess the reliability of the numerical results, and determine the effect of round off error or loss of significance.

#### **UNIT- I: (12 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.

#### **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. Relation between Bessel's and Everett's Formulae.

#### **UNIT – V: (12 hours) Interpolation - III**

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Derivation of governing equations, End conditions, Divided differences and their properties, Newton's general interpolation Formula, Inverse interpolation.

#### ***Prescribed Text Books :***

1. Numerical Analysis by Ranganatham S & others S.Chand and company Pvt Ltd., New Delhi.

#### **Reference Book :**

- 1.Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry, Prentice Hall of India Pvt. Ltd., New Delhi.
2. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.
- 3.Finite Differences and Numerical Analysis by H.C Saxena S. Chand and Company, Pvt. Ltd., New Delhi.

**B.Sc. THIRD YEAR MATHEMATICS SYLLABUS – PAPER-VII  
SEMESTER – VI ( w.e.f. 2022 -2023, Revised in March 2020)**

**VECTOR CALCULUS**

**(Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** Vector Calculus is a basic course in almost all branches of science. A full course in undergraduate program will help students in finding real life applications later.. The objective of this course is to introduce a student the basics of Vector Calculus and some of its application

**Expected Outcomes:** The student will use this knowledge wherever he/She goes after undergraduate program. It has applications in computer science, finance mathematics, industrial mathematics, bio mathematics and what not.

**UNIT –I, (12 hrs) VECTOR DIFFERENTIATION :-**

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

**UNIT – II, (12 hrs) VECTOR INTEGRATION :-**

Line Integral, Surface Integral, Volume integral with examples.

**UNIT – III, (12 hrs) VECTOR INTEGRATION APPLICATIONS :-**

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems.

**UNIT-IV, (12 hrs): RINGS-I**

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field.

**UNIT-V, ; (12 hrs):RINGS-II :-** Definition of Homomorphism – Homomorphic Image –

Elementary Properties of Homomorphism –Kernel of a Homomorphism – Fundamental theorem of Homomorphism –Maximal Ideals – Prime Ideals.

**Prescribed Text Books:**

1. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others publisher by S. Chand & Company Pvt. Ltd., New Delhi.

**Reference Books :-**

1. Abstract Algebra by J. Fraleigh, Published by Narosa Publishing house. Published by S. Chand & Company Pvt. Ltd. New Delhi.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd. New Delhi.
3. Vector Calculus by R. Gupta, Published by Laxmi Publications.

4. Vector Calculus by P.C. Matthews, Published by Springer Verlag publications.
5. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.
6. Vector Calculus by R. Gupta Published by Laxmi Publications.
7. Vector Calculus by P.C. Matthews Published by Springer Vector Publications.
8. Rings and Linear Algebra by Pundir & Pundir Published by Pragathi Prakashan.

**THIRD YEAR B.SC MATHEMATICS: PAPER VIII (ELECTIVE)**  
**SEMESTER – VI (w.e.f. 2022 -2023, Revised in March 2020)**

**NUMERICAL ANALYSIS -II**

**(Theory and Practical 75+75=150 marks 60 Hrs)**

**Objective:** Calculation of error and approximation is a necessity in all real life, industrial and scientific computing. The objective of this course is to acquaint students with various numerical methods of finding solution of different type of problems, which arises in different branches of science such as locating roots of equations, finding solution of nonlinear equations, systems of linear equations, differential equations, Interpolation, differentiation, evaluating integration.

**Expected Outcome:** Students can handle physical problems to find an approximated solution. After getting trained a student can opt for advance courses in Numerical analysis in higher mathematics. Use of good mathematical software will help in getting the accuracy one need from the computer and can assess the reliability of the numerical results, and determine the effect of round off error or loss of significance.

**UNIT- I: (12 hours) Curve Fitting:** Square curve fitting procedures, fitting a straight line, nonlinear curve fitting, curve fitting by a sum of exponentials.

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

**Numerical Differentiation :** Derivates using Newton's forward differential 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, Boole's and Weddle's rules,

**UNIT – IV: (14 hours)**

**Solution of Simultaneous Linear Systems of Equations:**

Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, 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, Predictor-corrector method- Milne's method,

### **Prescribed Book**

1. Numerical Analysis by Ranganatham S & others S.Chand and company Pvt Ltd., New Delhi.

**Reference Books:** 1.Scope as in Introductory Methods of Numerical Analysis by S.S.Sastry, Prentice Hall India (Latest Edition).

- 2.Finite Differences and Numerical Analysis by H.C Saxena S. Chand and Company, Pvt. Ltd., New Delhi.
- 3.Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain. New Delhi Published by S.Chand & Company Pvt. Ltd