ADIKAVI NANNAYA UNIVERSITY

RAJAMAHENDRAVARAM

CBCS / Semester System

(W.e.f. 2016-17 Admitted Batch)

I Semester Syllabus

B.A./B.Sc. MATHEMATICS

PAPER – 1 DIFFERENTIAL EQUATIONS

60 Hrs

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.

***UNIT – II (12 Hours),* 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 – III (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 b sin ax or b cos ax.

UNIT – IV (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= xV

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

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

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

Reference Books :

1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol 1 by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.

3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
4. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha-universities press.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Differential Equations in Real life

ADIKAVI NANNAYA UNIVERSITY

CBCS/SEMESTER SYSTEM

SEMESTER – II : B.A./B.Sc. FIRST YEAR MATHEMATICS SYLLABUS (UPDATED)

PAPER – 2 : SOLID GEOMETRY

60 Hrs

UNIT – I (12 hrs) : 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

UNIT-III: The Sphere

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; intersection of a sphere and a line; tangent plane; plane of contact; polar plane; pole of a plane; conjugate points; conjugate planes.

UNIT-IV: The Sphere and Cones

Angle of intersection of two spheres; conditions for two spheres to be orthogonal; Power of a point; radical plane; coaxal system of spheres; simplified form of the equation of two spheres.

Definitions of a cone; vertex; guiding curve; generators; equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogeneous; condition that the general equation of the second degree should represent a cone.

UNIT V-: Cones

Enveloping cone of a sphere; right circular cone; equation of the right circular cone with a given vertex, axis and semi vertical angle; condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; tangent lines and tangent plane at a point; condition that a plane may touch the cone; reciprocal cones; intersection of two cones with a common vertex.

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.

2. A text book of Mathematics for BA/B.Sc Vol 1, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.

3. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley Eastern Ltd., 1999

.**4.** 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.

ADIKAVI NANNAYA UNIVERSITY

RAJAMAHENDRAVARAM

CBCS / Semester System

(W.e.f. 2015-16 Admitted Batch)

III Semester Syllabus

B.A./B.Sc. MATHEMATICS

PAPER – 3 ABSTRACT ALGEBRA

60 Hrs

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) SUBGROUPS : -

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

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

Co-sets and Lagrange's Theorem :-

Cosets Definition – properties of Cosets–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–Hamilton group – 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 – aultomorphism 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.

Reference Books :

1. Abstract Algebra, by J.B. Fraleigh, Published by Narosa Publishing house.
2. 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.
3. Modern Algebra by M.L. Khanna.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Group theory and its applications in Graphics and Medical image Analysis

ADIKAVI NANNAYA UNIVERSITY
CBCS/SEMESTER SYSTEM
IV SEMESTER : B.A./B.Sc. MATHEMATICS
PAPER- 4
REAL ANALYSIS

60 Hrs

UNIT – I (12 hrs) : REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of 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 – Cauchey's general principle of convergence theorem.

UNIT –II (12 hrs) : INFINITIE SERIES :

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

1. P-test
2. Cauchey's n^{th} root test or Root Test.
3. D'-Alemberts' 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, Cauchhy's Mean value Theorem

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.

Reference Books :

1. Real Analysis by Rabert & Bartely and .D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisingkania Published by S. Chand & Company Pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications.

ADIKAVI NANNAYA UNIVERSITY

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

SEMESTER – V, PAPER -5

RING THEORY & VECTOR CALCULUS

60 Hrs

UNIT – 1 (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. Sub Rings, Ideals

UNIT – 2 (12 hrs) RINGS-II : -

Definition of Homomorphism – Homorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorhphism –
Maximal Ideals – Prime Ideals.

UNIT –3 (12 hrs) VECTOR DIFFERENTIATION : -

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

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

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

Reference Books :-

1. Abstract Algebra by J. Fralieh, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published by S. Chand & Company Pvt. Ltd., New Delhi.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications.
5. Vector Calculus by P.C. Matthews, Published by Springer Verlag publicattions.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

ADIKAVI NANNAYA UNIVERSITY

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

SEMESTER – V, PAPER -6

LINEAR ALGEBRA

60 Hrs

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 Quotientspace.

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) : Matrix :

Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT –V (12 hrs) : Inner product space :

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.

Reference Books :

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

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer Sciences"

MATHEMATICS MODEL PAPER

FIFTH SEMESTER

PAPER 5 – RING THEORY & VECTOR CALCULUS

COMMON FOR B.A & B.Sc

(w.e.f. 2015-16 admitted batch)

Time: 3 Hours **Maximum Marks: 75**

SECTION-A

Answer any **FIVE** questions. Each question carries **FIVE** marks. **5 x 5 = 25 Marks**

1) Prove that every field is an integral domain.

2) If R is a Boolean ring then prove that (i) $a + a = 0 \ \forall \ a \in R$ (ii) $a + b = 0 \Rightarrow a = b$.

3) Prove that Intersection of two sub rings of a ring R is also a sub ring of R.

4) If $\boldsymbol{f}$ is a homomorphism of a ring R into a ring R^1 then prove that Ker $\boldsymbol{f}$ is an ideal of R.

5) Prove that Curl (grad ∅) = $\bar{0}$.

6) If $\boldsymbol{f} = xy^2\,\boldsymbol{i} + 2x^2\,yz\,\boldsymbol{j} - 3yz^2\,\boldsymbol{k}$ the find div $\boldsymbol{f}$ and Curl $\boldsymbol{f}$ at the point (1, -1 1).

7) If $R(u) = (u - u^2)i + 2u^3 j - 3k$ then find $\int_1^2 R(u)\,du$.

8) Show that $\int_s (ax\,i + by\,j + cz\,k).N\,dS = 4\frac{\pi}{3}(a + b + c)$ where S is the surface of the sphere $x^2 + y^2 + z^2 = 1$.

SECTION-B

Answer the all **FIVE** questions. Each carries TEN marks. **5 x 10 = 50 Marks**

9(a) Prove that a finite integral domain is a field

OR

9(b) Prove that the characteristic of an integral domain is either a prime or zero.

10(a) State and prove fundamental theorem of homomorphism of rings.

OR

10(b) Prove that the ring of integers Z is a Principal ideal ring.

11(a) If $a = x + y + z$, $b = x^2 + y^2 + z^2$, $c = xy + yz + zx$; then prove that [grad a, grad b, grad c] = 0.

OR

11(b) Find the directional derivative of the function $xy^2 + yz^2 + zx^2$ along the tangent to the curve $x = t$, $y = t^2$, $z = t^3$ at the point (1, 1, 1,).

12(a) Evaluate $\int_S F.N ds$, where $F = z\,\mathbf{i} + x\,\mathbf{j} - 3y^2z\,\mathbf{k}$ and S is the surface $x^2 + y^2 = 16$ included in the first octant between z = 0, and z = 5.

OR

12(b) If $F = \left(2x^2 - 3z\right)i - 2xy\,j - 4x\,k$,then evaluate $\iiint_V \nabla.F\,dV$ where V is the closed region bounded by the planes $x = 0, y = 0, z = 0$ and $2x + 2y + z = 4$.

13(a) State and Prove Stoke's theorem.

OR

13(b) Find $\oint_C (x^2 - 2xy)\,dx + (x^2y + z)\,dy$ around the boundary C of the region bounded by $y^2 = 8x$ and $x = 2$ by Green's theorem.

MATHEMATICS MODEL PAPER

FIFTH SEMESTER

PAPER 6 – LINEAR ALGEBRA

COMMON FOR B.A & B.Sc

(w.e.f. 2015-16 admitted batch)

Time: 3 Hours **Maximum Marks: 75**

SECTION-A

Answer any **FIVE** questions. Each question carries **FIVE** marks. **5 x 5 = 25 Marks**

1) Let p, q, r be the fixed elements of a field F. Show that the set W of all triads (x, y, z) of elements of F, such that $px + qy + rz = 0$ is a vector subspace of V_3 (F).
2) Express the vector $\alpha = (1, -2, 5)$ as a linear combination of the vectors $e_1 = (1, 1, 1)$, $e_2 = (1, 2, 3)$ and $e_3 = (2, -1, 1)$.
3) If α, β, γ are L.I vectors of the vector space V(R) then show that $\alpha+\beta, \beta+\gamma, \gamma+\alpha$ are also L.I vectors.
4) Describe explicitly the linear transformation T: $R^2 \rightarrow R^2$ such that T (1, 2) = (3, 0), and T (2, 1) = (1,2).
5) Let U(F) and V(F) be two vector spaces and $T: U(F) \rightarrow V(F)$ be a linear transformation. Prove that the range set R(T) is a subspace of V(F).
6) Solve the system 2x-3y+z=0, x+2y-3z=0, 4x-y-2z=0.
7) State and prove Schwarz inequality.
8) Show that the set $S = \{(1,1,0), (1,-1,1), (-1,1,2)\}$ is an orthogonal set of the inner product space R^3(R).

SECTION-B

Answer the all **FIVE** questions. Each carries TEN marks. **5 x 10 = 50 Marks**

9(a) Prove that the subspace W to be a subspace of V(F) $\Leftrightarrow a\alpha + b\beta \in W \ \forall a, b \in F$ and $\alpha, \beta \in W$.

OR

9(b) Prove that the four vectors α =(1,0,0), β =(0,1,0), γ =(0,0,1), δ =(1,1,1) in V3(C) form a Linear dependent set, but any three of them are Linear Independent.

10(a) Let W be a subspace of a finite dimensional vector space V(F), then prove that $\dim\left(V/W\right) = \dim(V) - \dim(W)$

OR

10(b) Let W_1 and W_2 be two subspaces of a finite dimensional vector space V(F). Then prove that $\dim(W_1 + W_2) = \dim(W_1) + \dim(W_2) - \dim(W_1 \cap W_2)$.

11(a) State and prove Rank-Nullity theorem.

OR

11(b) Define a Linear transformation. Show that the mapping T: $R^3 \rightarrow R^2$ is defined by T (x, y, z) = (x - y, x - z) is a linear transformation.

12(a) State and prove Cayley- Hamilton theorem.

OR

12(b) Find the characteristic roots and the corresponding characteristic vectors of the matrix

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

13(a) State and prove Bessel's inequality.

OR

13(b) Applying Gram-Schmidt orthogonalization process to obtain an orthonormal basis of $R^3(R)$ from the basis S = { (1, 1, 0), (-1,1,0), (1, 2, 1,)}.

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.

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

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

SEMESTER – VI: PAPER – VIII-B-1
ELECTIVE – VIII-B-1: 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, Trapozoidal 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.

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.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI: PAPER – VIII-B-2
ELECTIVE – VIII-B-2: SPECIAL FUNCTIONS

UNIT-I (HERMITE POLYNOMIAL)

Hermite Differential Equations, Solution of Hermite Equation, Hermite's Polynomials, Generating function, Other forms for Hermite Polynomial, To find first few Hermite Polynomials, Orthogonal properties of Hermite Polynomials, Recurrence formulae for Hermite Polynomials. CHAPTER: 6.1 to 6.8

UNIT-II (LAGUERRE POLYNOMIALS-I)

Laguerre's Differential equation, Solution of Laguerre's equation, Laguerre Polynomials, Generating function, Other forms for the Laguerre Poynomials, To find first few Laguerre Polynomials,Orthogonal property of the Laguerre Polynomials, Recurrence formula for Laguerre Polynomials, Associated Laguerre Equation. CHAPTER: 7.1 to 7.9

UNIT-III (LEGENDRE'S EQUATION)

Definition, Solution of Legendre's Equation, Definition of $P_n(x)$ and $Q_n(x)$, General solution of Legendre's Equation(derivationis not required)To show that $P_n(x)$ is the coefficient of h^n in the expansion of $(1-2xh+h^2)^{\frac{-1}{2}}$, Orthogonal properties of Legendre's Equation, Recurrence formula, Rodrigues formula, CHAPTER: 2.1 to 2.8,2.12,

UNIT-IV (BESSEL'S EQUATION)

Definition, Solution of Bessel's General Differential Equations, General solution of Bessel's Equation, Integration of Bessel's equation in series for n=0,Definition of $J_n(x)$, Recurrence formulae for $J_n(x)$,Generating function for $J_n(x)$. CHAPTER: 5.1 to 5.7

UNIT-V (Beta and Gamma functions)

Euler's Integrals-Beta and Gamma Functions, Elementary properties of Gamma Functions, Transformation of Gamma Functions,Another form of Beta Function, Relation between Beta and Gamma Functions,Other Transformations. CHAPTER: 2.9to 2.15

Prescribed text book: Special Functions by J.N.Sharma and Dr.R.K.Gupta.