ADIKAVI NANNAYA UNIVERSITY
RAJAMAHENDRAVARAM
CBCS : MATHEMATICS
W.E. FROM 2015-16 ADMITTED BATCH
VI-Semester -(ELECTIVES & CLUSTERS)

Year	**Semester**	**Paper**	**Subject**	**Hours**	**Credits**	**IA**	**EA**	**Total**
	VI	VII	Elective (any one)* A. Laplace-Transformations B. Numerical Analysis C. Number Theory D. Graph Theory & **Elective Problem Solving Sessions**	5	5	25	75	100
		VIII	Cluster Electives: *** VIII A. 1.Integral Transformations & Problem Solving Sessions	5	5	25	75	100
			2.Special Functions & Problem Solving Sessions	5	5	25	75	100
			3.Project	5	5	50	50	100
			VIII B. 1. Advanced Numerical Analysis & Problem Solving Sessions 2. special Functions & Problem Solving Sessions 3. Project					
			VIII C. 1.Principles of Mechanics & Problem Solving Sessions 2.Fluid Mechanics & Problem Solving Sessions 3.Project					

			VIII D. 1. Applied Graph Theory & Problem Solving Sessions 2.Special Function & Problem Solving Sessions 3.Project					

*Candidate has to choose only one paper from VII(A) or VII(B) or VII(C) or VII(D)

* Candidates are advised to choose Cluster (A) if they have chosen VII (A) and Choose Cluster (B) if they have chosen VII(B) etc. However, a candidate may choose any cluster irrespective of what they have chosen in paper VII

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

SEMESTER – VI, PAPER – VII-(A)

ELECTIVE-VII(A); LAPLACE TRANSFORMS

60 Hrs

UNIT – 1 (12 hrs) Laplace Transform I : -

Definition of - Integral Transform – Laplace Transform Linearity, Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A.

UNIT – 2 (12 hrs) Laplace Transform II : -

First Shifting Theorem, Second Shifting Theorem, Change of Scale Property, Laplace Transform of the derivative of f(t), Initial Value theorem and Final Value theorem.

UNIT – 3 (12 hrs) Laplace Transform III : -

Laplace Transform of Integrals – Multiplication by t, Multiplication by t^n – Division by t. Laplace transform of Bessel Function, Laplace Transform of Error Function, Laplace Transform of Sine and cosine integrals.

UNIT –4 (12 hrs) Inverse Laplace Transform I : -

Definition of Inverse Laplace Transform. Linearity, Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions, Examples.

UNIT –5 (12 hrs) Inverse Laplace Transform II : -

Inverse Laplace transforms of Derivatives–Inverse Laplace Transforms of Integrals – Multiplication by Powers of 'P'– Division by powers of 'P'– Convolution Definition – Convolution Theorem – proof and Applications – Heaviside's Expansion theorem and its Applications.

Reference Books :-

1. **Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.**
2. **Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Co., Pvt. Ltd., New Delhi.**
3. **Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.**
4. **Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.**

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 – VII-(C)

ELECTIVE– VII-(C) : NUMBER THEORY

UNIT-I (12 hours)

Divisibility – Greatest Common Divisor – Euclidean Algorithm – The Fundamental Theorem of Arithmetic

UNIT-II (12 hours)

Congruences – Special Divisibility Tests - Chinese Remainder Theorem- Fermat's Little Theorem – Wilson's Theorem – Residue Classes and Reduced Residue Classes – Solutions of Congruences

UNIT-III (12 hours)

Number Theory from an Algebraic Viewpoint – Multiplicative Groups, Rings and Fields

UNIT-IV (12 hours)

Quadratic Residues - Quadratic Reciprocity – The Jacobi Symbol

UNIT-V (12 hours)

Greatest Integer Function – Arithmetic Functions – The Moebius Inversion Formula

Reference Books:

1. "Introduction to the Theory of Numbers" by Niven, Zuckerman & Montgomery (John Wiley & Sons)
2. "Elementary Number Theory" by David M. Burton.
3. Elementary Number Theory, by David, M. Burton published by 2nd Edition (UBS Publishers).
4. Introduction to Theory of Numbers, by Davenport H., Higher Arithmetic published by 5th Edition (John Wiley & Sons) Niven,Zuckerman & Montgomery.(Camb, Univ, Press)
5. Number Theory by Hardy & Wright published by Oxford Univ, Press.
6. Elements of the Theory of Numbers by Dence, J. B & Dence T.P published by Academic Press.

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

SEMESTER – VI, PAPER – VII-(D)

ELECTIVE– VII-(D) : GRAPH THEORY

UNIT – I (12 hrs) Graphs and Sub Graphs :

Graphs , Simple graph, graph isomorphism, the incidence and adjacency matrices, sub graphs, vertex degree, Hand shaking theorem, paths and connection, cycles.

UNIT – II (12 hrs)

Applications, the shortest path problem, Sperner's lemma.

Trees :

Trees, cut edges and Bonds, cut vertices, Cayley's formula.

UNIT – III (12 hrs) :

Applications of Trees - the connector problem.

Connectivity

Connectivity, Blocks and Applications, construction of reliable communication Networks,

UNIT – IV (12 hrs):

Euler tours and Hamilton cycles

Euler tours, Euler Trail, Hamilton path, Hamilton cycles , dodecahedron graph, Petersen graph, hamiltonian graph, closure of a graph.

UNIT – V (12 hrs)

Applications of Eulerian graphs, the Chinese postman problem, Fleury's algorithm - the travelling salesman problem.

Reference Books :

1. Graph theory with Applications by J.A. Bondy and U.S.R. Murthy published by Mac. Millan Press

2. Introduction to Graph theory by S. Arumugham and S. Ramachandran, published by scitech Publications, Chennai-17.

3. A Text Book of Discrete Mathamatics by Dr. Swapan Kumar Sankar, published by S.Chand & Co.
Publishers, New Delhi.

4. Graph theory and combinations by H.S. Govinda Rao published by Galgotia Publications.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS,
SEMESTER – VI, CLUSTER – A,
PAPER – VIII-A-1
Cluster Elective- VIII-A-1: INTEGRAL TRANSFORMS

60 Hrs

UNIT – 1 (12 hrs) Application of Laplace Transform to solutions of Differential Equations : -

Solutions of ordinary Differential Equations.
Solutions of Differential Equations with constants co-efficient
Solutions of Differential Equations with Variable co-efficient

UNIT – 2 (12 hrs) Application of Laplace Transform : -

Solution of simultaneous ordinary Differential Equations.
Solutions of partial Differential Equations.

UNIT – 3 (12 hrs) Application of Laplace Transforms to Integral Equations : -

Definitions : Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations.Application of L.T. to Integral Equations.

UNIT –4 (12 hrs) Fourier Transforms-I : -

Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT – 5 (12 hrs) Fourier Transform-II : -

Convolution Definition – Convolution Theorem for Fourier transform – parseval's Indentify – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Finte Fourier Transforms : -

Finte Fourier Sine Transform – Finte Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

Reference Books :-

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Lapalce and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
5. Integral Transforms by M.D. Raising hania, - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.

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

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.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-B, PAPER – VIII-C-1

Cluster Elective – VIII-C-1 : PRINCIPLES OF MECHANICS

60 Hrs

Unit – I : (10 hours)

D'Alembert's Principle and Lagrange's Equations : some definitions – Lagrange's equations for a Holonomic system – Lagrange's Equations of motion for conservative, nonholonomic system.

Unit – II: (10 hours)

Variational Principle and Lagrange's Equations: Variatonal Principle – Hamilton's Principle – Derivation of Hamilton's Principle from Lagrange's Equations – Derivation of Lagrange's Equations from Hamilton's Principle – Extension of Hamilton's Principle – Hamilton's Principle for Non-conservative, Non-holonomic system – Generalised Force in Dynamic System – Hamilton's Principle for Conservative, Non-holonomic system – Lagrange's Equations for Non-conservative, Holonomic system - Cyclic or Ignorable Coordinates.

Unit –III: (15 hours)

Conservation Theorem, Conservation of Linear Momentum in Lagrangian Formulation – Conservation of angular Momentum – conservation of Energy in Lagrangian formulation.

Unit – IV: (15 hours)

Hamilton's Equations of Motion: Derivation of Hamilton's Equations of motion – Routh's procedure – equations of motion – Derivation of Hamilton's equations from Hamilton's Principle – Principle of Least Action – Distinction between Hamilton's Principle and Principle of Least Action.

Unit – V: (10 hours)

Canonical Transformation: Canonical coordinates and canonical transformations – The necessary and sufficient condition for a transformation to be canonical – examples of canonical transformations – properties of canonical transformation – Lagrange's bracket is canonical invariant – poisson's bracket is canonical invariant - poisson's bracket is invariant under canonical transformation – Hamilton's Equations of motion in poisson's bracket – Jacobi's identity for poisson's brackets.

Reference Text Books :

1. Classical Mechanics by C.R.Mondal Published by Prentice Hall of India, New Delhi.

2. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.

3. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.

4. Fluid Mechanics by T. Allen and I.L. Ditsworth Published by (McGraw Hill, 1972)

5. Fundamentals of Mechanics of fluids by I.G. Currie Published by (CRC, 2002)

6. Fluid Mechanics : An Introduction to the theory, by Chia-shun Yeh Published by (McGraw Hill, 1974)

7. Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J. Pritchard Published by (John Wiley and Sons Pvt. Ltd., 2003)

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

SEMESTER – VI, CLUSTER-B, PAPER – VIII-C-2

Cluster Elective–VIII-C-2 : FLUID MECHANICS 60 Hrs

Unit – I : (10 hours)

Kinematics of Fluids in Motion

Real fluids and Ideal fluids – Velocity of a Fluid at a point – Streamlines and pthlines – steady and Unsteady flows – the velocity potential – The Vorticity vector – Local and Particle Rates of Change – The equation of Continuity – Acceleration of a fluid – Conditions at a rigid boundary – General Analysis of fluid motion.

Unit – II : (10 hours)

Equations of motion of a fluid- Pressure at a point in fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equations of motion – Bernoulli's equation – Worked examples.

Unit – III : (10 hours)

Discussion of the case of steady motion under conservative body forces - Some flows involving axial symmetry – Some special two-dimensional flows – Impulsive motion – Some further aspects of vortex motion.

Unit – IV : (15 hours)

Some Two – dimensional Flows, Meaning of two-dimensional flow – Use of Cylindrical polar coordinates – The stream function – The complex potential for two-dimensional, Irrotational, Incompressible flow – Uniform Stream – The Milne-Thomson Circle theorem – the theorem of Blasius.

Unit – V : (15 hours)

Viscous flow,Stress components in a real fluid – Relations between Cartesian components of stress – Translational motion of fluid element – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relations between stress and rate of strain – the coefficient of viscosity and laminar flow - The Navier-Stokes equations of motion of a viscous fluid.

Reference Text Books :

1. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.

2. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.

3. Fluid Mechanics by T. Allen and I.L. Ditsworth published by (McGraw Hill, 1972)

4. Fundamentals of Mechanics of fluids by I.G. Currie published by (CRC, 2002)

5. Fluid Mechanics, An Introduction to the theory by Chia-shun Yeh published by (McGraw Hill, 1974)

6. Fluids Mechanics by F.M White published by (McGraw Hill, 2003)

7. Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J. Pritchard published by (John

Wiley and Sons Pvt. Ltd., 2003

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

SEMESTER – VI, CLUSTER-D, PAPER – VIII-D-1

Cluster Elective -VIII-D-1: APPLIED GRAPH THEORY

60 Hrs

UNIT – I (12 hrs) :

Matchings

Matchings – Alternating Path, Augmenting Path - Matchings and coverings in Bipartite graphs, Marriage Theorem, Minimum Coverings.

UNIT –II (12 hrs) :

Perfect matchings, Tutte's Theorem, Applications, The personal Assignment problem -The optimal Assignment problem, Kuhn-Munkres Theorem.

UNIT –III (12 hrs) :

Edge Colorings

Edge Chromatic Number, Edge Coloring in Bipartite Graphs - Vizing's theorem.

UNIT –IV (12 hrs) :

Applications of Matchings, The timetabling problem.

Independent sets and Cliques

Independent sets, Covering number , Edge Independence Number, Edge Covering Number - Ramsey's theorem.

UNIT –V (12 hrs) :

Determination of Ramsey's Numbers – Erdos Theorem, Turan's theorem and Applications, Sehur's theorem. A Geometry problem.

Reference Books :-

1. Graph theory with Applications by J.A. Bondy and U.S.R. Murthy, published by Mac. Millan Press.
2. Introduction to graph theory by S. Arumugham and S. Ramachandran published by SciTech publications, Chennai-17.
3. A text book of Discrete Mathematics by Dr. Swapan Kumar Sarkar, published by S. Chand Publishers.
4. Graph theory and combinations by H.S. Govinda Rao, published by Galgotia Publications.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-D, PAPER – VIII-D-2
Cluster Elective -VIII-D-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.