B.Sc. Part -I (MATHEMATICS)

2016-2017

PAPER - I

ALGEBRA AND TRIGONOMETRY

Max.Marks.50

UNIT -I Symmetric. Skew symmetric,Hermitian matrices. Elementaryoperations on matrices,Inverse of a matrix. Linear independence of row and column matrices. Row rank,Column rank and rank of matrix. Equivalence of column and row rank. Eigen values, Eigen vectors and the characteristic equationof a matrix. Cayley Hamilton Theoremand its use in finding inverse of matrix.

UNIT–II Application of matrices to a system of linear (both homogenous and non-homogenous) equations. Theorems on consistency of a system of Linear equations. Relation between the roots and coefficients of general polynomial equation in one variable.Transformation of equation. Descarte's rule of signs. Solution of cubic equation (Cardon Method). Biquadratic equations .

UNIT–III Definition of a group with examples and simple properties. Subgroups. Generators of groups. Cyclic groups. Coset. Decomposition. Lagrange's theorem and its consequences. Fermat's and Euler's theorems.Normal Subgroups.Quotient groups. permutation group.Even and odd permutations. The alternating Groups A_n, Cayleys Theorem.

UNIT–IV Homomorphism and isomorphism. The fundamental theorems of homomorphism. Introduction and simple properties of rings. Sub-rings, integral domain and fields. Characteristics of a ring and fields.

UNIT–V De- Moivre's Theorem and its applications. Direct and inverse circular and hyperbolic functions. Logarithm of a complex quantity.Expansion of Trigonometrical Functions. Gregory's Series. Summation of series.

TEXT BOOKS :

1. N. Herstein , Topics in Algebra , Wiley Eastern Ltd. , New Delhi , 1975 .
2. K. B. Datta , Matrix and Linear Algebra , Prentice Hall of India Pvt. Ltd. . New Delhi , 2000.
3. Chandrika Prasad ,Text Book on Algebra and Theory of Equations Pothishala Private Ltd. , Allahabad .
4. S.L.Loney , Plane Trigonometry Part- II , Macmillan and Company London .

REFERENCES:-

1. K. B. Datta , Matrix and linear algebra , Prentics Hall of India Pvt. Ltd. New Delhi , 2000.
2. P.B. Bhattacharya , S.K. Jain and S.R. Nagpaul , First Course in

3. Linear Algebra , Wiley eastern Ltd. , New Delhi , 1983 .
4. P.B. Bhattacharya , S.K. Jain and S.R. Nagpaul , Basic Abstract Algebra (2^{nd} edition) , Cambridge university Press, Indian edition , 1997.
5. S. K .Jain , A Gunawardena and P.B. Bhattacharya , Basic Linear Algebra with MATLAB , Key College Publishing (Springer –Verlag) , 2001 .
6. H.S. Hall and S.R. Knight , Higher Algebra , H.M. Publications , 1994.
7. Chandrika prasad ,Text Book on Algebra and Theory of Equations Pothishala Private Ltd. Allahabad
8. S.L.Loney, Plane Trigonometry Part- II, Macmillan and Company Lodon .
9. R.S. Verma and K. S. Shukla , Text Book on Trignometry.Pothishala Pvt. Ltd. Allahabad.

B.Sc. Part -I (MATHEMATICS)

2016-2017

PAPER – II

CALCULUS

Max.Marks.50

UNIT–I ε - δdefination of the limit of a function. Basic properties of limits.Continuous functions and classification of discontinuities. Differentiability, Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.

UNIT–II Asymptotes. Curvature. Tests for concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in cartesian and polar co-ordinates.

UNIT–III Integration of irrational algebraic functions and transcendental function. Reduction formulae. Definite integrals.Quadrature .Rectification.Volumes and surfaces of solids of revolution .

UNIT–IV Degree andorder of a differential equation. Equations of first order and first degree Equationsin which the variables are separable. Homogeneous equations, Linear equations and equations reducible to the linear form. Exact differential equations. First order higher degree equations solvable for x,y,p.Clairaut's form and singular solutions. Geometrical meaning of a differential equation.Orthogonal trajectories. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations .

UNIT-V Linear differential equations of second order.Transformation of the equation by changing the dependent variable / independent variable. Method of variation of parameters. Ordinary simultaneous differential equations .

TEXT BOOK :

1. 1. Gorakh Prasad , Differential Calculas , Pothishala Private Ltd. . Allahabad .
2. 2. Gorakh Prasad , Integral Calculas , Pothishala Private Ltd. . Allahabad .
3. 3. D. A. Murray Introductory Course in Differential equations , Orient LongmanIndia) ,1976.

REFERENCES :

1. Gabriel Klambauer , Mathematical Analysis , Marcel Dekkar , Inc. New York , 1975.
2. Murray R. Spiegel ,Theory and Problems of Advanced Calculas , Schaum's outline series, Schaum Publishing Co. New York .
3. N. Piskunov , Differential and Integral Calculas , Peace Publishers , Moscow.
4. P.K .Jain and S. K. Kaushik , An introduction to real analysis , S. Chand & Co . New Delhi , 2000
5. Gorakh Prasad , Differential Calculas , Pothishala Private Ltd. Allahabad.
6. Gorakh Prasad , Integral Calculas , Pothishala Private Ltd. Allahabad.
7. D .A .Murray , Introductory Course in Differential Equations , Orient Longman (India), 1967 .

8. G . F. Simmons , Differential Equations , Tata Mc. Graw Hill , 1972 .
9. E. A. Codington , An introduction to ordinary differential equations , Prentics Hall of India, 1961 .
10. H.T.H Piaggio , Elementary Treatise on Differential Equations and their Applications , C.B.S. Publisher and Distributors , Delhi 1985 .
11. W .E . Boyce and P.O . Diprima , Elementary Differential Equation and Boudary Value Problems , John Wiley , 1986 .
12. Erwin Kreyszig , Advanced Engeneering Mathematics . John Wiley and Sons , 1999.

B.Sc. Part -I (MATHEMATICS)

2016-2017

PAPER – III

Vector Analysis and Geometry

Max.marks.50

Unit–I Scalar and vector product of three vectors. Product of four vectors. Reciprocal vector. Vector differentiation , Gradient , divergence and curl.

Unit –II Vector integration. Theorems of Gauss,Green, Stokes and problems based on these.

Unit–III General equation of second degree. Tracing of conics. System of conics. Confocal conics. Polar equation of a conic.

Unit–IV Plane: various forms. equation of a plane through the line of intersection.Sphere: general form ofplanesection of a sphere, equation through a given circle,tangent plane.Cone:equation if vertex and basecurve are given, condition for the general equation of second degree to represent a cone, equation of a cone whose vertex isorigin. Cylinder:right circular cylinder, equation of a cylinder whosegenerator intersect a conicand is parallel to a line,general equation of right circular cylinder.

Unit–V Central coincide,paraboloids,plane section of coincides. Generating lines,confocal coincide (Definition and elementary properties). Reductionof second degree equation.

TEXT BOOK :

1. N. Saran and S.N. Nigam , Introduction to Vector Analysis , Pothishala Pvt. Ltd. Allahabad .
2. Gorakh Prasad and H. C. Gupta , Text book on coordinate geometry , Pothishala Pvt. Ltd. Allahabad .
3. R.J.T. Bell , Elementary Treatise on coordinate Geometry of three dimensions , Machmillan India Ltd. 1994.

REFERENCES :

1. Murray R. Spiegel , Theory and Problems of Advanced Calculas , Schaum Publishing Company , New York .
2. Murray R. Spiegel , Vector Analysis , Schaum Publishing Company , New York.
3. N. Saran and S.N. Nigam Introduction to Vector analysis , Pothishala Pvt. Ltd. Allahabad .
4. Erwin Kreyszig , Advanced Engineering Mathematics , John Wiley and Sons , 1999 .
5. Shanti Narayan , A Text book of Vector Calculas ., S.Chand& Co . New Delhi .

6. S .L.Loney , The Elements of Coordinate geometry , Macmillan and Company , London .
7. Gorakh Prasad and H. C. Gupta , Text Book on Coordinate Geometry, Pothishala Pvt. Ltd. Allahabad .
8. N.Saran and R.S. Gupta , Analytical Geometry of three Dimensions , Pothishala Pvt. Ltd., Allahabad
9. P.K. Jain and Khalil Ahmad , A Text book of Analytical Geometry of Two Dimensions , Wiley Eastern Ltd . 1994.
10. P.K. Jain and Khalil Ahmad , A Text book of analytical Geometry of Three Dimensions , Wiley Eastern Ltd . 1999.

B.Sc. Part -II (MATHEMATICS)

2016-2017

PAPER – I

Advanced Calculus

Max Marks 50

UNIT–I Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic Sequences, cauchy's convergence criterion. Series of non-negative terms. Comparison tests, cauchy's integral test, ratio tests, raabe's, logarithmic, De Morgan and Bertrand's tests (without proof). Alternating series. Leibnitz's theorem. Absolute and conditional convergence.

UNIT-II Continuity, sequential continuity, properties of continuous functions, uniform continuity. Chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives. Taylor's theorem with various forms of remainders .

UNIT-III Limit and continuity of functions of two variables. Partial differentiation. Change of variables. Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians.

UNIT-IV Envelopes. Evolutes. Maxima- minima and saddle points of functions of two variables. Lagrange multiplier method.

UNIT-V Beta and Gamma functions. Double and triple integrals, Dirichlet's integrals. Change of order of integration in double integrals.

REFERENCES:

1. Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York, 1975.
2. T.M. Apostol, Mathematical analysis, Narosa Publishing House, New Delhi, 1985.
3. R.R. Goldberg, Real Analysis, Oxford & I.B.H. Publishing Co., New Delhi,
4. D. Soma Sundaram and B. Choudhary, a. first course in Mathematical analysis, Narosa Publishing House, New Delhi, 1997.
5. P.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S.Chand& Co., New Delhi, 2000.
6. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad.

7. Murry R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York.
8. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
9. S.C. Malik, Mathematical analysis, wiley Eastern Ltd., New Delhi
10. O.E. Stanaitis, an Introduction to Sequences, Series and Improper Integrals, Holden Day, Inc., san Francisco, California.
11. Earl D. Rainville, Infinite Series, The Macmillan Company,New York.
12. Chandrika Prasad, Text Book on algebra and Theory of Equations, Pothishala Pvt. Ltd., allahabad.
13. N. Piskunov, differential and Integral Calculus, Peace Publishers, Moscow.
14. Shanti Narayan, A course of Mathematical Analysis, S. Chand and Company, New Delhi.

B.Sc. Part -II (MATHEMATICS)

2016-2017

PAPER – II

DIFFERENTIAL EQUATIONS

Max.Marks.50

UNIT-I Laplace Transformation – Linearity of the Laplace transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

UNIT-II Partial differential equations of the first order. Lagrange's solution. Some special types of equation which can be solved easily by methods other than the general method. Charpit's general method of solution.

UNIT-III Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's methods.

UNIT-IV Series solutions of differential equations - Power series method. Bessel's and Legendre functions and their properties. Convergence, recurrence and generating relations. Orthogonality of functions. Sturm-Liouville problem. Orthogonality of eigen-functions. Reality of eigenvalues. Orthogonality of Bessel's functions and Legendre polynomials.

UNIT-V Calculus of variations – Variational problems with fixed boundaries - Euler's equation for functional containing first order derivative and one independent variable. Externals. Functionals dependent on higher order derivatives. Funcationals dependent on more than one independent variable. Varitional problems in parametric form. Invariance of Eulers Equation under coordinates transformation. Variational problems with moving Boundaries–Functionals dependent on one and two functions. One sided variations. Sufficient conditions for an Extremum – Jacobi and Legendre conditions. Second Variation. Variational principal of least action.

REFERENCE

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley &sons,Inc. New York, 1999.
2. D.A. Murray, Introductory Course on differential Equations, Orient Longman, (India) 1967.
3. A.R. Forsyth, a. Treatise on differential Equations, Macmillan and Co.Ltd. London .Lan N. Sneddon, elements of paprtial Differential Equations, McGraw-Hill Book Company, 1988.
4. Francis B.Hilderbrand, Advanced Calculus for Applications, Prentic Hall India Pvt.Ltd., New Delhi, 1977.

5. Jane Cronin, differential equations, Marcel dekkar, 1994.
6. Frank ayres, Theory and Problems of differential Equations, McGraw- Hill Book company, 1972.
7. Richard Bronson, Theory and Problems of Differential Equations,McGraw-Hill Inc., 1972.
8. A.S. Gupta, Calculus of variations with-applications, Prentice-Hall of India, 1997.
9. R. courant and D. Hilbert, Methods of Mathematical Physics, volts. I & II, wiley-Inter science, 1953.
10. I.M. Gelfand and s.V.Fomin, calculus of Variations, Prentice-Hill, Englewood Cliffs New Jersey), 1953.
11. A.M. Arthurs, Complementary Variational Principles, Calrendon Press, Oxford, 1970.
12. V. Kornkov, Variational Principales of Continuum Mechanies with Engineering Applications, vol. I, RedielPub. :dordrecht, Holland, 1985.
13. T. Oden and J.N. Reddy, Variational Methods in Theoretical Mechanics, Springer-Verlag. 1976.

B.Sc. Part -II (MATHEMATICS)

2016-2017

PAPER – III

MECHANICS

Max.Marks.50

STATICS :

UNIT – I Analytical conditions of equilibrium. Virtual work. Catenary.

UNIT –II Forces in three dimensions. Poinsot's central axis. Null lines and planes.

DYNAMICS :

UNIT–III Simple harmonic motion. Velocities and accelerations along radial and transverse directions. Projectile. Central orbits.

UNIT–IV Kepler's laws of motion. Velocities and acceleration in tangential and normal directions. Motion on smooth and rough plane curves.

UNIT-V Motion in a resisting medium. Motion of particles of varying mass. Motion of a particle in three dimensions. Acceleration in terms of different co-ordinate systems.

REFERENCE:

1. S.L. Loney, Statics, Macmillan and Company; London Press, 1956 R.S. Verma, a Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.
2. S.L. Loney, An elementary Treatise on the Dynamics of a particle and of rigid bodies . Cambridge University.

B.Sc. Part – III (MATHEMATICS)

2016-2017

PAPER-I

ANALYSIS

Max. Marks. 50

METRIC SPACES:

UNIT-I Construction of real numbers as the completion of the incomplete metric space of rationals. Real numbers as a complete ordered field.Definition and examples of metric spaces. Neighborhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points. Sub-Space of a metric space. Cauchy sequences. Completeness. Cantor's intersection theorem. Contraction principle.

UNIT-II Dense subsets. Baire Category theorem. Separable space, second countable and first countable spaces. Continuous functions. Extension theorem. Uniform continuity. Isometric and homeomorphism. Equivalent metrices. Compactness, Sequential compactness. Totally bounded spaces. Finite intersection property. Continuous functions and compact sets. Connectedness. Components. Continuous functions and connected sets.

COMPLEX ANALYSIS:

UNIT-III Complex numbers as ordered pair. Geometric representation of Complex numbers. Stereographic projection. Continuity and differentiability of complex functions. Analytic functions. Cauchy-Riemann equations. Harmonic functions. Elementary functions. Mapping by elementary functions. Mobius transformations. Fixed point. Cross ratio. Inverse points and critical mappings. Conformal mappings.

REAL ANALYSIS:

UNIT-IV Riemann integral. Integrability of continuous and monotonic functions. The fundamental Theorem of integral calculus. Mean value theorems of integral calculus. Improper integrals and their convergence, comparisiontests, Abel's and Dirichlet's tests. Frullani's integral. Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

UNIT-V Series of arbitrary terms. Convergence, divergence and oscillation. Abel's and Dirichlet's test. Multiplication of series. Double series. Partial derivation and differentiability of real valued functions of two variables. Schwarz and Youngs theorem. Implicit function theorem. Fourier series. Fourier expansion of piece wise monotonic function

REFERENCES:

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New-Delhi,1985.
2. R.R. Goldberg, Real Analysis, Oxford & IBH Publishing Company New-Delhi,1970.
3. S. Lang, Undergraduate Analysis, Springer-Verlag, New-York ,1983

4. D.Somasunderam and B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House, New Delhi,1997.
5. Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Company New-Delhi.
6. P.K. Jain and S.K.Kaushik, An Introduction to Real Analysis , S. Chand & Company New-Delhi ,2000.
7. R.V. Churchill & J.W. Brown, Complex Variables and Applications , 5^{th} Edition, Mc-Graw Hill, New-York ,1990.
8. Mark J.Ablowitz& A.S. Focas, Complex Variables : Introduction and Applications, Cambridge University Press South Asian Edition, 1998.
9. Shanti Narayan, Theory and Functions of a Complex Variable, S. Chand & Company New-Delhi. E.T. Copson. Metric Spaces Cambridge University Press , 1968.

B.Sc. Part – III (MATHEMATICS)

2016-2017

Paper II

Abstract Algebra

Max.Marks.50

UNIT-I Group – Automorphism, inner automorphism. Automorphism groups. Conjugacy relation. Normalizer. Counting principle and the class equation of a finite group. Center for groups of prime order. Abelianizing of a group and its universal property. Sylow's theorems. Sylow subgroup. Structure theorem for finite abelian groups.

UNIT-II Ring theory - Ring homomorphism. Ideals and Quotient rings. Field of quotients of an integral domain. Euclidean rings. Polynomial rings. Polynomials over the rational field. Eisenstien criterion. Polynomial rings over commutative rings. Unique factorization domain. R-unique factorization domain implies so is R $[x_1,x_2 \ldots\ldots\ldots x_n]$. Modules, submodules. quotient modules. Homomorphism and isomorphism theorems.

UNIT-III Definitions and examples of vector space. Subspaces. Sum and direct sum of subspaces. Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for basis. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.

UNIT-IV Linear transformation and their representation as matrices. The algebra of linear transformations. The rank-nullity theorem. Change of basis. Dual space, Bidual space and natural isomorphism. Adjoint of linear transformation. Eigen values and eigenvectors of a linear transformation. Diagonolisation, Annihilators of a subspace. Bilinear, Quadratic and Hermilton forms.

UNIT-V Inner product spaces - Cauchy-Schwarz inequality. Orthogonal vectors. Orthogonal complements. Orthogonal normal sets and basis. Bessel's inequality and for finite dimensional spaces. Gram-Schmidt orthogonalization process.

REFERENCES:

1. I.N.Herstien, Topics in Algebra, Wiley Eastern Ltd. New-Delhi.
2. N. Jacobson, Basic Algebra Vols. I &II ,W.H. Freeman, 1980.
3. Shanti Narayan, A Text book of Modern Abstract Algebra, S. Chand & Company New-Delhi.

4. K.B. Dutta, Matrix and Linear Algebra ,Prentice Hall of India Pvt. Ltd. New-Delhi 2000.
5. P.B.Bhattacharya,S.K.Jain and S.R.Nagpal,Basic Abstract (2nd edition) Cambridge UnivercityPress,Indian edition,1997.
6. K.Hoffman and R.Kunze,LinearAlgebra 2ndEdition,Prentice Hall Englewood Cliffs,New Jersey.1997.
7. S.K.Jain,A Gunawardena &P.B.Bhattacharya,Basic Linear Algebra with MATLAB.Key college publishing (Springer Verlag) 2001
8. S. Kumaresan,LinearAlgebra,AGeeometric Approach, Prentice-Hall of India,2000.
9. Vivek Sahai and vivkasbist, Algebra Norosa Publishing House, 1997.
10. I.S. Luther and B.S.Passsi, Algebra Vol. 1-Groups,Vol. II-Rings.Norosa Publishing House (Vol.1-1996,Vol.II-1999)
11. D.S. Malik ,J.N.Mordeson and M.K.Sen Fundamentals of Abstract Algebra,McGraw Hill International Edition, 1997.

B.Sc. Part – III (MATHEMATICS)

2016-2017

Paper III

Discrete Mathematics

Max.Marks.50

UNIT -I Sets and proposition - cardinality. Mathematical induction. Principle of inclusion and exclusion. Computability and formal languages - Ordered sets. Languages, Phrase structure grammars. Types of grammars and languages. Permutations, Combinations and Discrete probability.

UNIT -II Relations and Functions - Binary relations, Equivalence relations and partitions. Partial order relation and lattices. Chains and anti chains. Pigeon hole principle. Graphs and planar graphs - Basic terminology, Multi graphs, Weighed graphs, Paths and circuits, Shortest paths, Eularian paths and circuits. Travelling salesman problem, Planar graphs. Trees.

UNIT –III Finite state machines - Equivalent machines. Finite state machines as language recognizers. Analysis of algorithms - Time complexity. Complexity of problems. Discrete numeric functions and Generating functions.

UNIT – IV Recurrence relations and Recursive algorithms – Linear recurrence relations with constant coefficients. Homogeneous solutions. Particular solution. Total solution. Solution by the method of generating functions. Brief review of Groups and Rings.

UNIT- V Boolean algebras - Lattice and Algebraic structures. Duality. Distributive and Complemented Lattices. Boolean lattices and Boolean algebras. Boolean functions and Expressions. Propositional calculus. Design and implementation of Digital Networks. Switching circuits.

REFERENCES:

(1) C.L.Liu, Elements of Discrete Mathematics. [Second Edition], McGraw Hill, International edition, Computer Science series,1986.

B.Sc. Part III (MATHEMATICS)

2016-2017

Paper III (Optional)

PROGRAMMING IN C AND NUMERICAL ANALYSIS

(Theory & Practical)

UNIT-I Programmer's model of a computer. Algorithms. Flow Charts. Data Types. Arithmetic and input/output instructions. Decisions control structures. Decision statements. Logical and Conditional operators. Loop. Case control structures. Functions. Recursions. Preprocessors. Arrays. Puppetting of strings. Structures. Pointers. File formatting. Numerical Analysis.

UNIT-II Solution of Equations: Bisection, Secant, Regula Falsi, Newton's Method, Roots of Polynomials. Interpolation: Lagrange and Hermite Interpolation, Divided Differences, Difference Schemes, Interpolation Formulas using Differences. Numerical Differentiation. Numerical Quadrature: NewtonCote's Formulas. Gauss Quadrature Formulas, Chebychev's Formulas.

UNIT-III Linear Equations: Direct Methods for Solving Systems of Linear Equations (Guass Elimination, LU Decomposition, Cholesky Decomposition), Iterative Methods (Jacobi, GaussSeidel, Relaxation Methods). The Algebraic Eigenvalue problem: Jacobi's Method, Givens' Method, Householder's Method, Power Method, QR Method, Lanczos' Method.

UNIT-IV Ordinary Differential Equations: Euler Method, Single-step Methods, Runge-Kutta's Method, Multistep Methods, Milne-Simpson Method, Methods Based on Numerical Integration, Methods Based on Numerical Differentiation, Boundary Value Problems, Eigenvalue Problems. Approximation: Different Types of Approximation, Least Square Polynomial Approximation, Polynomial Approximation using Orthogonal Polynomials, Approximation with Trigonometric Functions, Exponential Functions, Chebychev Polynomials, Rational Functions. Monte Carlo Methods.

Unit-V

Random number generation, congruential generators, statistical tests of pseudo-random numbers. variate generation, inverse transform method, composition method, acceptance rejection method, generation of exponential, normal variates, binomial and Poisson variates. Monte Carlo integration, hit ormiss Monte Carlo integration, Monte Carlo integration for improper integrals, error analysis for Monte Carlo integration.

REFERENCES :

1. Henry Mullish and Herbert L. Cooper, Spirit of C: An Introduction to Modern Programming, Jaico Publishers, Bombay.
2. . B.W. Kernighan and D.M. Ritchie. The C Programming Language 2nd Edition, (ANSI features) Prentice Hall, 1989.
3. Peter A Darnel and Philip E. Margolis, C : A Software Engineering Approach, Narosa Publishing House, 1993.
4. Robert C. Hutehisonand Steven B. Just, Programming using C Language, McGraw Hill, 1988.
5. Les Hancock and Morris Krieger, The C Primer, McGraw Hill, 1988.
6. V. Rajaraman, Programming in C, Prentice Hall of India, 1994.
7. Byron S. Gottfried, Theory and Problems of Programming with C, Tata McGraw-Hill Publishing Co. Ltd., 1998.

8. C.E. Froberg, Introduction to Numerical Analysis, (Second Edition), Addison-Wesley, 1979.
9. James B. Scarborough, Numerical Mathematical Analysis, Oxford and IBHPublishing Co. Pvt. Ltd. 1966.
10. Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan publishing Co., Inc. New York, 1982.
11. M.K. Jain, S.R.K. lyengar, R.K. Jain, NumericalMethods Problems and Solutions, New Age International (P) Ltd., 1996.
12. M.K. Jain, S.R.K. lyengar, R.K. Jain, Numerical Methods for Scientific and Engineering Computation, New Age International (P) Ltd., 1999.
13. R.Y. Rubistein, Simulation and the Monte Carlo Methods, John Wiley, 1981.
14. D.J. Yakowitz, Computational Probability and Simulation, Addison-Wesley, 1977

PAPER - III - (OPTIONAL)
PRACTICAL
PROGRAMMING IN C AND NUMERICAL ANALYSIS

LIST OF PRACTICAL TO BE CONDUCTED...

1. Write a program in C to find out the largest number of three integer numbers.

2. Write a program in C to accept monthly salary from the user, find and display income tax with the help of following rules :

Monthly Salary	Income Tax
9000 or more	40% of monthly salary
7500 or more	30% of monthly salary
7499 or less	20% of monthly salary

3. Write a program in C that reads a year and determine whether it is a leap year or not.

4. Write a program in C to calculate and print the first n terms of fibonacci series using looping statement.

5. Write a program in C that reads in a number and single digit. It determines whether the first number contains the digit or not.

6. Write a program in C to computes the roots of a quadratic equation using case statement.

7. Write a program in C to find out the largest number of four numbers using function.

8. Write a program in C to find the sum of all the digits of a given number using recursion.

9. Write a program in C to calculate the factorial of a given number using recursion.

10. Write a program in C to calculate and print the multiplication of given 2D matrices.

11. Write a program in C to check that whether given string palindrome or not.

12. Write a Program in C to calculate the sum of series:

$$1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \cdots, \frac{1}{n!}x^n$$

13. Write a program in C to determine the grade of all students in the class using Structure. Where structure having following members - name, age, roll, sub1, sub2, sub3, sub4 and total.

14. Write a program in C to copy one string to another using pointer. (Without using standard library functions).

15. Write a program in C to store the data of five students permanently in a data file using file handling.