

BHUPAL NOBLES` UNIVERSITY, UDAIPUR
FACULTY OF SCIENCE

Department Of Mathematics

Scheme of Studies

B.Sc. I Year (Annual Scheme)

S. No.	PAPER	NOMENCLATURE	COURSE CODE	UNIVERSITY EXAM	INTERNAL ASSESSMENT	MAX. MARKS
1.	Paper I	Algebra	MAT-111	53	22	75
2.	Paper II	Calculus	MAT- 112	53	22	75
3.	Paper III	Geometry	MAT- 113	53	22	75

The marks distribution of internal assessment-

1. Mid Term Examination – 15 marks
2. Attendance – 7 marks

B.Sc. II Year (Annual Scheme)

S. No.	PAPER	NOMENCLATURE	COURSE CODE	UNIVERSITY EXAM	INTERNAL ASSESSMENT	MAX. MARKS
1.	Paper I	Advanced Calculus	MAT-221	53	22	75
2.	Paper II	Differential Equation	MAT- 222	53	22	75
3.	Paper III	Mechanics	MAT- 223	53	22	75

The marks distribution of internal assessment-

1. Mid Term Examination – 15 marks
2. Attendance – 7 marks

B.Sc. III Year (Annual Scheme)

S. No.	PAPER	NOMENCLATURE	COURSE CODE	UNIVERSITY EXAM	INTERNAL ASSESSMENT	MAX. MARKS
1.	Paper I	Real Analysis	MAT-331	53	22	75
2.	Paper II	Advanced Algebra	MAT- 332	53	22	75
3.	Paper III	Numerical Analysis	MAT-333 (A)	53	22	75
		Mathematical Quantitative Techniques	MAT-333 (B)			
		Mathematical Statistics	MAT-333 (C)			

The marks distribution of internal assessment-

1. Mid Term Examination – 15 marks
2. Attendance – 7 marks

BHUPAL NOBLES' UNIVERSITY, UDAIPUR

Department of Mathematics

Syllabus 2017 -2018

(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)

B.A. / B. Sc. FIRST YEAR EXAMINATIONS 2017-2020 MATHEMATICS

Theory Papers	Papers Name	Papers Code	Papers hours/ week	Maximum Marks BA/ B.Sc.
Paper I	ALGEBRA	MAT-111	3	75
Paper II	CALCULUS	MAT-112	3	75
Paper III	GEOMETRY	MAT-113	3	75
Total Marks				225

NOTE:

1. Common papers will be set for both the Faculties of Arts & Science.
2. Students are allowed to use simple electronic desk calculators (as per University Guidelines)
3. Mathematical/ Log Tables may be used (as per University guidelines).

Scheme of Examination:

Question Paper Pattern for Examination: 75 marks (Internal: 22 Marks & External: 53 Marks)

Section A: Total 15 Question will be set from five units i.e. three question from each unit. These questions require very short answer. Students are required to attempt two questions from each unit. Each question will be of (1) mark (Total 10 marks).

Section B: Total 10 questions will be set from five units i.e. two question from each unit. Students are required to attempt one question from each unit. Each question carries 5 marks (Total 25 marks). The answer of each question should be given approximately in 250 words.

Section C: Total 5 descriptive question will be set from five units of the paper, not more than one question from each unit. Students are required to answer two questions in about 300 words. Each question carries 9 marks (Total 18 marks).

NOTE: Proportionate marks will be given to the Arts students.

PAPER-I

MAT-111: ALGEBRA

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT-I

Groups and its related theorems, Various examples, Order of an element and related theorems, Subgroups: Union and intersection of subgroups and various examples. Product of two subgroups, Cyclic group, Left and right cosets and their properties, Lagrange's theorem, Index of a subgroup.

UNIT- II

Permutation groups, Even and odd permutations, Normal subgroups their examples and elementary basic theorems, Quotient group, Simple group, Centre of group, Normalizer of an element and that of a subgroup.

UNIT-III

Group homomorphism and isomorphism with elementary basic properties, Cayley's theorem for finite groups, Fundamental theorem of homomorphism in groups. The three isomorphism theorems of groups.

UNIT -IV

Symmetric, Skew Symmetric, Hermitian and skew Hermitian matrices. Linear independence of row and column matrices. Row rank, column rank and rank of a matrix. Equivalence of column and row ranks.

Eigen values, Eigen vectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding inverse of a matrix. Solution of system of linear equations.

UNIT-V

Descartes's Rule of signs , Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations, solution of Cubic equations (Cardan method). Biquadratic equations (Ferrari's Method).

References:

1. I. N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975
2. R. S. Agrawal : A Textbook on Modern Algebra
3. Gokhroo & Gokhroo : Group Theory
4. Gokhroo, Saini : Elements of Abstract Algebra
5. Sharma, Purohit : Elements of Abstract Algebra

PAPER-II

MAT-112: CALCULUS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT-I

Polar coordinates and derivatives of arc, Polar subtangent and subnormal, Pedal-equation, Asymptotes of the Cartesian curve and methods of finding the Asymptotes.

UNIT -II

Curvature of the curve, Concavity and convexity. Points of inflexion. Multiple points. Tracing of curves in Cartesian and polar coordinates.

UNIT – III

Beta Gamma functions and their properties, Relation between Beta Gamma function, Duplication formula, Gamma Integral formula.

Rectification: Length of curve of various curves, Intrinsic equation of various curves.

UNIT - IV

Differential equation of first order and first degree: Degree and Order, Method of separation of variables, Homogeneous equations, Equation reducible to homogeneous form. Linear equations and equations reducible to the linear form. Exact differential equations.

UNIT - V

Differential equation of first order and higher degree: Solution of differential equations solvable for x, y, p , Clairaut's form, Geometrical meaning of a differential equation.

Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations and the equations reducible in homogeneous form.

References:

1. M.D. Raisingania : Differential Equation
2. Bansal, Bhargava : Avakalan Ganita-II
3. Gokhroo, Saini : Advanced Calculus
4. Gokhroo, Saini : Calculus
5. Bansal, Bhargava & Agrawal : Avkal Samikaran I .
6. Gokhroo, Saini, Kumbhat : Differential Equation-I.

PAPER -III

MAT-113: GEOMETRY

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT -I

Plane and straight line: Equation to represent two planes and angle between them, Projection on a plane area of a triangle and volume of tetrahedron. Equations of line intersecting two lines, skew lines, Shortest distance between two lines.

UNIT – II

Introduction of general equation of second degree and conic section.

Ellipse: Tangent, Normal, Chord of contact of the tangents, Pole and polar, Eccentric angle, Auxiliary circle, Director circle, Equation of chord in term of middle point, Pair of tangents, Conjugate lines, Diameter and conjugate diameters and their properties.

UNIT-III

Hyperbola: Parametric coordinates, Tangent, Normal, Chord of contact of tangents, Pole and polar etc. Asymptotes, Conjugate hyperbola, Conjugate diameters, Rectangular hyperbola, Equation of hyperbola referred to its asymptotes. Polar Equations: Polar equation of conic, Polar equations of tangent, Perpendicular lines and normal, Director circle of the conic.

UNIT-IV

Sphere: General equation, Tangent Plane, Pole and Polar, Intersection of two Spheres, Radical plane and line, radical centre, Co-axial Spheres, Limiting points.

UNIT-V

Cone: Equation of Cone, Enveloping Cone, Tangent plane, Reciprocal Cone, Three mutually perpendicular generators, Right circular Cone.

Cylinder: Equation of Cylinder, Right circular Cylinder, Enveloping Cylinder.

References:

1. Gorakh Prasad and H.C.Gupta : A Text book of coordinate Geometry (Pothishala)
2. S.L.Loney : The Elements of coordinate Geometry;
Mack-Millan and Company, London.
3. Bansal, Bhargava : Dwivim Nirdeshank Jyamiti
4. Gokhroo, Saini : Dwivim Nirdeshank Jyamiti
5. Gokhroo, Saini : Trivim Nirdeshank Jyamiti

(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)**B.A. / B. Sc. SECOND YEAR EXAMINATIONS 2018-2019 MATHEMATICS**

Theory Papers	Papers Name	Papers Code	Papers hours/ week	Maximum Marks BA/ B.Sc.
Paper I	ADVANCED CALCULUS	MAT-221	3	75
Paper II	DIFFERENTIAL EQUATIONS	MAT-222	3	75
Paper III	MECHANICS	MAT-223	3	75
Total Marks				225

NOTE:

1. Common papers will be set for both the Faculties of Arts & Science.
2. Students are allowed to use simple electronic desk calculators (as per University Guidelines)
3. Mathematical/ Log Tables may be used (as per University guidelines).

Scheme of Examination:

Question Paper Pattern for Examination: 75 marks (Internal: 22 Marks & External: 53 Marks)

Section A: Total 15 Question will be set from five units i.e. three question from each unit. These questions require very short answer. Students are required to attempt two questions from each unit. Each question will be of (1) mark (Total 10 marks).

Section B: Total 10 questions will be set from five units i.e. two question from each unit. Students are required to attempt one question from each unit. Each question carries 5 marks (Total 25 marks). The answer of each question should be given approximately in 250 words.

Section C: Total 5 descriptive question will be set from five units of the paper, not more than one question from each unit. Students are required to answer two questions in about 300 words. Each question carries 9 marks (Total 18 marks).

NOTE: Proportionate marks will be given to the Arts students.

PAPER - I

MAT-221: ADVANCED CALCULUS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT – I

Quadrature, Area of curve given by a Cartesian equations, Area between two Cartesian curves, Area of curves given by polar equations.

Differentiation under the sign of integration, Leibnitz's law.

UNIT – II

Partial differentiations, Euler's formula for solving partial differentiations, Envelopes, Maxima and Minima of two variables and more than two variables including Lagrange's method of undetermined multipliers.

UNIT -III

Jacobians, Evaluation of double and triple integrals, Dirichlet's theorem and Liouville's extension, Change of order of integration.

UNIT - IV

Vector Calculus: Direction of derivatives, Gradient of scalar functions, Irrotational Vectors, Definition of gradient, Divergence of a vector, Curl of a vector, Curl of the product of a scalar and vector, Divergence of a vector product, Vector identities (without proof) .

UNIT - V

Vector Integration: Gauss's theorem, Divergence of the product of a scalar and a vector, Stoke's theorem, surface integral of the curl of a vector, Green's theorem (Excluding the proofs of the theorems).

References:

1. Gorakh Prasad : Differential calculus, Pothishala Pvt. Ltd., Allahabad.
2. Gorakh Prasad : Integral calculus, Pothishala Pvt. Ltd., Allahabad.
3. Spain, B. : Vector Analysis.
4. Bhargava, Banwari Lal : Sadish Kalan.
5. Gokhroo, Saini : Sadish Kalan.

PAPER - II

MAT-222: DIFFERENTIAL EQUATIONS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT - I

Linear differential equations of second order and their solutions by:

- I. The method of finding an integral of the C.F. by Inspection,
- II. Changing of independent variables,
- III. Removal of the first derivative,
- IV. Variation of parameters.

UNIT - II

Exact differential equations and equations of special forms. Simultaneous differential equations. Total differential equations.

UNIT - III

Linear partial differential equations of first order: Lagrange's method, Integral surfaces passing through a given curve, Orthogonal surfaces. Linear equations involving more than two variables. Non-Linear partial differential equations of order one. Special methods of solution applicable to certain standard forms.

UNIT -IV

Charpit's method of solving non linear partial differential equations of first order, Monge's method for the integration of equations $Rr + Ss + Tt = V$. Linear partial differential equations with constant coefficients, Homogeneous equations with constant coefficients.

UNIT - V

Integral transform, Kernal of the transform, Laplace transform of continuous function, Properties of Laplace transform, Laplace transform of some standard functions.

Inverse Laplace transform, Properties of inverse Laplace transform.

References:

1. Ray and Sharma : Differential equation.
2. Bansal, Dhami : Differential equation (Vol. II).
3. Raisinghania, M.D. : Advanced differential equations.
4. Murray A. Daniel : Differential equation.
5. Hari Kishan, K.B. Yadav : Differential Equations & Integral Transforms
6. Ian N. Sneddon : Elements of Partial differential equation,

Mc Graw - Hill Book Company.

PAPER – III

MAT-223: MECHANICS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT – I

Friction: Force of friction, Kinds of friction, Coefficient of friction, Angle of friction, Cone of friction, Limiting Equilibrium on an inclined plane, Equilibrium on a rough inclined plane.

Common Catenary: Intrinsic equation of common catenary, Cartesian equation of the common catenary, General properties of common catenary, Shape of common catenary, Approximations of the common catenary, Sag of a tightly stretched wire (Telegraph wires).

UNIT –II

Velocity and Accelerations: Tangential, Normal, Radial and Transversal velocity and accelerations, Rectilinear motion, Simple Harmonic motion, Nature of SHM, Period of SHM, Frequency, Motion under inverse square law.

Rectilinear Motion in Resisting Medium: Horizontal motion, Terminal Velocity, Vertical motion (Descent and Ascent).

UNIT – III

Constrained Motion: (Circular and Cycloidal)

Circular Motion: Motion of a smooth curve in a vertical plane, Parabolic motion of the particle after leaving the Circle, Point of intersection of the circle and the parabolic path, Latus rectum of the parabolic path, Motion of a particle on the outside of a smooth vertical circle

Cycloidal Motion: Definition, Parametric equation, intrinsic equation, Radius of curvature, Motion on a smooth cycloid.

UNIT –IV

Projectile: Equation of the Trajectory, Velocity and direction of a projectile at any time t and given height, Highest height, time of flight, Horizontal range, Least velocity of projection, Time to pass through a given point.

Impact: Direct and Oblique impact, Elasticity, Laws of Impact, Principle of conservation of momentum, Direct impact of two smooth elastic spheres, Height of throw due to impact, Time of throw due to impact, Loss of kinetic energy by direct impact of two smooth and elastic spheres.

UNIT –V

Fluid pressure under gravity, Equality of pressure at all points in a horizontal plane, Atmospheric pressure, Difference of pressure between two points, Surface of equal densities, Free surface of a homogeneous liquid, Surface of separation of two fluids, Effective surface of a liquid, Whole pressure, Whole pressure on a plane surface, Whole pressure on a horizontal base, Centre of pressure, coordinates of centre of pressure, Some theorems relating to centre pressure (without proof), Centre of pressure in some standard cases, Centre of pressure of a compound area.

References:

1. S. L. Loney : Statics, Macmillan and Company, London.
2. R.S. Verma : A Text book of Statics (Pothishala)
3. Ray & Sharma : A Text book of Hydrostatics
4. N.Sharma : A Text book of Dynamics.
5. M Ray : A Text book of Dynamics.
7. Gokhroo, Saini : Dynamics
8. Gokhroo & Others : Hydrostatics(Hindi Ed.)
9. Gokhroo & Others : Statics (Hindi Ed.)
10. Bhargava & Others : Hydrostatics (Hindi Ed.)
11. Bhargava & Others : Statics (Hindi Ed.)

(COMMON FOR THE FACULTIES OF ARTS & SCIENCE)

B.A. / B. Sc. THIRD YEAR EXAMINATIONS 2019-2020 MATHEMATICS

Theory Papers	Papers Name	Papers Code	Papers hours/ week	Max. Marks BA/ B.Sc.
Paper I	REAL ANALYSIS	MAT-331	3	75
Paper II	ADVANCED ALGEBRA	MAT-332	3	75
Paper III	NUMERICAL ANALYSIS	MAT-333(A)	3	75
	MATHEMATICAL QUANTITATIVE TECHNIQUES	MAT-333 (B)		
	MATHEMATICAL STATISTICS	MAT-333 (C)		
Total Marks				225

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Scheme of Examination:

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Section B: Total 10 questions will be set from five units i.e. two question from each unit. Students are required to attempt one question from each unit. Each question carries 5 marks (Total 25 marks). The answer of each question should be given approximately in 250 words.

Section C: Total 5 descriptive question will be set from five units of the paper, not more than one question from each unit. Students are required to answer two questions in about 300 words. Each question carries 9 marks (Total 18 marks).

NOTE: Proportionate marks will be given to the Arts students.

PAPER – I

MAT-331: REAL ANALYSIS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT – I

Real number system:

- (i) Sets, Types of sets, Finite and Infinite sets, Equivalent sets, Subsets, Nature of subsets of a countable set, Upper and Lower bounds of a set, Supremum and infimum of a set and their properties.
- (ii) Function, Basic properties of limit, Limit of a function of one and two variables (not theorem), Continuous function and their theorems (Composite of continuous function, Boundedness theorem, Mostest theorem, Intermediate value theorem).
- (iii) Open interval, Closed interval, Neighborhood of a number. Real line \mathbb{R} -Interior points and limit points of a set in \mathbb{R} , Open sets and closed sets in \mathbb{R} and their properties, Bolzano – Weierstrass theorem for set.

UNIT – II

- (i) Sequence: Bounded sequence, Monotonic sequence, limit of a sequence, Convergent sequence, Properties of convergent sequence, Subsequence and its properties, Cauchy sequence and its properties, Cauchy general principle of convergence, Examples of convergent sequences.
- (ii) Series: Convergence and divergence of an Infinite series of real numbers, The necessary and sufficient conditions, Various tests of convergence: Comparison test, Practical Comparison test, P-test, Ratio Comparison test, D'Alembert ratio test, Rabbe's test, De Morgan and Bertrand's test, Logarithmic test, Gauss's test, Alternating series and Leibnitz test.

UNIT-III

Riemann Integration: Partition of a closed interval, Norm of the partition, Upper and Lower Darboux sum, theorems on Darboux sums, Upper and Lower Riemann integrals, Riemann integrability of a bounded function in a closed interval, the necessary and sufficient condition for R integrability in terms of Darboux sums, various basic examples of Rirmann integration.

UNIT – IV

Fourier Series: Periodic functions, Even and odd functions, Representation of Fourier series, Determination of Fourier coefficients, Dirichlet's condition for the expansion of fourier series, Fourier series for even and odd functions, Various problems on fourier serious. Fourier's half range series.

UNIT – V

Improper Integrals: Improper integral, Kinds of improper integral, Convergence of various types of improper integral, Comparison test, P-test, Abel's test, Dirichlet's test and Quotient test for convergence of improper integral.

References:

1. T. M. Apostol : Mathematical Analysis.
2. R. R. Goldbeg : Real Analysis
3. Walter Rudin : Principles of Mathematical Analysis
4. P.K. Jain& S. K. Kaushuik : An introduction to Real Analysis.

5. D. Somasundaram & B. Chaudhary : A First Course of Mathematical Analysis.
6. Bhargava & Goyal : Real Analysis.
7. Gokhroo & others : Real Analysis.
8. Sharma & Purohit : Elements of Real Analysis.

PAPER – II

MAT-332: ADVANCED ALGEBRA

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT – I

Rings, Definition and examples of various kinds of rings, Integral domain, Division ring, Field, Characteristic of a ring and integral domain, Subring and subfield with examples. Left and right ideals with examples and properties, Quotient ring, Homomorphism and isomorphism in rings, Kernel of homomorphism, Fundamental theorem of ring homomorphism. Embedding of a ring into a ring with unity.

UNIT -II

Definition and various examples of vector spaces, subspaces and examples, Intersection, Sum and direct sum of two subspaces, Linear span, Linear dependence, Independence and their basic properties and problems.

UNIT - III

Basis, Dimension and examples, Finite dimensional vector spaces, Existence theorem for a basis, Extension theorem, Invariance of the number of elements of a basis set, Existence of complementary subspaces of a subspace of a finite dimensional vector space, Dimension of sum (and direct sum) of two subspaces, Quotient space and its dimension.

UNIT- IV

Linear transformations, Rank and Nullity of a linear transformation, Sylvester law of nullity, To obtain a matrix from a linear transformation and vice-versa and their problems relating to the same and different bases. The algebra of linear transformations, Dual space and dual basis and dimension of dual space.

UNIT – V

Bilinear form, Symmetric and anti symmetric forms, Quadratic form, Matrix representation of bilinear form, Degenerate and non-degenerate forms.

References:

1. Surjeet Singh and Quazi Zarneeruddi : Modern Algebra.
2. I.N.Herstein : Topics in Algebra.
3. R.S.Agrawal : Algebra.

4. Gokhroo, Saini : Advance Abstract Algebra.
5. Shanti Narayan : A Text-Book of Modern Abstract Algebra.
6. Hoffman and Kunze : Linear Algebra, (Second Edition).

Paper –III (Optional): Any one of the following papers –

NOTE: Candidates who have offered Statistics as an optional subject will not be permitted to offer the paper III - MAT-333 (C)}.

PAPER -III

MAT-333 (A): NUMERICAL ANALYSIS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT – I

Finite Differences, Difference formulae, Fundamental theorem of the difference calculus, Differences table, The operator E, Properties of operators E and Δ . Relation between operator E of finite differences and differential coefficient D of differential calculus, Factorial notation, Methods of representing any given polynomial in factorial notation.

UNIT –II

Interpolation: Graphic method, curve fitting method, Newton-Gregory formula for forward interpolation, Newton-Gregory formula for backward interpolation, Interpolation with unequal interval, Newton's formula for unequal interval, Lagrange's interpolation formulae for unequal interval.

UNIT – III

Central difference operator, Gauss's interpolation formulae, Various problems on Gauss forward formula, Gauss backward formula, Stirling's formula and Bessel's formula, Newton-Gregory formula for numerical differentiation

UNIT –IV

Numerical Integration: General quadrature formula for equidistant ordinates, Numerous examples on trapezoidal rule, Simpson's one-third rule, Simpson's three-eight rule and Weddle's rule.

Inverse interpolation: Lagrange's method, Iteration or successive approximation method, Method of reversion series.

UNIT – V

Ordinary differential equations of first order: Methods of solving ordinary differential equation of first order (Picard's method of successive approximations, Euler's method, Modified euler's method, Taylor's series method, Milne's series method, Runge-Kutta method)

References:

1. C. E. Froberg : Introduction to Numerical Analysis

2. M. K. Jain, S. R. K. Iyenger : Numerical methods: Problems & solutions
and R.K. Jain
3. H.C. Saxena : Numerical Analysis
4. Goyal, Mittal : Numerical Analysis
5. Goyal, Mittal : Numerical Analysis (Hindi ed.)
6. Goyal, Mittal : Numerical Analysis (Hindi ed.)

PAPER- III

MAT-333 (B): MATHEMATICAL QUANTITATIVE TECHNIQUES

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT - I

Linear programming, Basic assumptions of Linear programming, Application area of Linear programming, Formulating a problem as a Linear programming model, Graphical method for solving Linear programming, Some special cases in Linear programming: Infeasible solution, Multiple optimal solution, Unbounded Solution.

UNIT - II

Linear programming: Simplex method, Basic terms involved in simplex procedure, Computational aspect of simplex method, Maximization and minimization problems, Duality, Characteristics of the dual problem, Advantages of duality.

UNIT-III

Transportation problem: Formulating of Transportation models, North-west corner method (NWCM), Least cost method (LCM), Vogel's approximation method (VAM), Test for optimality, The modified distribution (MODI) method.

UNIT-IV

Assignment problem: Mathematical model of Assignment problem, Hungarian Assignment method (Minimization case), Multiple optimal solutions, Maximization case in Assignment problem, Unbalanced Assignment problem.

UNIT - V

Project network analysis: Critical path method (CPM), Advantages and drawbacks of CPM, Programme evaluation and review technique (PERT), Optimistic time, Most likely time, Pessimistic time, Advantages and drawbacks of PERT.

References:

1. N.D. Vohra : Quantitative Technique
2. V.K. Kapoor : Operations Research
3. G. Hadley : Linear Programming
4. Goyal, Mittal : Operations Research
5. S.D.Sharma : Operations Research

PAPER- III

MAT-333 (C): MATHEMATICAL STATISTICS

Duration: 3 Hours

Internal Marks: 22

External Marks: 53

UNIT -I

Probability: Definitions of Probability, Addition and Multiplication laws, Conditional probability , Independent events, Baye's Theorem, Random variable, Distribution function, Probability mass & density functions, probability distribution, Joint, marginal and conditional probability functions.

UNIT II

Mathematical expectation and Moments, Addition & Multiplication laws of expectation, Covariance, Expectation and Variance of linear combination of random variables, Moment generating, Cumulant generating & characteristic functions.

UNIT -III

Theoretical Probability distributions- Binomial, Poisson, Rectangular, Normal, Exponential, Gamma and Beta distributions. Area property of Normal distribution.

UNIT -IV

Concept of Population and Random sample, Random numbers, Parameter, Statistic, Sampling distribution and standard error, Sampling of attributes. Large Sample tests for mean and proportion. Tests of significance based on t, F and Chi-square distributions.

UNIT -V

Curve fitting by the principle of least squares, fitting of straight line, Parabola, k^{th} degree polynomial, Exponential and power curves. Scatter diagram, Bivariate linear correlation and regression.

Books Recommended:

1. Mathematical Statistics, J. N. Kapur & H.C. Saxana, S. Chand & Co., New Delhi.

2. Fundamentals of Mathematical Statistics, V. K. Kapoor & S.C. Gupta, Sultan Chand
& Sons, New Delhi.