

**B.Sc. (Math/statistics/Computer Science)
ORDINANCE & COURSE STRUCTURE**

(1). Eligibility for B.Sc. (MSC)

Candidates should have passed 10+2 examination with mathematics.

(2). Intake

Intake shall be provided in the academic bulletin of each academic year.

(3). Duration:

The course shall be of 3 year duration and shall be based on yearly Exam.

(4). Medium of Instruction and examination:

English

(5). Fee:

1) Tuition and other fees

As prescribed by the University from time to time and as given in the academic bulletin of each year.

(6). Attendance:

Students should require a minimum attendance of 75% in each theory theory paper and Practical in a semester.

In case a student is short of attendance due to illness, participation in sports, extra Curricular activities etc the following rules shall apply.

A shortage of up to 25% can be considered by the Vice-Chancellor on the specific Recommendations of the HOD.

Those who fail to put up minimum attendance as said above will not be permitted for the Year end examination. However, under extraordinary circumstances (with due

Evidence) the Vice Chancellor may use his discretionary power.

(7). Examination:

All the theory papers shall include a yearly examination for 50 % marks and Practical

Examination for 50 marks.

A) Theory Papers:

(I) Yearly Examination:

The pattern of the question paper will be decided by the University.

B) Practical Examinations:

Mode of practical examinations:

The examiners may ask the students to conduct experiments in their presence and evaluate, or conduct a viva-voce based on practical experiments prescribed in the syllabus.

(8) Evaluation

(a) In B.Sc. part-I, II, III Examinations each subject shall carry 150 marks and in order to pass the examination of B.Sc. part-I, II, III, it shall be necessary that a candidate obtain a minimum of 33% marks in each subject separately in theory and practical and also in the aggregate of all the subjects in which she/he was examined B.Sc. part-I, II, III examinations as the case may be.

Provide also that a candidate, who in B.Sc. part-I or part-II examination has passed in the aggregate and in any two optional subjects separately and has obtain 25% and above but less than 33% marks both in theory and practical separately in the third subject, she/he shall be declared passed.

Provide further that a candidate, who in B.Sc. Part-I and part-II examination passed in the aggregate and in any two optional subjects separately and has obtain 25% marks either in theory and practical separately in third subject, shall be provisionally promoted to the next higher class with the condition that he/she should qualify in the Back Paper Exam with 25% or more than marks in back paper exam.

If he/she fails to qualify the B.P. Exam in one attempt then he/she shall be declared failed in respective exam

(b) Every candidate shall have to pass the B.Sc. Part-I, Part-II and Part-III examinations separately but the division shall be awarded on the basis of the aggregate of marks obtained by a candidate in all three parts of the examination.

(c) Division shall be awarded on the basis of the aggregate of the marks of the combined result of the B.Sc. Part-I, Part-II and Part-III. A candidate who has obtained 33% marks and above but less than 45% marks in the aggregate shall be placed in the third division. A candidate who has obtained 45% marks and above but less than 60% marks shall be placed in the IInd Division and a candidate who has obtained 60% marks or above shall be placed in the First Division.

(9). Revaluation:

Revaluation of answer copies will not be allowed in the any case. However the VC may use his discretionary power under exceptional cases.

(10). Declaration of results and award of degree:

After completion of the evaluation process, result will be declared by the University, Candidate declared successful may get the provisional degree certificate. Degree will be conferred at the time convocation or as decided by the V.C

BMSC-11
Algebra & Trigonometry

Unit:1

Matrix: Symmetric, skew symmetric, Hermitian, skew hermitian matrices. Elementary row & column transformation, rank of matrix, Linear dependence of matrices, consistency & inconsistency of linear equations, Eigen values, eigenvectors, characteristics equation of a matrix, Cayley Hamilton theorem and its use in finding inverse of matrix, Solution of linear equations by matrix method..

Unit-2

Relation between the roots & coefficients of general polynomial equation in one variable, transformation of equations, Descartes's rule of signs. Solution of cubic & biquadratic equations (Cardan's methods),.

Unit 3

Groups: Binary Operation, Algebraic Structure, Groupoid, Group, Finite & infinite groups, order of a group, semi group, Monoid, trivial & non trivial groups, Residue classes of set of integers, Order of an element of a group, Cyclic group, Lagrange's theorem, Fermat's & Euler's theorem, Isomorphism of group, Automorphism, Inner & outer Automorphism.

Unit 4

Homomorphism, Monomorphism, Properties of Isomorphic groups, Kernel of homomorphism, Permutations, Subgroup, Cosets, Index of subgroup in a group, Relation of congruence modulo a subgroup, subgroup of cyclic group, Normal subgroup, Quotient group, Centre of a group, Conjugate subgroup, External & internal Direct Product. Normaliser.

Unit 5

Trigonometry: DeMoivre's theorem & its applications, circular & hyperbolic functions. Euler's theorem, Logarithm of a complex quantity. Gregory's series. Summation of series.

Reference:

- 1 Topics in Algebra; I.N. Herstein, Wiley Eastern Ltd., New Delhi**
- 2 Matrix & Linear Algebra; K.B.Datta, Prentice Hall of India Pvt. Ltd. New Delhi**
- 3 Basic Abstract Algebra; P.B.Bhattacharya, S.K. Jain & Basic Abstract Algebra, Cambridge university Press, Indian Edition**
- 4 Higher Algebra; H.S.Hall, S.R. Knight, H.M. Publications**
- 5 Text Book on Algebra & theory of equations; Chandrika Prasad, Pothishala Private Ltd., Allahabad**
- 6 Plane Trigonometry Part II: S.L.Loney, Macmillan & company, London**
- 7 Text Book on Trigonometry; R.S.verma & K.S. Shukla, Pothishala Private Ltd., Allahabad**

BMSC-12

Calculus

Unit 1

Differential Calculus: Definition of the limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Differentiability, Successive differentiation, Leibnitz theorem, Maclaurin & Taylor series, Asymptotes, curvature, Point of inflexion, Multiple points, Tracing of curves in Cartesian & polar coordinates.

Unit-2

Integral Calculus: Integration of irrational algebraic functions and transcendental functions, Reduction formulae, Definite integrals, Quadrature, Rectification, Volume and surfaces of solid of revolution.

Unit-3

Ordinary Differential equations: Order & degree of differential equation, Equation of first order & first degree, Equations in which the variables are separable, Homogeneous equations, Equations reducible to homogeneous, Linear Differential equations & equations reducible to the linear, Exact differential equations, Equation reducible to Exact, Clairaut's form of a ordinary differential equations, singular solutions, orthogonal trajectories,

Unit-4

Linear differential equations of higher Order: Linear Differential Equations, Non Linear Differential Equations, Linear differential equations of second order with constant coefficients, Methods for finding the complimentary function and particular integrals, Homogeneous Linear equations, Method of variation of parameter, Simultaneous Differential Equations.

Unit-5

Differential equations of other Types:

Equations of type $d^n y/dx^n = f(x)$, Equations of type $d^n y/dx^n = f(y)$, Equations which do not y directly, Equations which do not x directly, Equations whose one solution is known, Normal Form (Removal of first derivative), Transformation of the equation by changing the dependent & independent variables.

Reference:

- 1 Gabriel Kiambauer, Mathematical Analysis, Marcel Dekkar, Inc. New York,**
- 2 Murray R. Spiegel, Theory & Problem of Advanced Calculus, Schaum's outline series, Schaum's Publishing Co., New York**
- 3 N.Piskunov, Differential & Integral Calculus, Peace publishers, Moscow**
- 4 P.K.Jain & S.K. Kaushik, An Introduction to Real Analysis, S.Chand & Co. New Delhi**
- 5 Gorakh Prasad, Differential Calculus, Pothishala Private Ltd., Allahabad**
- 6 Gorakh Prasad, Integral Calculus, Pothishala Private Ltd., Allahabad**
- 7 D.A.Murray, Introductory Course in Differential Equations, Orient Longman(India)**
- 8 G.F.Simmons, Differential Equations, Tata McGraw Hill**
- 9 E.A.Codington, An Introduction to ordinary differential Equations, Prentice Hall of India**
- 10 H.T.H.Piaggio, Elementary Treatise on Differential Equations & their Applications, C.B.S.Publisher & Distributer, Delhi**
- 11 W.E.Boyce & P.C. DiPrima, Elementary Differential Equations & Boundary Value Problems, John Wiley**
- 12 Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons**

BMSC-13
Vector Analysis & Geometry

Unit-1

Scalar & vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector Differentiation. Gradient, Divergence, Curl.

Unit-2

Vector integration. Line integral. Surface integral. Volume integral. Gauss divergence theorem. Stokes theorem. Greens theorem. Problems based on these theorems

Unit -3

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

Plane: Introduction, particular planes, various forms of the equations of a plane, General equation of second degree, angle between two planes, Perpendicular distance of a point from a plane, Positive & negative sides of a plane, bisectors of angles, Systems of planes, Area of a triangle and volume of a tetrahedron

Unit 4

The Straight Line: Introduction, Various forms of the equations of a line, Plane & a line, Shortest Distance, Intersection of three planes, Intersection of lines

Sphere: Definition, The Circle, Intersection of a sphere and a line, Plane of contact and polar plane, Intersection of two spheres, Radical plane, Coaxal sphere, Conjugate system of coaxal spheres

Cone: Definition, General second degree equation, Intersection of a cone and a line, Intersection of a cone with a plane, Enveloping cone, Right circular cone

Cylinder: Definition, Enveloping cylinder, Right circular cylinder

Unit-5

Central conicoids: Introduction, Shapes of the central conicoids, Intersection of a conicoids and a line, Normal, Plane of contact and polar plane, Enveloping cone, Enveloping cylinder, Diameters and diametral planes, Conjugate diameters and diametral planes.

Paraboloids: Introduction, Shapes of the paraboloids, Paraboloids as limiting case of central conicoids, Some important results, Normal

Plane sections of conocoids. Generating lines. Confocal conicoids. Reduction of second degree equations.

Reference:

- 1 Murray R. Spiegel, Theory & Problems of Advanced Calculus, Schaum Publishing Company, New York
- 2 Murray R. Spiegel, Vector Analysis, Schaum Publishing Company, New York
- 3 Shanti Narayan, A Text Book of Vector Calculus, S. Chand & Co. , New Delhi
- 4 S.L.Loney, The Elements of coordinate Geometry, Macmillan & Company, London
- 5 Gorakh Prasad & H.C.Gupta, Text Book on Coordinate Geometry, Pothishala Private Ltd., Allahabad
- 6 R.J.T.Bill, Elementary Treatise on coordinate Geometry of three Dimensions, Macmillan India Ltd
- 7 P.K.Jain & Khalil Ahmad, A Text Book of two dimensions , Wiley Eastern Ltd.
- 8 P.K.Jain & Khalil Ahmad, A Text Book of three dimensions , Wiley Eastern Ltd
- 9 N.Saran & R.S.Gupta, Analytical Geometry of three dimensions, Pothishala Private Ltd., Allahabad
- 10 N.Saran & S.N.Nigam, Introduction to Vector Analysis, Pothishala Private Ltd., Allahabad

BMSC-14
PROBABILITY THEORY

Unit-I

Important Concept in Probability: Definition of probability – classical and relative frequency approach to probability, Richard Von Mises, Cramer and Kolmogorov's approaches to probability, merits and demerits of these approaches (only general ideas to be given)

Random Experiment : Trial, sample point and sample space, definition of an event, Operation of events, mutually exclusive and exhaustive events. Discrete sample space, properties of probability based on axiomatic approach , conditional probability independence of events, Baye's theorem and its applications.

Unit -II

Random variables: Definition of discrete random variables, probability mass function , idea of continuous random variable, probability density function , illustrations of random variables and its properties, expectation of a random variable and its properties moments, measures of location, dispersion, skewness and kurtosis, probability generating function (if it exists), their properties and uses.

Unit-III

Standard univariate discrete distributions and their properties, Discrete uniform, Binomial, Poisson , Hypergeometric, and Negative Binomial distributions .

Unit-IV

Continuous univariate distributions – uniform, normal, Cauchy, Laplace , Exponential, ChiSquare, Gamma and Beta distributions ,Bivariate distribution (including marginal and conditional distributions).

Unit-V

Chebyshev's inequality and applications, statements and application of weak law of large numbers and central limit theorems. De moivre's central limit theorem, Lindberg Levy form of central limit.

References

- 1 **Bhat B.R Srivenkatramana T and Rao Madhava K.S.; Statistics; A Beginner's Text, Vol.II, New Age International(P) Ltd.**
- 2 **Edward P.J. Ford J.S. and Lin : Probability for Statistical Decision – Making , Prentice Hall.**
- 3 **Goon A.M., Gupta M.K, Das Gupta B.: Fundamentals of Statistics, Vol.II, World Press, Calcutta.**
- 4 **Mood A.M, Graybill F.A and Boes D.C.: Introduction to the theory of Statistics, McGraw Hill.**
- 5 **Cooke, Cramer and Clarke : Basic Statistical Computing ,Chapman and Hall.**
- 6 **David S : Elementary Probability , Oxford Press.**
- 7 **Hoel P.G. : Introduction to Mathematical Statistics, Asia Publishing House.**
- 8 **Meyer P.L.: Introductory Probability and Statistical application . Addison Wesley.**

**BMSC-15
DESCRIPTIVE STATISTICS**

Unit -I

Types Of Data : Concept of a statistical population and sample from a population ; Qualitative and quantitative data, nominal and ordinal data, cross sectional and time Series data, discrete and continuous data; frequency and non frequency data. Different types of scales – nominal, ordinal ratio and interval.

Collection and Scrutiny of Data: Primary data –designing a questionnaire and a schedule; checking their consistency. Secondary data- its major sources including some government publication . Complete enumeration , controlled experiments, observational studies and sample surveys, Scrutiny of data for internal consistency and detection of errors of recording . ideas of cross- validation.

Presenting of Data : Construction of tables with one or more factors of classification , Diagrammatic and graphical representation of grouped data. Frequency distributions, Cumulative frequency distributions and their graphical representation , histogram , frequency polygon and ogives , Stem and leaf chart . Box plot.

Unit –II

Analysis of Quantitative Data: Univariate data-Concepts of central tendency or location, dispersion and relative dispersion, skewness and kurtosis, and their measures including those based on quantiles and moments. Sheppard's corrections for moments for grouped data (without derivation)

Unit - III

Bivariate Data: Scatter diagram , Product moment correlation coefficient and its properties, Coefficient of determination, Correlation ratio, Concepts of error in regression, Principle of least squares, Fitting of linear regression and related results, Fitting of curves reducible to polynomials by transformation, Rank correlation- Spearman's and Kendall's measures.

Unit – IV

Multivariate data: Multiple regression, multiple correlation and partial correlation in three variables. Their measures and related results.

Unit-V

Analysis of Categorical data: Consistency of categorical data, Independence and association of attributes, Various measures of association for two –waand three- way classified data, Odds ratio.

REFERENCES:

- 1 Bhat B.R, Srivenkatramana T and Rao Madhava K.S.; Statistics: A Beginner's Text, Vol 1, New Age International (P) Ltd.
- 2 Croxton F.E, Cowden D.J and Kelin S : Applied General Statistics, Prentice Hall of India.
- 3 Goon A.M., Gupta M.K., Das Gupta B.: Fundamentals of Statistics, Vol. 1, World Press, Calcutta.
- 4 Anderson T.W and Sclove S.L . An Introduction to the Statistical Analysis of Data, Houghton Mifflin\Co.
- 5 Cooke, Cramer and Clarke : Basic Statistical Computing, Chapman and Hall.
- 6 Mood A.M, Graybill F.A and Boes D.C.: Introduction to the Theory of Statistics, McGraw Hill.
- 7 Snedecor G.W and Cochran W.G.: Statistical Methods, Iowa State University Press.
- 8 Spiegel, M.R.: Theory and Problems of Statistics, Schaum's Publishing Series.

BMSC-16
Statistics Practical-I

- 1. Presentation of data by Frequency tables, diagrams and graphs.**
- 2. Calculation of Measures of central tendency, dispersion, skewness and kurtosis.**
- 3. Product Moment Correlation and Correlation ratio.**
- 4. Fitting of Curves by the least square method.**
- 5. Regression of two variables.**
- 6. Spearman's Rank correlation and Kendall's tau.**
- 7. Multiple regression of three variables.**
- 8. Multiple correlation and Partial Correlation.**
- 9. Evaluation of Probabilities using Addition and Multiplication Theorems, Conditional Probabilities , and Baye's theorems.**
- 10. Exercises on mathematical expectations and finding measures of central tendency , dispersion, skewness and kurtosis of univariate probability distributions.**
- 11. Fitting of standard univariate and continuous distributions**

BMSC-17
(Digital Computer Fundamental)

Unit 1 Number Systems

Introduction to Number system, Binary Numbers, Octal Numbers, Hexadecimal Numbers, Conversion of Base, Binary Addition, Subtraction, Multiplication and Division, Complement, Binary Codes.

Unit 2 Boolean Algebra & Logic Gates

Basic theorem and properties of Boolean algebra, Digital Logic Gates, Canonical and standard forms, K-Map method of 2,3&4 Variable map, NAND & NOR Implementations, universal gates.

Unit 3 Combinational and Sequential Logic Circuits

Design Procedure, Half Adder, Full Adder, Half Subtracted, Full Subtracted, Multiplexer, Decoder, Encoder, Flip-Flops & Registers.

Unit 4 Introduction to Computer Systems

Introduction to Computers, Classification and history of computers, block diagram of computer Architecture of digital computer, CPU, Memory, Input and Output Devices.

Unit 5 Software & Information Technology

Software: System & Application, compiler & interpreter, Programming Languages, Operating Systems. Information technology: Computer Networks and Internet Fundamentals.

Referenced Books:

**“Digital Logic and Computer Design” by M.Morris Mano, PHP Publication,
“Fundamental of Information Technology” by Alexis Leon.**

BMSC – 18
(Programming Fundamentals and C language programming)

Unit 1:

Introduction to the algorithms , Flowcharts, Tracing flowcharts, Problem solving methods Need for computer language , reading programs written in C language. Character set, Identities and key words, Data type's declarations, Expressions statements and preparing and running a complete C program.

Unit 2:

**Operators : arithmetic , Logical , relational, assignment , Bitwise;
Conditional Statements : If , If Else , Nested If , Switch , break , continue and goto statement
Looping Statements : For , Do while , While**

Unit 3:

**Arrays: Defining and processing , Multi Dimensional arrays.
Strings : Operations on strings.
Functions : Defining and accessing , Passing argument , Function Prototypes , recursion , Use of Library functions
Storage classes : automatic , external and static variables.**

Unit 4:

Pointer: Declarations , Passing to functions , operations on pointer . Array of Pointers structure : Defining , Processing to a function , unions.

Unit 5:

**File handling : Open , close , create , process .
Pre – processor directives , Introduction to graphical programming .**

Reference Books:

**“ Let us C “ by Yeshwant Kanitker , BPB Publications.
“ Programming in C “ by E Balaguruswami , TMH Publications.**

BMSC-19

Computer Practical- I

- 1. Simple program for arithmetic operation**
- 2. Program on relational operator**
- 3. Program on logical AND operator**
- 4. Program on logical OR**
- 5. Program on conditional operator**
- 6. Program on bitwise operator**
- 7. Program on simple if statement.**
- 8. Program on if else statement.**
- 9. Program on nested if else statement.**
- 10. Program on if else ladder.**
- 11. Program on while loop.**
- 12. Program on do while loop .**
- 13. Program to find the sum & multiplication of numbers.**
- 14. Program to find the multiplication of two numbers using call by reference.**
- 15. Program for implementing the concept of function overloading.**
- 16. Program for implementing the concept of multiple inheritance.**
- 17. Program for writing a friend function.**
- 18. Program for implementing the concept of virtual function.**
- 19. Program that gives the example of constructor & destructor.**
- 20. Program that gives the implementation of static method.**

BMSC-21
Advanced Calculus

Unit-1

Continuity, Sequential continuity, Properties of continuous functions, Uniform continuity, chain rule of differentiability, Mean value theorems & their geometric interpretations, Darboux's intermediate value theorem for derivatives, Taylors theorem with various form of remainders.

Unit-2

Limit & continuity of functions of two variables, Partial differentiation, Change of variables, Euler's theorem on homogeneous functions, Taylors theorem for function of two variables, Jacobians.

Unit-3

Envelopes, Evolutes, Maxima, Minima & saddle point functions of two variables, Lagrange's multiplier's method , Indeterminate forms, Double Integration, Evaluation of double integral, Change of order of integration. Triple integration,

Unit-4

Gamma function, Reduction formula, Transformation of Gamma function, Beta function, Evaluation of Beta function, Property of Beta function, Transformation of Beta function, Relation Between Beta & Gamma Functions, Dirichlet's theorem.

Unit-5

Definition of sequences, Theorems on limits of sequences, Bounded & monotonic sequences, Cauchy's convergence criterion, Series of non negative terms, Comparison tests, Cauchy's integral test, Ratio Test, Raabe's , logarithmic, De-Morgan's, & Bertrand's tests, Alternating series, Absolute & conditional convergence.

Reference:

- 1 Gabriel Klaumber, Mathematical Analysis, Marcel Dekkar, Inc. New York**
- 2 T.M.Apostol, Mathematical Analysis, Narosa Publishing House New Delhi**
- 3 D. Soma Sundaram & B.Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House New Delhi**
- 4 P.K.Jain & S.K.Kaushik, An Introduction to Real Analysis, S.Chand & Co. New Delhi**
- 5 Murray R. Spiegel, Theory & Problems of Advanced Calculus, Schaum Publishing Company, New York**
- 6 S.C.Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi**
- 7 Gorakh Prasad , Differential Calculus, Pothishala Private Ltd., Allahabad**
- 8 Gorakh Prasad , Integral Calculus, Pothishala Private Ltd., Allahabad**
- 9 O.E.Stanaitis, An Introduction to Sequences, Series & Improper Integrals, Holden-Dey, Inc.,San Francisco, California**
- 10 Earl D. Rainville, Infinite Series, The Macmillan Company, Newyork**
- 11 Chandrika Prasad, Text Book on Algebra & Theory of Equations, Pothishala Private Ltd., Allahabad**
- 12 N.Piskunov, Differential & Integral Calculus, Peace Publishers, Moscow**
- 13 Shanti Narayan, A Course of Mathematical Analysis, S.Chand & Company, New Delhi**

BMSC-22
Differential equations & Fourier series

Unit-1

Partial differential equations: Partial differential equations, Order, Method of forming Partial Differential Equations, Solution of Equations by Direct Integration , First order Linear Partial Differential Equations, Lagrange's Method , First order non linear Partial differential equations, Charpit's method

Unit-2

Partial differential equations of second & higher orders, Classification of linear partial differential equations of second order, Homogeneous & non homogeneous partial differential equations with constant coefficient

Unit-3

Series Solution: Power Series Solution of Differential Equations, Ordinary Point, Frobenius Method, Bessels Equations, Bessels functions, Recurrence formulae, Generating Functions, Legendre Equations, Laplace integrals, orthogonal property, Recurrence formulae

Unit-4

Laplace Transform- Introduction Properties of Laplace transform, change of scale property, Shifting property, Laplace transform of derivative, Laplace transform of integral, Inverse Laplace transform, Convolution theorem, Solution of differential equations by Laplace transform

Unit-5

Fourier Series: periodic functions, Fourier series, Dirichlet's conditions for a fourier Series, Determination of Fourier Coefficients(Euler's formula), Fourier Series for Discontinuous Functions, Even functions & odd functions, Half range sin & cosine series.

Reference:

- 1 Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc., New York
- 2 D.A.Murray, Introductory Course on Differential Equations, Orient Longman, (India)
- 3 A.R.Forsyth, A Treatise on Differential Equations, Macmillan & Co. Ltd., London
- 4 Ian N. Sneddon, Elements of Partial Differential Equations, McGraw-Hill Book Company
- 5 Francis B. Hilderbrand, Advanced Calculus for Applications, Prentice Hall of India Pvt. Ltd., New Delhi
- 6 Jane Cronin, Differential Equations, Marcel Dekkar
- 7 Frank Ayres, Theory and Problems of Differential Equations, McGraw-Hill Book Company
- 8 Richard Bronson, Theory and Problems of Differential equations, McGraw-Hill, Inc.
- 9 R.R.Goldberg, Real Analysis, Oxford & IBH Publishing Co. New Delhi

**BMSC-23
Mechanics**

Unit-1

Statics: Analytical conditions of equilibrium of coplanar forces, Virtual work, Catenary, Forces in three dimensions, Poinsot's axis, Wrenches, Null lines & planes, Stable & unstable equilibrium

Unit-2

Dynamics: Velocities & accelerations along radial & transverse directions and along tangential & normal directions, Simple harmonic motion, Elastic strings,

Unit-3

Motion on smooth & rough plane curves, Motion in resisting medium, Motion of particles of varying mass

Unit-4

Central Orbits, Kepler's laws of motion, Motion of a particle in three dimensions, Acceleration in terms of different coordinate systems.

Reference:

- 1 S.L.Loney, Statics, Macmillan & Company, London**
- 2 R.S.Verma, A Text Book on Statics, Pothishala Private Ltd., Allahabad**
- 3 S.L.Loney, An Elementary Treatise on the Dynamics of a Particle & a rigid bodies, Cambridge University, Press**

BMSC-24
Statistical Methods

Unit-I

Sampling distribution, Standard error, tests of significance, Null hypothesis, Error in sampling, Critical region and level of significance, Test of significance for large samples, Sampling of attributes, Sampling of variables, Unbiased estimate for population mean and variance, Standard error of sample mean, Test of significance for single mean, difference of means, difference of standard deviations.

Unit-II

Chi-square variate, Derivation of chi square distribution, M.G.F. of chi-square distribution, C.G.F. of chi-square distribution, Additive property of chi-square variate, Conditions for the validity of chi-square test, Applications of chi square distribution, chi-square test homogeneity of correlation coefficient, Non-central chi square distribution.

Unit-III

Student's-t, Derivation of Student's t-distribution, Fisher's-t, Constants of t-distribution, Applications of t-distribution, t-test of single mean, t-test for difference of means, t-test for testing significance of an observed sample correlation coefficient, t-test for testing significance of an observed regression coefficient, t-test for testing significance of an observed partial correlation coefficient, Non-central t-distribution.

Unit-IV

F-statistics, Derivation of Snedecor's F-distribution, Constants of F-distribution, Mode and points of inflexion of F-distribution, Application of F-distribution, F-test for equality of population variances, F-test for testing significance of an observed multiple correlation coefficient, F-test for testing the significance of an observed sample correlation ratio, F-test for testing the linearity of regression, F-test for equality of several means, Non-central F-distribution, Fisher's Z- distribution, M.G.F. of Z- distribution, Fisher's Z-Transformation

Unit-V

Non-parametric methods, Basic distribution, Wold-Wolfowitz run test, Test for randomness, Median Test, Sign test, Mann-Whitney-Wilcoxon U-test, Order statistics and their distributions.

Reference:

- 1 Freund J.E : Mathematical Statistics; Prentice Hall of India.**
- 2 Goon A.M., Gupta M.K., Das Gupta. B : Fundamental of Statistics, Vol.I, World Press, Calcutta.**
- 3 Hodges J.L and Lehman E.L : Basic Concepts of probability and statistics, Holden Day**
- 4 Mood A.M, Graybill F.A and Boes D.C: Introduction to the Theory of Statistics, McGraw Hill**
- 5 Bhat B.R. Srivenkatramana T and Rao Madhava K.S. : Statistics: A Beginner's Text, Vol.II, New Age International (P) Ltd.**
- 6 Rohatgi V.K : An Introduction to Probability Theory and Mathematical Statistics, John Wiley & Sons**
- 7 Snedecor G.W and Cochran W.G. : Statistical Methods, Iowa State University Press**

BMSC-25
Sample Surveys, Analysis and Design of Experiments

Unit-1

Sample Surveys: Concept of population and sample, need for sampling, census and sample survey, basic concepts in sampling, organizational aspects of survey sampling, sample selection and sample size, Some basic sampling methods- simple random sampling(SRS) with and with out replacement.

Unit-2

Stratified random sampling, Systematic sampling, ratio and regression methods of estimation under SRS. Non Sampling errors, acquaintance with the working (questionnaires, sampling design, methods followed in field investigation, principal finding etc.) of NSSO, and other agencies undertaking sample surveys.

Unit-3

Analysis of variance for one way and two-way classifications.

Unit-4

Need for design of experiments, fundamental principles of design, basic designs- CRD, RBD, LSD and their analysis.

Unit-5

Factorial designs- 2^n designs, illustrations, main effects and interaction effects and confounding in 2^3 designs

Reference:

- 1 Cochran W.G and Cox G.M: Experimental Designs, John Wiley and sons.**
- 2 Das M.H and Giri: Design and Analysis of Experiments, Springer verlag**
- 3 Murthy M.N: Sampling Theory and Methods, Statistical Publishing Society, Calcutta.**
- 4 Sampath S. : Sampling Theory and Methods, Narosa Publishing House.**
- 5 Sukhatme B.V: Sample Survey Methods and its Applications, Indian Society of Agricultural Statistics.**
- 6 Des Raj: Sample Survey Theory, Narosa Publishing House**
- 7 Goon A.M., Gupta M.K., Das Gupta. B : Fundamental of Statistics, Vol.II, World Press, Calcutta.**
- 8 Kempthorne O.: The Design and Analysis of Experiments, Wiley Eastern.**

BMSC-26
Statistics Practical-II

- 1 Drawing random samples from standard univariate discrete and continuous distributions such as binomial, Poisson, Normal, Cauchy and exponential.**
- 2 Tests of significance based on t, chi-square, F, testing of significance of sample, correlation coefficient, use of Z transformation, Testing of equality of means and equality of variances in sampling from bivariate normal.**
- 3 Large sample tests for means and proportions, tests of goodness of fit and independence of attributes in contingency tables.**
- 4 Non parametric tests- Sign, Run, Median and Wilcoxon- Mann-Whitney test, Selection of sample and determination of sample size, simple random sampling, Stratified SRS, and systematic sampling, Allocation problems in stratified SRS, Ratio and Regression method of estimation in SRS.**
- 5 Analysis of variance for one-way and two-way classifications, Analysis of CRD, RBD, LSD, Analysis of 2^2 and 2^3 factorial designs.**

BMSC-27
Operating System Fundamental with special reference Windows and Unix environment

Unit 1

Introduction: O.S. goals ,purpose, services of O.S, Simple Batch system, Spooling, Multiprogrammed batched systems, Time sharing(Multitasking) system, Parallel systems, Distributed systems, real time system, system call, I/O structure, storage structure, storage hierarchy, hardware Protection.

Unit II

Processes: process concept, process control block(PCB), process scheduling Queues, Schedulers(long term schedulers, short term schedulers & medium term schedulers),degree of multiprogramming, I/O bound, CPU bound process, context switch, Process creation , Process termination, Cooperating process, Threads, inter process communication(IPC), Process Synchronization, Methods for handling deadlocks, Deadlocks prevention, Deadlock avoidance.

Unit III

CPU Scheduling: CPU-I/O Burst cycle, CPU scheduler ,Preemptive scheduler & Non preemptive scheduler, Dispature, Scheduling Criteria, Scheduling algorithms.

Unit IV

Memory management: Address Binding, Dynamic loading, Dynamic Linking, Overlogs, Logical Versus, Physical address space, Swapping Contiguous allocation, Paging, Segmentation, Virtual Memory.

Unit V

The Unix System: File system, Process management, bouner shell, Shell Variable, command line programming

Filters: head, tail, cut, paste, short.

System Call: Create,open,close,read,write,seek,link,unlink,stat,exec,fork,wait,system etc.

Window 2000: History, Design Principles, System Components, Environmental Subsystem, File System, Networking, Programmer Interface.

Reference:

- 1) “Operating System Concept” By Peter Galvin**
- 2) “Operating System ”By Dietel**
- 3) “Operating System Concept” ByPeterson**

BMSC-28
Data Structures through C++

Unit-I

Object oriented programming : feature, advantage, application,& elements of Object oriented programming, classes & object : access specifier, class specification, creating object, defining member function, nesting of member function, array within a class, statics data member, static member function, array of object, object as function argument, friend function, function returning objects assigning one object to another object, pointer to object, constructor, destructor, oprator overloading, data conversion.

Unit-II

Basic of C++ programming : Constant, variable, keywords, data type, comments, escape sequence, simple input output statement, different operator, scope resolution operator, type cast operator, manipulators, reference variable, control structure: if, if-else statement, for loop, while loop, do-while loop, switch statement, continue, break & goto statement, function ,array, pointer, function overloading, new &delete operator, this pointer, inheritance, virtual function, input output file & stream.

Unit III

C++ implementation of stack and Its example infix, postfix & prefix, Recursion, Queue, Linked list ,circular List, stack as a circular list, Queue as a circular list, primitive operation on circular list, header nodes, doubly linked lists.

Unit-IV

Trees: Binary tree- operation omn Binary Trees, Application of Binary Trees, Representation- Node Representation of Binary trees, Internal & External Nodes, Binary Tree Traversals in C++, Threaded Binary Trees, Representing lists as Binary Trees- finding the Kth element, Deleting an element, implementing tree(represented list in C++) .

Unit-V

**Sorting: Slection and tree sorting, exchange sorts, insertion sorts merge sorts
Searching: Sequential searching, indexed sequential search binary search
Hashing, Graps and their representation in C++.**

References:

- 1. Data Structure Using C and C++ By Aaron M.Tenenbaum**
- 2. Object Oriented Programming with C++ By E.Balaguruswamy**
- 3. Mastering C++ By Venu Gopal / Raj Kumar /Ravi Shankar**
- 4. Object Oriented Programming with C++ By Robert Lafore**

BMSC-29
Computer Practical- II

- 1. Write a program to find the sum of two numbers.**
- 2. Write a program to find the area of circle using class.**
- 3. Write a program to find the sum of the number using call by value.**
- 4. Write a program to find the multiplication of two numbers using call by reference.**
- 5. Write a program of function overloading.**
- 6. Write a program of multiple inheritances.**
- 7. Write a program of friend functions.**
- 8. Write a program of virtual functions.**
- 9. Write a program of constructors & destructor.**
- 10. Program on do while loop .**
- 11. Program to find the sum & multiplication of numbers.**
- 12. Program to find the multiplication of two numbers using call by reference.**
- 13. Program for implementing the concept of function overloading.**
- 14. Program for implementing the concept of multiple inheritance.**
- 15. Program for writing a friend function.**
- 16. Program for implementing the concept of virtual function.**
- 17. Program that gives the implementation of static method.**
- 18. Write a program to implement the concept of insertion sort.**
- 19. Write a program to implement the concept of merge sort.**
- 20. Program for implementing the concept of binary search.**

BMSC-31
Analysis

Unit-1

Real Analysis: Riemann integral, Integrability of continuous & monotonic functions, The Fundamental theorem of integral calculus, Mean value theorem of integral calculus, Improper integrals & their convergence, comparison tests, Abel's & Dirichlet's tests, Ratio test.

Unit-2

Series of arbitrary terms, Convergence, Divergence, Oscillation, Multiples of Series, Double Series, Partial derivatives and differentiability of real valued functions of two variables, Schwarz and Young's theorem, Implicit function theorem

Unit-3

Complex Analysis: Introduction, complex variable, Function of a complex variable, Limit of a function of complex variable, Continuity, Differentiability, Analytic function, Cauchy-Riemann equations, Harmonic functions, Methods to find conjugate Function, Milne Thomson Method, Partial Differential of Function of complex

Unit-4

Conformal Mapping: Geometric Representation, Transformation, conformal transformation, Translation, Rotation, Magnification, Bilinear Transformation, Cross ratio, Fixed points, Inverse points & critical mappings

Unit-5

Metric Spaces: Definition & examples of metric spaces, Neighborhoods, Supremum, Infimum, Limit points, Interior points, Open & closed sets, Derived sets, Balzono-Weierstrass theorem, Closure & interior, Cauchy sequences, Convergent sequences, Compactness, Connectedness.

Reference:

- 1 T.M.Apostol, Mathematical Analysis, Narosa Publishing House New Delhi
- 2 R.R.Goldberg, Real Analysis, Oxford & IBH Publishing Co. New Delhi
- 3 S. Lang, Undergraduate Analysis, Springer-Verlag, New York
- 4 D.Somasundaram & B. Choudhary, A First Course in Mathematical Analysis, Narosa Publishing House New Delhi
- 5 Shanti Narayan, A Course of Mathematical Analysis, S. Chand & Co. New Delhi
- 6 P.K.Jain & S.K.Kaushik, An Introduction to Real Analysis, S. Chand & Co., New Delhi
- 7 R.V.Churchill & J.W.Brown, Complex Variables & Applications, McGraw-hill, New York
- 8 Mark J. Ablowitz & A.S. Fokas, Complex Variables: Introduction & Applications, Cambridge University Press, South Asian Edition
- 9 Shanti Narayan, Theory of functions of a complex variables, S.Chand & Co., New Delhi
- 10 Singh, Karanjgaokar, Chandel, Complex Analysis, Gaura Pustak Sadan, Agra
- 11 E.T.Copson, Metric Spaces, Cambridge University Press
- 12 P.K.Jain & K. Ahmad, Metric Spaces, Narosa Publishing House New Delhi
- 13 G.F.Simmons, Introduction to topology & Modern Analysis, McGraw-Hill

BMSC-32
Abstract Algebra

Unit-1

Ring: Boolean ring, Divisor of zero, Integral domain, Field, Characteristic of a ring, Modular field, Ordered Integral domain, Elementary Property of ring, subring, Proper & improper subring, subdomain, subfield, Prime field, Left & right ideals, Proper & Improper ideals, Unit & zero ideals, simple ring

Unit-2

Homomorphism of ring, Isomorphism, Kernel of a homomorphism, Theorems on isomorphism, Direct Sum of two subrings, The quotient field of an integral domain, Polynomial over a ring, constant polynomial, Monic Polynomial, Zero polynomial, Sum & Product of Polynomial.

Unit-3

Linear Algebra: Vector spaces, sub spaces, External, sum & direct sum of subspaces, Linear span, Linear dependence & independence, Basis, Finite dimensional vector space

Unit-4

Homomorphism & Isomorphism of vector spaces, Quotient spaces, Direct sum of spaces, Linear transformations, Dual spaces, Dual basis, Annihilator

Unit-5

Inner product spaces, Cauchy Schwarz inequality, orthogonal vectors, orthogonal complements, orthogonal sets & bases, Bessel's inequality for finite dimensional spaces, Gram- Schmidt Orthogonalization process

Reference:

- 1** **Topics in Algebra; I.N. Herstein, Wiley Eastern Ltd., New Delhi**
- 2** **N.Jacobson, Basic Algebra, Vol.I & II W.H. Freeman,(also published by Hindustan Publishing Company**
- 3** **Shanti Narayan, A Text Book of Modern Abstract Algebra, S.Chand & Co. New Delhi**
- 4** **K.B.Datta, Matrix & Linear Algebra, Prentice Hall of India Pvt. Ltd.,New Delhi**
- 5** **P.B.Bhattacharya, S.K. Jain & S.R.Nagpal, Basic Abstract Algebra, Cambridge University Press, Indian Edition**
- 6** **K.Hoffman & R. Kunze, Linear Algebra, Prentice Hall, Englewood Cliffs, New Jersey**
- 7** **S.K.Jain, A. Gunawardena, P.B.Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing(Springer-verlag)**
- 8** **S. Kumaresan, Linear Algebra , A Geometric Approach, Prentice- Hall of India**
- 9** **Vivek Sahai & Vikas Bist, Algebra, Narosa Publishing House New Delhi**
- 10** **I.S.Luther and I.B.S.Passi, Algebra, Vol I –Groups, Vol.II-Rings, Narosa Publishing House New Delhi**
- 11** **D.S.Malik, J.N.Mordeson, M.K.Sen, Fundamentals of Abstract Algebra, McGraw-Hill International Edition**

BMSC-33
Numerical Analysis & Optimization

Unit-1

Interpolation: Finite Differences, Difference table, Divided Difference, Newton's-Gregory forward & Backward Interpolation, Gauss forward & backward difference formula, Stirling's formula, Bessel's formula, Interpolation with unequal interval, Lagrange's interpolation, Newton's Divided Difference formula

Unit-2

Numerical Integration & Differentiation: Numerical differentiation, Formula for Derivative, Maxima & Minima of tabulated function, Newton Cote's Quadrature formula, Trapezoidal rule, Simpsons 1/3 & 3/8 rule, Weddle's rule

Unit 3

Solution of Algebraic & Transcendental Equation: Bisection Method, Iteration Method, Regula Falsi Method, Newton Raphson Method, Errors & Convergence.

Unit-4

Solution of Differential Equation: Picard's Method, Euler's Method, Euler's Modified Method, Taylor's Method, Runga Kutta Method, Predictor Corrector Methods

Unit-5

Optimization: The Linear Programming problem, Problem formulation, Linear programming in matrix notation, Graphical solution of linear programming problem, Some Basic properties of convex sets, convex functions & concave functions, Theory & application of the simplex method of solution of a linear programming problem.

Reference:

- 1 C.E. Froberg, Introduction to Numerical Analysis, Addison-Wesley
- 2 James B. Scarborough, Numerical Mathematical Analysis, Oxford & IBH Publishing Co. Pvt. Ltd.
- 3 Melvin J. Maron, Numerical Analysis A Practical Approach, Macmillan Publishing Co. Inc. New York
- 4 M.K.Jain, S.R.K.Iyengar, R.K.Jain, Numerical Methods Problems & Solutions, New Age International Ltd.
- 5 M.K.Jain, S.R.K.Iyengar, R.K.Jain, Numerical Methods for Scientific & Engineering Computation, New Age International Ltd.
- 6 Kanti Swaroop, P.K.Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi

**BMSC-34
APPLIED STATISTICS**

Unit –I

Indian Applied Statistical System: Present official Statistical System in India, Methods of collection of official statistics, their reliability and limitation and the principal publications containing such statistics on the topics-population, agriculture, industry, trade, price, labour and employment, transport and communication ,banking and finance.

Unit-II

Demographic Method: Source of Demographic data-census, register, adhoc survey, hospital record, Demographic profiles of Indian census, Measurement of mortality and life table –crude, death rate, infant mortality rate, death date by cause, standardized death rate, complete life table-its main feature, mortality rate and probability of dying, use of survival tables, Measurement of fertility-crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate.

Unit-III

Economic statistics: Index number-its definition, application of index number, price relatives and quantity or volume relatives, link and chain relatives, problems involved in computation of index number, use of averages .simple aggregative and weighted average methods Laspeyre's paasche's and fisher's index numbers, time and factor reversal tests of index numbers consumer price index

Unit-IV

Demand analysis static laws of demand and supply price elasticity of demand analysis of income and allied size distribution pareto distribution, graphical test, fitting of pareto's law log normal distribution and its properties ,Lorenz curve and estimation of elasticity from time series data. Gini's coefficient.

Unit-V

Time Series Analysis: Economic time series, its different components, illustrations, additive and multiplicative models, determination of trend, growth curves, analysis of seasonal fluctuations, construction of seasonal indices.

References:

- 1 Croxton F.E and Cowden D.J.:Applied General Statistics, Prentice Hall of India.
- 2 Goon A.M., Gupta M.K., Das Gupta.B. :Fundamentals of Statistics, Vol .II, World Press, Calcutta.
- 3 Guide to Current Indian Office Statistics: Central Statistical Organization, Govt. Of India, New Delhi.
- 4 SalujaM.P. Indian Official Statistical Systems, Statistical Publishing Society, Calcutta.
- 5 Srivastava O.S.:A Textbook of Demography,Vikas Publishing.
- 6 Gupta and Mukhopadhyay P.P : Applied Statistics, Central Book Agency.
- 7 Pressat R: STATISTICAL Demography, Methuen and Co. Ltd

BMSC – 35

Statistical Quality Control & Inference

Unit – 1

Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, determination of tolerance limits. General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out of control criteria, charts of attributes, np-chart, p-charts, u- chart, c-charts charts for variables-X and R- charts, design of X and R charts versus p-charts, process capability studies.

Unit – 2

Principle of acceptance sampling- problem of lot acceptance, stipulation of good and bad lots, producer's and consumer's risks single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN function, rectifying inspection plans, sampling inspection plans, Indian standards Tables Part I (including applications), IS 2500 Part I.

Unit -3

Characteristics of Estimators, consistency , Unbiasedness Invariance property of consistent estimators, Sufficient condition for consistency, Efficient estimators, Most efficient estimator, Sufficiency, cramer-rao Inequality, complete family of distribution, MVUE and Blackwellisation.

Unit – 4

Methods of estimation, Methods of Maximum likelihood estimation, Methods of minimum variance, Methods of Moments, Methods of Least squares, confidence Intervals and confidence limits, confidence intervals for large sample.

Unit – 5

Most Powerful Test, Uniformly Most Powerful Test(UMP Test) , Neyman J. and Pearson E.S. Lemma, Likelihood ratio test, Test for mean of a Normal population, Test for equality of means for two normal distribution, Test for equality of means of several normal population, Test for variance of normal population, Test for equality of variance of two populations, Test for the equality of variance of several normal populations.

References:

- 1. Brownlee K.A: Statistical Theory and Methodology in Science and Engineering, John Wiley and Sons.**
- 2. Grant E.L: Statistical Quality Control, McGraw Hill.**
- 3. Duncan A.J: Quality Control and Industrial Statistics, Taraporewala and Sons. .**
- 4. Bowker H.A. and Libermanb G.T : Engineering Statistics, Prentice Hall.**
- 5. Cowden D.J : Statistical methods in Quality Control , Asia Publishing society.**
- 6. Mahajan M: Statistical Quality Control, Dhanpat Rai & Co. (P) Ltd.**

BMSC-36
Statistics Practical-III

- 1. Computing measures of mortality & fertility, Construction of life tables and examples involving use of life tables, Graduation of mortality rates by Gompertz curves fitting of a logistic curve.**
- 2. Construction of Index Numbers by Laspeyre's, Paasche's, Fisher's method.**
- 3. Determination of trend in a time series, construction of seasonal indices.**
- 4. Fitting of Pareto curve to income data, Lorenz curve of concentration, estimation of price elasticity of demand from time series data.**
- 5. Drawing of X-R, np, p and c- charts. Drawing of OC curve for single and double sampling plans for attributes, AOQ and ATI curves.**

BMSC-37
Data Base Management Systems

Unit-I

Data Modeling for a database: records and files, abstraction and data integration.
Database Management System: the three level architecture of a DBMS, Components of a DBMS.

Unit-II

Data Models and their Implementation, Relational, Network and Hierarchical Models. Relational data manipulations: Relational Algebra, Relational Calculus, and Sub Query.

Unit-III

Selection Database Design: Functional Dependencies, Finding Keys, list to 3rd NFS, BCNF, oins and dependency preserving decomposition, computing coures of set FD's Finding keys.

Unit-IV

Query Processing: General Strategies for query processing, query optimizations, query processor. Concepts of Security, Concurrency and recovery.

Unit-V

Database Design Project: Detiaition and analysis of existing system, preliminary and final design, Testing and Implementation, Operation and training. Use of relational DBMS package for class project.

Reference:

- 1.DBMS By CJ Date**
- 2.DBMS By Korth**
- 3. DBMS By Bipin Desai**

BMSC-38
Java Language & Computer Networking Fundamentals

Unit 1

Fundamental of Java, overview of OOPs concept, compiling and running Java program, Introduction of Java virtual machine. Data types, Variables, Operators and Array, Conditional Statement: If else statement, iteration statement, looping statement: For, While, Do While Loop, Nested Loop, Jump statement: Break, continue, return.

Unit 2

Introduction of classes, methods, Constructors, method overloading using Object as parameter, access control, Nested and inner classes, string classes, Inheritance: Basic of inheritance method overriding, Dynamic Method, dispatch, abstract classes.

Unit 3

Interface: definition of interface, defining interface, implementing interface applying interface, package, defining package, understanding package, class path access, Protection, importing. Exception Handling: Exception handling Fundamental, Exception using try & catch ,multiple catch clause, Nested try statement throws, finally Java Builds in exception.

Unit 4

Network classification and data communication services, communication Media, local area network, MAN, WAN, wireless network, intranet, Extranet, Internet and Internet Services, Network Topologies and types. Connecting Device, Network Reference Models, Layered architecture, Protocol Heirarchies, Interface & services, ISO-OSI Reference Model, TCP/IP Reference Model, Basic Protocol.

Reference:-

- 1.JAVA-2 Complete reference By Herbert Schildt**
- 2.Computer Networking by-Tannan Baum**

BMSC-39
Computer Practical-III

- 1. Use of class and object to find different types of area .**
- 2. WAP for that uses the concept of constructor.**
- 3. WAP for that uses the concept of destructor.**
- 4. Application of single inheritance**
- 5. Sort the number in ascending order & decending order.**
- 6. Assess a package**
- 7. Threads sing yield (), stop () and sleep ()methods**
- 8. WAP to creating threads using thread class**
- 9. WAP that shows the use of break & continue statement.**
- 10. Program to show use of argument constructor**
- 11. WAP to create a package**
- 12. WAP of else if ladder**
- 13. WAP to implement the interface**
- 14. WAP that shows the illustration of method overriding .**
- 15. Program to show static methods**
- 16. Program to show priority in threads**
- 17. Program to illustrate the run time errors.**
- 18. WAP to throw the exception of users choice.**
- 19. Program to show the use static import.**