POOMPUHAR COLLEGE (AUTONOMOUS)

(of the Tamil Nadu H.R & C.E Department)

(Accredited B+ By NAAC)

MELAIYUR 609 107

B.Sc SYLLABUS

(FROM THE ACADEMIC YEAR 2016-2017 ONWARDS)

PG & RESEARCH
DEPARTMENT OF MATHEMATICS

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : I	**No of hours : 5**
Part III : Core Paper I	**No of credits: 5**

Title of the Paper:DIFFERENTIAL CALCULUS AND TRIGONOMETRY

Unit - I

Methods of successive differentiation – Leibnitz's theorem and its applications– Increasing and decreasing functions –Maxima and Minima of function of two variables.

Unit - II

Curvature – Radius of curvature in Cartesian coordinates – Centre of curvature – Evolutes and Involutes.

Unit - III

Expansions of sin (nx), cos (nx), tan (nx) – Expansions of $\sin^n x$, $\cos^n x$ – Expansions of sin(x),cos(x), tan(x) in powers of x.

Unit - IV

Hyperbolic functions – Relation between hyperbolic & circular functions– Inverse hyperbolic functions.

Unit - V

Logarithm of a complex number – Summation of trigonometric series – Difference method– Angles in arithmetic progression method – Gregory's series

Text Books

[1] S.Narayanan, T.K.Manickavasagam Pillai, Calculus, Vol .I, S.V Publications, 2014. (Units I and II)

[2] S.Arumugam, A.Thangapandi Issac, Theory of equations and Trignometry, New Gamma Publications, 2006. (Units III, IV and V)

Unit- I: Chapter III, Sections 1.1 to 1.6, 2.1, 2.2
Chapter IV, Sections 2.1,2.2
Chapter VIII, Section 4.1 [1]
Unit- II: Chapter X, Sections 2.2 to 2.5 [1]
Unit- III: Chapter VI, Sections 6.1 to 6.3 [2]
Unit- IV: Chapter VII, Sections 7.1, 7.2 [2]
Unit– V: Chapter VIII, Section 8.1
Chapter IX, Sections 9.1 to 9.4[2]

Reference Books

[1] S.Arumugam and Isaac, Calculus, Volume1, New Gamma Publishing House, 1991.

[2] S.Narayanan, T.K.Manichavasagam Pillai, Trigonometry, S.Viswanathan Pvt Limited and Vijay Nicole Imprints Pvt Ltd, 2004.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : II	**No of hours : 6**
Part III : Core Paper II	**No of credits : 5**

Title of the Paper:THEORY OF PROBABILITY

Unit - I

Basic terminology – Mathematical probability: Limitations of classical definition – Statistical probability: limitations of empirical probability – Axiomatic approach to probability: Random experiment, Sample space and elementary events, Event, Acceptable assignment of probabilities, Natural assignment of probabilities, Axiomatic probability, Algebra of events – Some theorems on probability: Addition theorem of probability, Extension of addition theorem of probability to n events.

Unit - II

Conditional probability – Multiplication theorem of probability – Independent events – Multiplication theorem of probability for independent events – Extension of multiplication theorem of probability to n events and n – independent events – Pairwise independent events: Mutually independent events, To find the probability of occurrence of at least one of them – Bayes' theorem.

Unit - III

Introduction – Distribution function: Properties of distribution function – Discrete random variable: Probability mass function, Discrete distribution function – Continuous random variable: Probability density function, Various measures of central tendency, Dispersion, Skewness and kurtosis, Continuous distribution function.

Unit - IV

Two – dimensional random variables: Joint probability mass function – Distribution function, Marginal distribution functions, Joint density function, Marginal density function, Conditional distribution function and conditional probability density function, Stochastic independence, Generalisation of n – Dimensional random variable.

Unit - V

Introduction – Mathematical expectation – Expected value of function of a random variable – Properties of expectation – Properties of variance – Covariance: Variance of a linear combination of random variables – Moments of bivariate probability distributions – Conditional expectation and conditional variance.

Text Book

[1] S.C Gupta and V.K Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, 2015.

Unit - I: Chapter III, Sections 3.3, 3.5, 3.8, 3.9.
Unit - II: Chapter III, Sections 3.10 – 3.15
Chapter IV, Section 4.2
Unit - III: Chapter V, Sections 5.1 – 5.4
Unit - IV: Chapter V, Section 5.5
Unit - V : Chapter VI, Sections 6.1 – 6.8

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : II	**No of hours : 5**
Part III : Core Paper III	**No of credits : 5**

Title of the Paper: ANALYTICAL GEOMETRY (3D) AND INTEGRAL CALCULUS

Unit - I

Standard equation of a plane – Intercept form - Normal form – Plane passing through given points – Angle between planes – Plane through the line of intersection of two planes – Equation of the straight line – Shortest distance between two skew lines – Equation of the line of shortest distance.

Unit - II

Sphere – Standard equation – Sphere passing through a given circle – Intersection of two spheres.

Unit - III

Integration by parts – Definite integrals and Reduction formula.

Unit - IV

Double integrals – Changing the order of Integration – Triple integrals.

Unit - V

Beta and Gamma functions and the relation between them – Integration using Beta and Gamma functions.

Text Books

[1] T.K.Manickavasagam Pillai and T.Natarajan, Analytical Geometry, S.V Publications, 1985 Revised Edition.(Units I and II)
[2] S.Narayanan and T.K.Manickavasagam Pillai, Calculus, Vol.II, SV Publications, 2013. (Units III,IV and V).

Unit - I : Chapter I, Sections 1,2,5 to 11

Chapter II Sections 1 to 11

Chapter III, Sections 1 to 8. [1]

Unit - II: Chapter IV Sections 1 to 7.[1]

Unit - III:Chapter I, Sections 11, 12, 13.1-13.9[2]

Unit - IV: Chapter V, Sections 1, 2.1. 2.2, 4 [2]

Unit - V :Chapter VII, Sections 2.1-2.3, 3, 4, 5, 6[2]

Reference Books

[1] Duraipandian and Chatterjee, Analytical Geometry

[2] Shanti Narayan, Differential and Integral Calculus.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : III	**No of hours : 5**
Part III : Core Paper IV	**No of credits : 5**

Title of the Paper: ALGEBRA AND THEORYOF NUMBERS

Unit - I

Relation between roots and coefficients of polynomial equations – Symmetric functions –Sum of the r^{th} powers of the roots –Two methods.

Unit - II

Transformations of equations – Diminishing, increasing and multiplying the roots by a constant – Forming equations with the given roots – Reciprocal equations – All types – Descarte's rule of signs (statement only) – Simple problems.

Unit- III

Inequalities – Elementary principles – Geometric and Arithmetic means – Weirstrass inequalities – Cauchy inequality – Applications to maxima and minima.

Unit - IV

Algebra of matrices – Types of matrices – Symmetric – Skew-symmetric, Orthogonal, Hermetian – Skew-Hermitian, Unitary matrices – Rank of a matrix – Consistency – Eigen values, Eigen vectors – Cayley Hamilton's theorem (Statement only).

Unit- V

Theory of numbers – Prime and composite numbers – Divisors of a given number N – Euler's function $\phi(N)$ and its value – The highest power of a prime P contained in N!

Text Books

[1] T.K.Manickavasagam Pillai, T.Natarajan, K.S.Ganapathy, Algebra Volume I, S.V

Publications –1985 Revised Edition (Unit I and II)

[2] T.K.Manickavasagam Pillai, T.Natarajan, Algebra Volume II, S.V Publications – 1985,

Revised edition. (Unit III and V)

[3] S.Arumugam, A.Thangapandi Issac, Modern Algebra, New Gamma Publishing House, 2000. (Unit IV)

Unit - I : Chapter VI, Sections 11 to 14 [1]

Unit-II : Chapter VI, Sections 15 to 21 and 24 [1]

Unit-III: Chapter IV [2]

Unit-IV:Chapter VII, Sections 7.1, 7.2, 7.5 to 7.8. [3]

Unit- V : Chapter V [2]

Reference Books

[1] H.S.Hall and S.R. Knight. Higher Algebra, Prentice Hall of India, New Delhi,

[2] H.S.Hall and S.R. Knight. Higher Algebra, McMillan and Co. London. 1948.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Core Paper V	**No of credits : 4**

Title of the Paper: VECTOR CALCULUS AND FOURIER SERIES

Unit - I

Vector differentiation: – Velocity and acceleration– Gradient, Curl and Divergence– Divergence and Curl of a Vector point function - vector identities – Simple problems.

Unit -II

Vector integration: Line integral - Surface and Volume integral – Simple problems.

Unit - III

Gauss Divergence Theorem – Stoke's Theorem – Green's Theorem – Simple problems and verification of the theorems for simple problems.

Unit - IV

Fourier series – Definition – Fourier Series expansion of periodic functions with Period 2π– Use of odd and even functions in Fourier Series.

Unit - V

Half-range Fourier series – Definition – Development in cosine series and in sine series – Change of interval –Combination of series.

Text Books

[1] P.R Vittal, V. Malini,Vector Calculus Fourier Series and Fourier Transforms, Margham Publications, 2007. (Units I to III)

[2] S.Narayanan, T.K.Manickavasagam Piliai, Calculus, Vol. III, S. Viswanathan Pvt Ltd,2011. (Units IV, V)

Unit - I : Chapter I [1]

Unit - II :Chapter II [1]

Unit - III:Chapter II [1]

Unit - IV:Chapter VI, Sections 1 to 3 [2]

Unit - V: Chapter VI, Sections 4 to 7 [2]

Reference Book

[1] P.Kandasamy, K.Thilagavathi, Vector Calculus Fourier Series and Fourier Transforms, S. Chand & Company Ltd, 2005.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Core Paper VI	**No of credits : 4**

Title of the Paper: SEQUENCES AND SERIES

Unit - I

Sequence (definition), Limit, convergence of a sequence – Cauchy's general principle of convergence – Cauchy's first theorem on limits – Bounded sequences – Monotonic sequence always tends to a limit finite or infinite – Limit superior and limit inferior.

Unit - II

Infinite series – Definition of convergence, divergence and oscillation – Necessary condition for convergence – Convergence of $\sum \frac{1}{n^p}$ and Geometric series – Comparison test.

Unit - III

D'Alembert's ratio test – Cauchy's condensation test – Cauchy's root test and their simple problems.

Unit - IV

Binomial Theorem for a rational index – Exponential and Logarithmic series – Summation of series using these theorems – Approximations related to binomial series only.

Unit - V

General summation of series including successive difference and recurring series.

Text Book

[1] T.K. Manickavasagam Pillai, T. Natarajan, K.S. Ganapalhy, Algebra, Vol. I,
S. Viswanathan Pvt Limited, Chennai. 2004.

Unit – I : Chapter II, Sections 4, 6 & 7

Unit - II: Chapter II, Sections 8 to 14

Unit - III: Chapter II, Sections 15 to 17

Unit - IV: Chapter III,Sections 5,6,9,10,14

Chapter IV Sections 1 to 3, 5 and 9

Unit - V: Chapter V

Reference Books

[1] M.K.Singal, Asha Rani Singal, A first course in Real Analysis, R. Chand & Co.1999.

[2] Dr.S.Arumugam, Sequences and Scries, New Gamma Publishers, 1999.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 5**
Part III : Core Paper VII	**No of credits : 5**

Title of the Paper: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Unit - I

First order, higher degree differential equations solvable for x, solvable for y, solvable for $\frac{dy}{dx}$– Clairaut's form – Conditions of integrability of Mdx + Ndy = 0 – Simple problems.

Unit - II

Particular integrals of second order Differential Equations with constant coefficients – Linear equations with variable coefficients – Method of variation of parameters (omit third and higher order equations)

Unit - III

Formation of Partial Differential Equation – General , particular and complete integrals – Solution of PDE of the standard forms – Lagrange's method of solving – Charpit's method and a few standard forms.

Unit - IV

PDE of second order homogeneous equation with constant coefficients – Particular integrals of F (D,D') z = f (x,y), where f (x,y) is of one of the forms $e^{(ax+by)}$, sin (a x + b y), cos (a x + b y), $x^r y^s$, and $e^{(ax+by)}$ f(x,y).

Unit - V

Laplace transforms – Standard formulae – Basic theorems and simple applications – Inverse Laplace transform – Use of Laplace transform in solving ODE with constant coefficients.

Text Books

[1]S.Narayanan, T.K.Manickavasagam Pillai, Calculus, Vol. III, S.V Publications, 2011.

(Units I, II, III, V)

[2] M.D.Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Co.,New Delhi, 2006. (Unit IV)

Unit - I : Chapter I, Sections 3.1 to 3.3, 4, 5.1 to 5.5, 6.1 [1]

Unit - II : Chapter II, Sections 1.1 , 1.2, 2, 3, 4, 8.1 to 8.3, 10 [1]

Unit - III: Chapter IV Sections 2.1, 2.2, 5.1 to 5.4, 6.1, 7 [1]

Unit - IV: Part Two, Chapter III, Sections 3.1 to 3.7 [2]

Unit - V: Chapter V Sections 1.1, 1.2, 4, 5, 6, 7, 8 [1]

Reference Books

[1] S.Narayanan, Differential Equations, S.Viswanathan Publishers, 1996.
[2] M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut, 2004.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 5**
Part III : Core Paper VIII	**No of credits : 5**

Title of the Paper: ABSTRACT ALGEBRA

Unit - I

Groups: Subgroups – Cyclic groups – Order of an element – Cosets and Lagrange's theorem.

Unit - II

Normal subgroups and Quotient groups – Isomorphism – Homomorphisms.

Unit - III

Rings: Definition and examples – Elementary properties of rings – Isomorphism – Types of rings – Subrings – Ideals – Quotient rings – Homomorphism of rings .

Unit - IV

Vector Spaces – Definition and examples – Subspaces – Linear transformation – Span of a set – Linear independence.

Unit - V

Basis and Dimension – Rank and Nullity – Matrix of a linear transformation.

Text Book

[1] N.Arumugam, A.Thangapandi Isaac, Modern Algebra, New Gamma Publishing House, 1997.

Unit - I :Chapter III, Sections 3.5 to 3.8

Unit - II:Chapter III,Sections 3.9 to 3.12

Unit - III:Chapter IV, Sections 4.1 to 4.4, 4.6 to 4.8 and 4.10

Unit - IV:Chapter V, Sections 5.1 to 5.5

Unit - V: Chapter V, Sections 5.6 to 5.8

Reference Books

[1] T.K. Manickavasagam Pillai, T.Natarajan, K.S. Ganapathy, Algebra, Vol. I, S.Viswanathan Pvt Limited, Chennai, 2004

[2] M.L. Santiago,Modern Algebra, Tata McGraw Hill, 2003.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 5**
Part III : Core Paper IX	**No of credits : 5**

Title of the Paper: REAL ANALYSIS

Unit - I

Real Number system – Field axioms – Order relation in R – Absolute value of a real number and its properties – Supremum and Infimum of a set – Order completeness property – countable and uncountable set.

UNIT - II

Continuous functions – Limit of a function – Algebra of limits – Continuity of a function – Types of discontinuities – Elementary properties of continuous functions – Uniform continuity of function.

UNIT - III

Differentiability of a function – Derivability and continuity – Algebra of derivatives – Inverse function Theorem – Daurboux's theorem on derivatives.

UNIT - IV

Rolle's theorem – Mean value theorems on derivatives – Taylor's theorem with remainder – Power series expansion.

UNIT - V

Riemann integration – Definition – Daurboux's theorem – Conditions for integrability – Integrability of continuous and monotonic functions – Integral functions – Properties of integrable functions – Continuity and derivability of integral functions – The first Mean value theorem and the fundamental theorem of Calculus.

Text Books

[1] M.K,Singhal, Asha Rani Singhal, A First Course in Real Analysis, R.Chand& Co., 1997.

(Units I to IV)

[2] Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995. (Unit V)

Unit - I : Chapter I [1]

Unit - II: Chapter VII[1]

Unit - III:Chapter VIII[1]

Unit - IV:Chapter IX [1]

Unit- V: Chapter VI [2]

Reference Book

[1]Gold Berge, Richar R,Methods of Real Analysis, Oxford & IBHP Publishing Co., New Delhi, 1970.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 5**
Part III : Core Paper X	**No of credits : 5**

Title of the Paper: MATHEMATICAL STATISTICS

Unit- I

Measure of Central Tendency: Introduction – Frequency Distribution – Graphical representation of a frequency distribution – Averages – Arithmetic mean – Median – Mode – Geometric mean – Harmonic mean.

Unit - II

Measure of Dispersion: Range – Quartile deviation – Mean deviation – Standard deviation – Coefficient of variation – Moments – Skewness – Kurtosis.

Unit - III

Correlation and Regression: Meaning of Correlation – Scatter Diagram – Karl Pearson's Coefficient of Correlation – Calculation of the correlation for bivariate frequency distribution – Probable error of correlation coefficient – Rank correlation – Linear regression – Curvilinear regression – Regression curves.

Unit - IV

χ^2 **- Distribution:** Introduction – Deviation of the chi-square distribution – M.G.F of chi-square distribution – Some theorems on chi-square distribution – Applications of chi-square distribution.

Unit - V

Exact Sampling Distribution: Introduction – Student's t-distribution – F-distribution – Applications of t-distribution – Applications of F-distribution – Fisher's – Z-distribution – Fisher's Z-transformation.

Text Book

[1] S.C.Gupta, V.K.Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 2015.

Unit - I: Chapter 2 Sections 2.1to 2.9
Unit - II : Chapter 2 Sections 2.13 to 2.17

Unit - III: Chapter 10, Sections 10.1 to 10.7
Chapter 11, Sections 11.1 to 11.19
Unit - IV: Chapter 15, Sections 15.1 to 15.6
Unit - V:Chapter 16, Sections 16.1 to 16.6

Reference Books

[1] Gupta, S.C, Fundamentals of Applied Statistics, S. Chand & Sons, New Delhi, 1993.

[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.

[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 5**
Part III : Core Paper XI	**No of credits : 5**

Title of the Paper: METHODS IN NUMERICAL ANALYSIS

Unit - I

Algebraic and Transcendental equations – Finding root of the given equation (Derivation of the formula not needed) using Bisection method – Method of False Position – Newton Raphson Method – Iteration method.

Unit - II

Finite differences – Forward, Backward and Central differences – Their symbolic relations – Newton's forward and backward difference interpolation formulae –Interpolation with unevenly spaced intervals – Application of Lagrange's interpolating polynomial (Proof not needed) – Divided differences and their properties – Application of Newton's General Interpolating formula (Proof not needed).

Unit - III

Numerical differentiation – Numerical Integration using Trapezoidal rule & Simpson's 1/3 rule, Simpson's 3/8 rule – Theory & problems.

Unit - IV

Solutions to linear Systems – Gaussian elimination method – Jacobi & Gauss Siedal iterative methods – Theory & problems.

Unit - V

Numerical solution of ODE – Solution by Taylor series method, Picard's method, Euler's method, Modified Euler's method, Runge Kutta 2^{nd} and 4^{th} order methods (Derivation of the formula not needed).

[In all the units the value of a root may be calculated up to 3 decimal accuracy only]

Text Book

[1] S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt.

Limited, New Delhi, 2006.

Unit - I: Chapter II, Sections 2.1 to 2.5

Unit -II: Chapter III, Sections 3.3.1, 3.3.2, 3.3.3, 3.3.6, 3.9.1, 3.10.1.

Unit - III:Chapter V, Sections 5.1, 5.2, 5.4, 5.4.1, 5.4.2 and 5.4.3

Unit - IV: Chapter VI, Sections 6.3.2 and Chapter VIII, Sections 8.3.1,8.3.2.

Unit - V: Chapter VII, Sections 7.1 to 7.4, 7.4.2, 7.5

Reference Books

[1]S.Narayanan & Others, Numerical Analysis, S.Viswanathan Publishers, 1994.

[2] A.Singaravelu, Numerical Methods, Meenachi Agency, 2000.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 5**
Part III : Core Paper XII	**No of credits : 5**

Title of the Paper: COMPLEX ANALYSIS

Unit - I

Functions of a complex variable – Limits – Theorems on limits – Continuous functions -Differentiability – Cauchy - Riemann equations – Analytic functions – Harmonic functions.

Unit – II

Elementary transformations – Bilinear transformations – Cross ratio – Fixed points of bilinear transformation – Some special bilinear transformations.

Unit – III

Complex integration – Definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives.

Unit – IV

Series expansions – Taylor's series – Laurent's Series – Zeroes of analytic functions - Singularities.

Unit – V

Residues – Cauchy's Residue theorem – Evaluation of definite integrals.

Text Book

[1] S.Arumugam, A.Thangapandi Isaac, and A.Somasundaram, Complex Analysis, New Gamma Publishing House, 1999.

Unit - I: Chapter II, Sections 2.1 to 2.8

Unit - II : Chapter III, Sections 3.1 to 3.5

Unit - III: Chapter VI, Sections 6.1 to 6.4

Unit - IV: Chapter VII, Sections 7.1 to 7.4

Unit - V: Chapter VII, Sections 8.1 to 8.3

Reference Books

[1]P.P Gupta, Kedarnath, Ramnath, Complex Variables, Meerut, Delhi.

[2] J.N.Sharma, Functions of a Complex variable, Krishna Prakasan Media (P) Ltd., 13th Edition, 1996.

[3] T.K.Manickavasagam Pillai, Complex Analysis, S.Viswanathan Publishers Pvt Ltc, 1994.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 5**
Part III : Core Paper XIII	**No of credits : 5**

Title of the Paper: GRAPH THEORY

Unit - I

Definition of a Graph – Application of graphs – Finite and infinite graphs – Incidence and degree – Isolated vertex, pendent vertex and null graph – Isomorphism – Sub graphs – Walks, paths and circuits – Connected and disconnected graphs – Components – Euler graphs – Operations on graphs – More on Euler graphs – Hamiltonian paths and circuits.

Unit - II

Trees – Properties of trees – Pendent vertices in a tree – Distance and centres in a tree – Rooted and binary trees – Spanning trees – Fundamental circuits – Finding all spanning trees of a graph – Spanning trees in a weighted graph.

Unit - III

Cut sets – Properties of a cut set – All cut sets in a graph – Fundamental circuits and cut sets – Connectivity and separability.

Unit - IV

Vector space of a graph: Sets with one, two operations – Modular arithmetic – Galois Fields – Vectors – Vector spaces – Basis vectors of a graph – Circuit and cutest subspaces - Orthogonal vectors and spaces.

Unit - V

Matrix representation of a graphs: Incidence matrix – Submatrices of Incidence matrix – Circuit matrix – Fundamental circuit matrix and rank of the circuit matrix – Cut set matrix – Adjacency matrix.

Text Book

[1] Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science,

Prentice Hall of India, New Delhi, 2005.

Unit - I : Chapter I, section 1.1 to 1.5 and Chapter II, Sections 2.1, 2.2, 2.4 to 2.9

Unit - II: Chapter III, Sections 3.1 to3.5, 3.7 to 3.10

Unit - III: Chapter IV, Sections 4.1 to 4.5

Unit - IV: Chapter VI, Section 6.1 to 6.8

Unit - V: Chapter VII, Sections 7.1 to 7.4, 7.6, 7.9

Reference Books

[1] Dr.S.Arumugam, Dr. S. Ramachandran, Invitation to Graph Theory, Scitech Publications India Pvt Limited, Chennai, 2001.

[2] K.R.Parthasarathy, Basic Graph Theory, Tata McGraw Hill Publishing Company New Delhi, 1994.

[3] G.T. John Clark, Derek Allan Holten, A First Look at Graph Theory, World Scientific Publishing company, 1995.

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 6**
Part III : Major Based Elective I	**No of credits : 5**

Title of the Paper: OPERATIONS RESEARCH – I

Unit - I

Introduction: – Basics of OR – OR and decision making – Role of Computers in OR – Linear programming formulations and Graphical solution of two variables – Canonical and standard forms of LPP.

Unit - II

Simplex Method: Simplex method for <, =, > constraints – Charne's method of penalties – Two phase simplex method.

Unit - III

Duality in linear programming: Introduction – General Primal – Dual pair – Formulating a Dual problem – Primal-dual pair in Matrix form – Duality and simplex method –Dual simplex method.

Unit - IV

Integer Programming: Pure and Mixed IPP – Gomory's cutting - plane method.

Unit - V

Transportation problems: Transportation algorithm – Degeneracy algorithm – Degeneracy in transportation problem - Unbalanced transportation problem. Assignment Problems - Hungarian Method - Unbalanced assignment problem.

(Inall the units no Book work need to be proved – only problems of the Book works need to be taught)

Text Book

[1] Kanti Swarup, P.K Gupta,Manmohan, Operations Research, Sultan Chand Publishers,

New Delhi, 2005.

Unit - I :Chapter I, Sections 1.1 to 1.8

Chapter II, Sections 2.1,2.2

Chapter III, Sections 3.1 to 3.5.

Unit - II: Chapter IV Sections 4.1, 4.3, 4.4

Unit - III: Chapter V, Sections 5.1 to 5.4, 5.7

Unit - IV: Chapter VII, Sections 7.1 to 7.5.

Unit - V: Chapter X, Sections 10.1 to 10.3, 10.8, 10.14

Chapter XI, Sections 11.3, 11.4.

Reference Books

[1]Prem Kumar Guptha and D.S. Hira, Operations Research: An Introduction, S.Chand and Co., Ltd. New Delhi,

[2] Hamdy A.Taha, Operations Research (7^{th} Edn.) McMillan Publishing Company, New Delhi, 1982.

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 6**
Part III : Major Based Elective I	**No of credits : 5**

Title of the Paper: DISCRETE MATHEMATICS

Unit - I

Connectives, statements formulae, equivalence of statement formulae, functionally complete set of connectives –NAND and NOR connectives, implication, principal conjunctive and disjunctive normal forms.

Unit - II

Inference calculus – Derivation process – Conditional proof – Indirect method of proof – Automatic theorem proving – Predicate calculus.

Unit - III

Partial ordering – Lattices – Properties – Lattices as algebraic system – Sub lattices – Direct product and homomorphism – Special lattices- Complemented and distributive lattices.

Unit - IV

Boolean Algebra – Sub algebra – Direct product and homomorphism – Boolean expression and Boolean functions – Re-presentation and Minimization of Boolean functions.

Unit - V

Combinatorics: The rules of sum and product – Permutations – Combinations – Binomial theorem – Multinomial theorem – Well ordering principle – Mathematical induction.

Text Books

[1] J.P Tremblay and R.Manohar, Discrete Mathematical Structures with Application to Computer Sciences, Tata Mc Graw – Hill publishing company Pvt Ltd, New Delhi, 1997. (Units I to IV)

[2] G.Ramesh and C.Ganesamoorthy, Discrete Mathematics,HI – Tech Publications,2003. (Unit V)

Unit - I: Chapter I, Sections 1.2, 1.3 [1]
Unit - II: Chapter I, Sections 1.4, 1.5, 1.6 [1]
Unit - III: Chapter IV, Sections 4.1 [1]
Unit - IV: Chapter IV, Sections 4.2 to 4.4 [1]
Unit - V :Chapter III, Sections 3.1 to 3.26 [2]

Reference Books

[1] Kenneth H . Rosen, Discrete Mathematics and its applications, Fifth edition, Tata Mc Graw Hill Publishing Company Pvt.Ltd, New Delhi,2003.

[2] C.L Liu, Elements of Discrete Mathematics, Second Edition, MC- Graw Hill Book company, New york, 1998.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Major Based Elective II	**No of credits : 5**

Title of the Paper: OPERATIONS RESEARCH – II

Unit - I

Sequencing problems: Processing of n jobs through 2 machines – Processing of n jobs through k machines – Processing of 2 jobs through k machines.

Unit - II

Games and strategies: Two-Person Zero-Sum Games – Some basic terms – The Maximin - Minimax principle – Games without saddle points – Mixed strategies.

Unit - III

Replacement problem and system reliability: Replacement of equipment – Asset that Deteriorates gradually – Replacement of equipment that fails suddenly – Recruitment and promotion problem - Equipment renewal problem.

Unit - IV

Inventory Control: Costs associated with Inventories – Factors affecting Inventory control –Economic Order Quantity – Deterministic Inventory problems with no shortages – Deterministic Inventory problems with shortages.

Unit - V

Networks: Network and basic components – Logical sequencing – Rules of network construction – Critical path analysis – Probability considerations in PERT – Distinction between PERT and CPM.

(Inall the units no Book work need to be proved, only problems of the Book works need to be taught)

Text Book

[1] Kanti Swarup, P.K Gupta andManmohan, Operations Research, Sultan Chand

Publishers, New Delhi, 2005.

Unit - I: Chapter XII, Sections 12.1 to 12.6.

Unit - II: Chapter XVII, Sections 17.1 to 17.6.

Unit - III: Chapter XVIII, Sections 18.1 to 18.3.

Unit - IV:Chapter XIX,Sections 19.1 to 19.7.

Unit - V: Chapter XXI,Sections 21.1 to 21.7

Reference Books

[1]Prem Kumar Guptha and D.S. Hira, Operations Research: An Introduction, S.Chand and Co., Ltd. New Delhi,

[2] Hamdy A.Taha, Operations Research (7^{th} Edn.) McMillan Publishing Company, New Delhi, 1982.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Major Based Elective II	**No of credits : 5**

Title of the Paper: APPLIED STATISTICS

Unit - I

Time series: Introduction – Definition of a time series – Utility of a time series – Components of a time series – Analysis of a time series – Uses of a time series – Mathematical models for a time series – Editing of a time series – Measurement of trend – Graphic Method – Method of semi-averages – Method of moving averages – Weighted moving average –Least squares.

Unit - II

Index numbers: Definition – Relatives – Characteristics of index numbers – Uses of index numbers – Problems in the construction of index numbers – Base year – Conversion of price relatives into link relatives and vice-versa – Types of index numbers – Methods for construction of index numbers – Laspeyre's price index – Paasche's method – Dorbish and Bowley's method – Fisher's ideal index method – Marshall-Edgeworth formula – Walsch index number method – Kelly's method – Price relatives P_{01}.

Unit – III

Quantity index numbers – Value index numbers – Test of adequacy – Chain base index numbers – Base shifting.

Unit - IV

Statistical Decision Theory: Meaning and scope – Elements of decision making problem – Types of decision making situations.

Unit - V

Statistical quality control: Statistical quality Control – Causes of Variations – Advantages of Statistical quality Control – Types of quality control – Control Charts – Determination of control limits – Types of control chart – Mean chart – Range chart – Standard deviation chart.

Text Book

[1] P.N Arora,S.Arora, Sumeet Arora and S.Arora, Comprehensive Statistical Methods, S.Chand & Sons, New Delhi, 2007.

Unit -I: Chapter 9, Sections 9.1 to 9.14
Unit - II: Chapter 10, Sections 10.1 to 10.17
Unit - III : Chapter 10, Sections 10.18 to 10.22
Unit - IV: Chapter 14, Sections 14.1 to 14.3
Unit - V :Chapter 23, Sections 23.1 to 23.11

Reference Books

[1] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.

[2] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Major Based Elective III	**No of credits : 5**

Title of the Paper: MECHANICS

Unit - I

Forces and Equilibrium: Newton's Laws of motion – Resultant of two forces on a particle – Equilibrium of a particle under three or more forces.

Unit - II

Forces on a rigid body – Moment – Equivalent system of forces – Parallel forces – Varignon's theorem forces along a triangle – Couples – Resultant of several coplanar forces.

Unit - III

Kinematics velocity: Relative velocity – Acceleration – Coplanar motion – Components of velocity and acceleration.

Unit - IV

Simple harmonic motion: Simple harmonic motion along a horizontal line – Simple harmonic motion along a vertical line – Motion under gravity in a resisting medium.

Unit - V

Projectiles: Forces on a projectile – Maximum height reached, range, time of flight – Projectile projected on a inclined plane – Enveloping parabola or bounding parabola.

Text Book

[1] P.Duraipandiyan, Vector Treatment as in Mechanics, S.Chand & Co, 2008.

Unit - I : Chapter II, Sections 2.1, 2.2 and Chapter III, Section 3.1
Unit - II : Chapter IV, Sections 4.1, 4.3 to 4.7
Unit - III : Chapter I, Sections 1.1 to 1.4
Unit - IV : Chapter XII, Sections 12.1 to 12.4
Unit - V : Chapter XIII, Sections 13.1 to 13.3

Reference Books

[1]M.K.Venkataraman, Statics, Agasthiyar Publications, 2002.
[2] M.K. Venkataraman, Dynamics, Agasthiyar Book Dept, 1990.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Major Based Elective III	**No of credits : 5**

Title of the Paper: FLUID DYNAMICS

Unit - I

Real fluids and ideal fluids – Velocity of a fluid at a point – Streamlines and path lines; steady and unsteady flows – The velocity potential – The vorticity vector – Local and particle rates of change – The equation of continuity – Worked examples – Acceleration of a fluid – Pressure at a point in a fluid at rest – Pressure at a point in moving fluid – Conditions at a boundary of two invisid Immiscible fluids.

Unit - II

Euler's equations of motions – Bernoulli's equation – Worked examples – Some flows involving axial symmetry – Some special two – dimensional flows – Some three – dimensional flows: Introduction – sources, sinks and doublets – Axi – symmetric flows; Stokes stream function.

Unit - III

Some two – dimensional flows: Meaning of a two – dimensional flow – use of cylindrical polar coordinates – The stream function – The complex potential for two – dimensional, irrotational, incompressible flow – Complex velocity potentials for standard two dimensional flows – Some worked examples.

Unit - IV

Stress components in real fluid – Relations between cartesian components of stress - Translational motion of fluid element – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric.

Unit - V

The coefficient of viscosity and Laminar flow – The Navier – Stokes equations of motions of a viscous fluid. Some solvable problems in viscous flow – steady viscous flow in tubes of uniform crass section.

Text Book

[1**]** F.Charlton,Content and Treatment as in Text Book of Fluid Dynamics, CBS Publishers and Distributors, New Delhi, 1985.

Unit - I: Chapter II, Sections2.1 to 2.9 and

Chapter III, Sections 3.1 to 3.3

Unit-II: Chapter III, Sections 3.4 to 3.6, 3.9, 3.10

Chapter IV, Sections 4.1, 4.2, 4.5

Unit - III:Chapter V, Sections 5.1 to 5.6

Unit - IV: Chapter VIII, Sections 8.1to8.5

Unit - V : Chapter VIII, Sections 8.8 to 8.12 except 8.8.4

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POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Zoology **Subject Code :**
Semester : III **No of hours : 2**
Part IV : Non Major Elective - I **No of credits : 2**

Title of the Paper:FUNDAMENTALS OF MATHEMATICAL STATISTICS- I

Unit – I

Classification and tabulation of data: Introduction – Data and its collection – Classification of data – Purpose, advantages and types of classification of data – Variable – Tabulation of data – Objectives, rules and types of tables – Difference between classification and tabulation – Essential parts of a statistical table – Format of a table – Sorting – Presentation of data – Frequency distribution – Bi-Variate frequency distribution.

Unit - II

Diagrammatic and Graphic presentation of data: Introduction – Graphical representation of statistical data – Diagramatic presentation of data – Types of diagrams – Line, Bar diagram – Two-dimensional diagrams – Pie diagram – Pictograph – Difference between diagram and graph – Types of graph – Line graph – Graph of two or more variables – Range, net balance, band graph – Histogram – Frequency polygon.

Unit - III

Measures of Central Tendency: Features of a good average – Arithmetic mean– Methods to calculate arithmetic mean(direct method only) – Median – Calculation of median – Merits, demerits and uses of median – Mode – Types of model series – Computation of mode – Merits, demerits and uses of mode – Geometric mean – Merits, demerits and uses of geometric mean – Harmonic mean – Merits, demerits and uses of harmonic mean – Relation between A.M, G.M and H.M.

Text Book

[1] P.N.Arora, Sumeet Arora and S.Arora, Comprehensive Statistical Methods, S.Chand and Sons, New Delhi, 2007.

Unit - I: Chapter II, Sections 2.1 to 2.3, 2.5, 2.6, 2.8, 2.9, 2.11 to 2.20, 2.26
Unit - II: Chapter III, Sections 3.1 to 3.9, 3.12 to 3.18, 3.24, 3.25.
Unit -III:Chapter IV, Sect4.1 to 4.3, 4.5.1 to 4.5.3, 4.10 to 4.12, 4.14 to 4.17, 4.20 to 4.24

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.Sc Zoology **Subject Code :**
Semester : IV **No of hours : 2**
Part IV : Non Major Elective - II **No of credits : 2**

Title of the Paper: FUNDAMENTALS OF MATHEMATICAL STATISTICS - II

Unit - I

Correlation Analysis: Introduction - Concept of correlations – Coefficient of correlation – Types of correlation – Scatter diagram – Karl Pearson's coefficient of correlation –Spearman's rank correlation.

Unit - II

Regression Analysis: Introduction **–** Types, Lines of regressions–Regression coefficients– Properties of regression coefficients– Properties of linear regressions – Method of least squares – Derivations of the lines of regressions directly from data, actual means and assumed means – Relation between regression and correlation analysis.

Unit - III

Chi – Square distribution: Introduction – M.G.F of Chi – Square distribution – Applications of Chi – Square distribution: Inferences about a population variance – Goodness of fit test – Test of independence of attributes-contingency tables.

Text Book

[1] P.N.Arora, Sumeet Arora and S.Arora, Comprehensive Statistical Methods, S.Chand and

Sons, New Delhi, 2007.

Unit - I : Chapter 7, Sections 7.1 to 7.3, 7.6, 7.8 to 7.10.
Unit - II : Chapter 8, Sections 8.1 to 8.10, 8.14.
Unit - III : Chapter 15, Sections 15.1, 15.3, 15.6.1, 15.6.2, 15.6.3.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics **Subject Code :**
Semester : IV **No of hours : 2**
Part IV : Skill Based Elective - I **No of credits : 2**

Title of the Paper: FUNDAMENTALS OF COMPUTER

Unit – I

Introduction – History of Computer – Generations of computer – Classification of Computer – Advantages and disadvantages – Computer Basic Architecture .

Unit- II

Basic components of computer system: Control unit – Input output unit – Memory – RAM – ROM – Memory – Types and devices– Peripherals.

Unit – III

Software – System software – Application software – Hardware – Printer – Scanners – Limitations of computers – Terminology.

Text Book

[1] V.Ramesh Babu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books

[1] Ghosh Dastidar, Chattopadhyay and Sarkar, Computers and Computation - A Beginner's Guide, Prentice Hall of India, 1999.

[2] Taxali, PC Software for Windows Made Simple, Tata McGraw Hill, 1999.

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POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics **Subject Code :**
Semester : V **No of hours : 2**
Part IV : Skill Based Elective - II **No of credits : 2**

Title of the Paper: WINDOWS OPERATING SYSTEM

Unit - I

Windows basics: Starting windows – Windows desktop – Using the mouse – Task bar and start menu – Structure of a window – Moving a window – Maximizing, minimizing and restoring – Resizing a window – Arranging icons – Using help menu.

Unit - II

My computer – Windows explorer – Control panel: Changing date and time – Customising our mouse –Changing the display characteristics – Multimedia control panel – Customising sound – Fonts – Regional settings – Modems.

Unit - III

Working with programs: Start – Exit – Adding and removing programs – Managing files and folders – Printers – Windows accessories.

Text Book

[1] V.Ramesh Babu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Book(s)

[1] Silberschatz , Galvin, GAGNE “Operating System Concepts” , Sixth edition, John wile and Sons,INC, 2002.
[2] D.M.Dhamdhere, “Operating Systems”, Tata McGraw Hill, 2002.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 2**
Part IV : Skill Based Elective - III	**No of credits : 2**

Title of the Paper: MS-OFFICE

Unit - I

Introduction to MS-Word - Starting Microsoft word – Parts of the word screen – menus in Ms – word – Tool bars – Working with documents – Selecting text – Moving and coping – Inserting the auto text – Finding and replacing text – Deleting text – Formatting documents – Working with tabs, tables and columns – Other tools in word – Borders and shading, Working with styles, Macros and graphics – Mail merge – Printing.

Unit – II

Introduction to Ms – Excel – Starting Ms – excel – Parts of a spread sheet – Working with worksheet – Formatting work sheets – Working with work workbooks – Functions and formulas – Working with excel graphics – Macros in excel – Printing a worksheet – Exit from Ms – excel.

Unit - III

Introduction to powerpoint –Starting powerpoint – Opening new/blank presentations – Parts of powerpoint screen – Creating slides – Setting a background layout – Saving a presentation – Closing a presentation – Opening an existing presentation – Deleting slides – Inserting objects – Adding headers and footers – Working with colors and transitions – Drawing tools – Animation objects anf slides – Slideshow creating templates – Creating built in presentation.

Text Book

[1] V.Ramesh Babu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books

[1] David Rivers, Word 2003, 2004, Essential Training [MOV], Lynda.com, Inc Publications.

[2] Jill Murphy, 2003, Microsoft Office Word- Comprehensive Course - Labyrinth Publications.

[3] McGraw-Hill/Irwin - Deborah Hinkle, 2003, Microsoft Office Word 2003:

[4] A Professional Approach, Comprehensive Student Edition Specialist Student Edition.

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POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Physics / B.Sc Chemistry	**Subject Code :**
Semester : I / III	**No of hours : 5**
Part III : Allied Course - I	**No of credits : 3**

Title of the Paper: CALCULUS AND NUMERICAL ANALYSIS

Unit - I

Successive differentiation – n^{th}derivative of standard functions (Derivation not needed) simple problems only – Leibnitz theorem (proof not needed) simple problems in all these.

Unit - II

Integration by trigonometric substitution and by parts of the integrals

1) $\int \frac{dx}{\sqrt{a^2-x^2}}$ 2) $\int \frac{dx}{\sqrt{a^2+x^2}}$ 3) $\int \frac{dx}{\sqrt{x^2-a^2}}$

4) $\int \sqrt{a^2-x^2}\,dx$ 5) $\int \sqrt{a^2+x^2}\,dx$ 6) $\int \sqrt{x^2-a^2}\,dx$

Evaluation of definite integrals of types

1) $\int_a^b \frac{dx}{\sqrt{(x-a)(b-x)}}$ 2) $\int_a^b \sqrt{(x-a)(b-x)}dx$ 3) $\int_a^b \sqrt{\frac{x-a}{b-x}}dx$

Unit - III

Evaluation of integrals of types

1) $\int \frac{dx}{ax^2+bx+c}$ 2) $\int \frac{px+q}{ax^2+bx+c}dx$ 3) $\int \sqrt{ax^2+bx+c}dx$ 4) $\int \frac{dx}{\sqrt{ax^2+bx+c}}$

5) $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$ 6) $\int \frac{dx}{a+b\cos x}$ 7) $\int \frac{dx}{a+b\sin x}$ 8) $\int \frac{dx}{a\cos x+b\sin x}$

Unit - IV

Reduction formula (when n is a positive integer) for

1) $\int sin^n x dx$ 2) $\int_0^{\frac{\pi}{2}} \sin^n x\,dx$ 3) $\int \cos^n x\,dx$ 4) $\int_0^{\frac{\pi}{2}} \cos^n x\,dx$

5) Without proof $\int_0^{\frac{\pi}{2}} \sin^n x \cos^m x\,dx$ - and illustrations

Unit - V

Algebraic and transcendental equations – Finding a root of the given equation (Derivation of the formula not needed) using Bisection method, Newton Raphson method, Iteration method, simple problems only.

Text Books

[1] A. Singaravelu, Allied Mathematics – I, A.R Publications, 2002. (Units I to IV)
[2] S.S Sastry, Introductory methods of Numerical Analysis, 4^{th} edition.(Unit V)

Unit - I: Chapter I, Sections 1.1 to 1.23.[1]
Unit - II:Chapter III, Sections 3.12 to 3.24, 3.65 to 3.67.[1]
Unit - III: Chapter III, Sections, 3.45 to 3.59, 3.68 to 3.73.[1]
Unit - IV: Chapter III, Sections, 3.86 to 3.99.[1]
Unit - V: Chapter II , Sections , 2.2 , 2.4, 2.5.[2] (Problems only)

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.Sc Physics / B.Sc Chemistry	**Subject Code :**
Semester : II / IV	**No of hours : 6 / 5**
Part III : Allied Course - II	**No of credits : 4**

Title of the Paper: ANALYTICAL GEOMEMTRY(3D), ALGEBRA AND TRIGONOMETRY

Unit - I

Finding the shortest distance between two skew lines and the equations of the plane containing them – Condition for Coplanarity –Equation of a sphere.

Unit - II

Symmetric, Skew-Symmetric, Orthogonal, Hermitian, Skew-Hermitian, Unitary matrices – Rank of matrices –Solving systems of Linear Equations.(Excluding Properties)

Unit - III

Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (Proof not needed) –Simple problems only.

Unit - IV

Expansion of $\sin n\theta, \cos n\theta, \tan n\theta$,(n being a positive integer) – Expansion of $\sin^n\theta$,$\cos^n\theta$,$\sin^n\theta$, $\cos^m\theta$ in a series of sines and cosines of multiples of θ **(**θ – given in radians) – Expansion of sin θ, cos θ and tan θ in terms of powers of θ (only problems in all the above).

Unit - V

Euler's formula for $e^{i\theta}$ – Definition of Hyperbolic functions – Expansion of inverse hyperbolic functions $\sinh^{-1}x$, $\cosh^{-1}x$ and $\tanh^{-1}x$– Separation of real and imaginary parts of sin(x+iy), cos (x+iy), tan(x+iy), sinh(x+iy), cosh(x+iy), tanh(x+iy).

Text Book

[1] A. Singaravelu, Allied Mathematics (Paper – II), A.R Publications, 2003.

Unit - I: Chapter III, Sections 3.57 to 3.65, 3.68 to 3.75.
Unit - II : Chapter II, Sections 2.1 to 2.40 (Excluding Properties)
Unit - III: Chapter II, Sections 2.51 to 2.66, 2.75 to 2.80.
Unit - IV: Chapter IV, Sections 4.7 to 4.32.(Only Problems)
Unit- V: Chapter V, Sections 5.1 to 5.17.

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme	**: B.Sc Physics / B.Sc Chemistry**	**Subject Code :**
Semester	**: II / IV**	**No of hours : 5**
Part III	**: Allied Course - III**	**No of credits : 3**

Title of the Paper: ODE, NUMERICAL AND VECTOR CALCULUS

Unit - I

Linear equations with constant coefficients – Finding particular integrals in the cases of e^{kx} ,sin(kx),cos(kx)(where k is aconstant) and $e^{kx}f(x)$ where f(x) is any function of x (only problems in all the above – No proof needed for any formula).

Unit - II

Numerical Integration using Trapezoidal rule & Simpson's First and second rules – Simple problems.(Proofs not needed)

Unit - III

Solutions to linear systems – Gaussian Elimination Method – Jacobi & Gauss siedal Method – Simple problems.(proofs not needed).

Unit - IV

Scalar and Vector, Vector differentiation – velocity & acceleration Vectors – Gradient and its properties - directional derivative – unit normal vector – scalar Potential.

Unit - V

Divergence , Curl – Solinoidal and irrotational vectors - Double operators- properties connecting gradient, divergence, and curl of a vector(simple properties only).

Text Books

[1] A.Singaravelu,Allied Mathematics (Paper III) ,A.R Publications,2003. (Unit I)
[2]S.S Sastry, Introductory methods of Numerical Analysis, 4^{th} edition. (Units II, III)
[3] A.Singaravelu,Allied Mathematics (Paper I) ,A.R Publications,2002. (Units IV, V)

Unit - I: Chapter I, Sections 1.41 to 1.53 [1]
Unit - II: Chapter V, Sections 5.4.1 to 5.4.3 [2]
Unit - III: Chapter VI Section 6.3.2 and Chapter VIII, sections 8.3.1, 8.3.2.[2]
Unit - IV: Chapter V, Sections5.1 to 5.10, 5.22 to 5.36[3]
Unit - V: Chapter V, Sections 5.37 to 5.55 [3] (Simple Properties only)

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POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.C.A	**Subject Code :**
Semester : I	**No of hours : 5**
Part III : Allied Course - I	**No of credits : 3**

Title of the Paper: NUMERICAL ANALYSIS

Unit - I

Algebraic and transcendental equations – Finding a root of the given equation (Derivation of the formula not needed) using Bisection method, Newton Rapson method.

Unit - II

Finite differences forward – Backward differences – Newton's forward and backward difference interpolation Formulae. Lagrange's interpolating polynomial. (Proof not needed);

Unit - III

Numerical differentiation – Numerical Integration using Trapezoidal rule & Simpson's First and second rules – Simple problems.

Unit - IV

Solutions to linear systems – Gaussian Elimination Method – Jacobi and Gauss Siedal methods – Simple problems.

Unit - V

Numerical solution of O.D.E: Solution by Taylor series method, Euler's method, Runge-kutta 2^{nd} order method.

Text Book

[1] S.S Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India Pvt Ltd, 2005.

Unit- I: Chapter 2, Sections 2.1,2.2,2.5.
Unit -II: Chapter 3, Sections 3.3,3.3.1,3.3.2,3.6,3.9.1.
Unit - III: Chapter 5 – Sections 5.4,5.4.1,5.4.2,5.4.3
Unit - IV: Chapter 6, Section 6.3.2 and Chapter 8, Sections8.3.1,8.3.2.
Unit - V : Chapter 7 – Sections 7.2,7.4,7.5.

Reference Books

[1]S.Narayanan & Others, Numerical Analysis, S.Viswanathan Publishers, 1994.
[2] A.Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.C.A	**Subject Code :**
Semester : II	**No of hours : 6**
Part III : Allied Course - II	**No of credits : 4**

Title of the Paper: BASIC STATISTICS

Unit – I

Measures of Central Value: Arithmetic mean for raw data and frequency distribution – Limitations – Mode and its limitations – Median and its limitations.

Unit - II

Quartile – properties of Geometric mean – Harmonic mean – simple problems.

Unit - III

Correlation Analysis: Types of correlations – scatter diagram – Pearson's coefficient of correlations – Direct Method – Spearman's rank correlation.

Unit - IV

Regression Analysis: Differences between correlation and regression Analysis – Two Regression lines – Regression coefficients.

Unit - V

Index Numbers: Uses of Index numbers – Problems in the construction of index numbers – quantity index numbers – Laspeyers, Passche formula.

Text Book

[1] P.R Vittal,Business Mathematics and Statistics,Margham publications, Chennai,2008.

Unit - I : Part Two Chapter V (Mean, Median, Mode problems only)
Unit - II: Part Two Chapter V (Quartile, Geometric mean, Harmonic mean problems only)
Unit - III: Part Two Chapter VIII (Problems in three types only)
Unit - IV: Part Two Chapter IX
Unit - V: Part Two Chapter XIII (Problems in four types only)

Reference Books

[1] Elements of mathematical statistics by S.C.Kupta, V.K.Kapoor.
[2]Elements of statistics by S.P.Gupta.

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.C.A	**Subject Code :**
Semester : II	**No of hours : 5**
Part III : Allied Course - III	**No of credits : 3**

Title of the Paper:OPERATIONS RESEARCH

UNIT – I

Operations Research: Introduction – Basic concepts Linear programming problem- Mathematical Formulation of the problem – Graphical solution method.

UNIT – II

Simplex method: Introduction – canonical and standard forms of L.P.P.– the Simplex procedure – BIG – M Method only. (simple problems).

UNIT – III

Sequencing problems: Processing of n jobs through two machines – Processing of n jobs through 3 machines – Processing of two jobs through m machines.

UNIT – IV

Transportation problem: Introduction _General transportation problem – the transportation table –solution of a transportation problem – finding an initial Basic feasible solution (NWC, LCM, VAM) – Degeneracy in transportation problem – Transportation Algorithm (modi method) – unbalanced Transportation problem .

UNIT – V

Network scheduling by PERT /CPM: Introduction _ network and Basic components – logical sequencing rules of network construction – critical path analysis – probability considerations in PERT- Distinction between PERT and CPM.

Text Book

[1] Kanti Swarup, P.K Gupta andMan Mohan, Operations Research, Sultan Chand and sons,

New Delhi, 2005.

Unit I: Chapter 2, Chapter 3, Sections 3.1 to 3.3
Unit II: Chapter 3, Sectios 3.4, 3.5, Chapter 4, Sections 4.1, 4.3, 4.4 (Big – M method only).
Unit III: Chapter 12, Sections 12.1 to 12.6.
Unit IV: Chapter 10, Sections 10.9 to 10.12, 10.14.
Unit V : Chapter 21, Sections 21.1 to 21.7.

Reference Books

[1]Prem Kumar Guptha and D.S. Hira, Operations Research: An Introduction, S.Chand and Co., Ltd. New Delhi,

[2] Hamdy A.Taha, Operations Research (7^{th} Edn.) McMillan Publishing Company, New Delhi, 1982.

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POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2016 – 2017 and after)

Programme : B.A.ECONOMICS	**Subject Code :**
Semester : III	**No of hours : 5**
Part III : Allied Course - I	**No of credits : 3**

Title of the Paper: STATISTICAL METHODS – I

Unit - I

Introduction:Statistics – Nature and Scope – its relation with other sciences – Limitation – collection of data – Primary and secondary sources.

Unit - II

Sampling:Essentials of sampling – probability and Non – probability sampling methods – Merits and limitations of sampling.

Unit - III

Types of Diagram – bar and pie diagrams – Pictographs – graphs Histogram – Frequency polygon-problems – limitations of diagrams and graphs.

Unit - IV

Measures of Central Value:Arithmetic mean for raw data and frequency distribution – Limitations – Mode and its limitations – Median and its limitations. (mean, median and mode problems only)

Unit - V

Quartile – properties of Geometric mean – Harmonic mean – simple problems.(Quartile, geometric mean and harmonic mean problems only)

Text Book

[1] P.R Vittal,Business Mathematics and Statistics,Margham publications, Chennai,2008.

Unit - I: Part Two Chapter I and Chapter II
Unit - II: Part Two Chapter XVIII
Unit - III: Part Two Chapter IV
Unit - IV: Part Two Chapter V(Mean,median and mode problems only)
Unit - V: Part Two Chapter V (Quartile,geometric mean and harmonic mean only)

Reference Books

[1] Gupta, S.C, Fundamentals of Applied Statistics, S.Chand & Sons, New Delhi, 1993.
[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.

[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.
[4] Chou, Y, Statistics Analysis, Holt, Reinhart and Winston, New York, 1975.

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Programme : B.A.ECONOMICS	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Allied Course - II	**No of credits : 4**

Title of the Paper:STATISTICS PRACTICAL

1.Tabulation of data

2. Diagrammatic representation

3. Graphical representation

4. Mean

5. Median

6. Mode

7. Correlation

8. Regression

9. Mean Deviation

10. Standard Deviation

A record of lab work should be maintained and submitted at the time of the practical examinations.

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Programme : B.A.ECONOMICS	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Allied Course - III	**No of credits : 3**

Title of the Paper: STATISTICAL METHODS – II

UNIT - I

Tabulation of data: Frequency distribution – Its formation – Types of tables.

UNIT - II

Correlation Analysis: Types of correlations – Scatter diagram – Pearson's coefficient of correlations – Direct Method – Spearman's rank correlation.(Problems only)

UNIT - III

Regression Analysis: Difference between correlation and regression analysis – Two Regression lines – Regression coefficients.

UNIT - IV

Index Numbers: Uses of Index numbers – Problems in the construction of index numbers – Quantity index numbers – Laspeyers, Passche formula. (Problems only)

UNIT - V

Interpolation: Newton's Forward and backward interpolation formula – Lagrange's interpolation formula – Simple problems only.

Text Book

[1] P.R Vittal,Business Mathematics and Statistics,Margham publications, Chennai,2008.
[2] S.S Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India Pvt Ltd, 2005.

Unit - I: Part Two Chapter III [1]
Unit - II: Part Two Chapter VIII (Problems only) [1]
Unit - III: Part Two Chapter IX
Unit - IV: Part Two Chapter XIII (Problems only) [1]
Unit - V : Chapter III Sections 3.6, 3.9.1 (Problems only) [2]

Reference Books

[1] Gupta, S.C, Fundamentals of Applied Statistics, S.Chand & Sons, New Delhi, 1993.
[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.

[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.
[4] R.S.N.Pillai, V.Bagavathi, Statistics, S,Chand and Company Ltd, 1993.

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