

(For Students admitted from 2015-2016 onwards)

SYLLABUS

f or

B.Sc. MATHEMATICS

**(For students admitted from 2015-2016
onwards)**

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
I	RR1M1	Differential Calculus, Trigonometry and Matrices	6	5	Tamil and English

UNIT I: Successive Differentiation – Leibnitz’s Theorem and its Applications- Maxima and Minima of Two Variables.

UNIT II: Curvature – Radius of Curvature in Cartesian and Polar Co-ordinates – Centre of Curvature – Evolute.

UNIT III: Expansion for $\sin n\theta, \cos n\theta, \tan n\theta$ - Expansion for $\sin^n \theta$ and $\cos^n \theta$ - Expansion of $\sin \theta, \cos \theta$ and $\tan \theta$ in powers of θ .

UNIT IV: Hyperbolic functions – Relations between hyperbolic functions and circular trigonometry functions – Inverse hyperbolic functions – Logarithm of complex number.

UNIT V: Matrices: Symmetric, Skew – Symmetric matrices - Hermitian and Skew-Hermitian matrices – Unitary matrices – Orthogonal matrices –Eigen values and Eigen vectors – Cayley –Hamilton theorem - verification of Cayley-Hamilton theorem.

Text Books

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

1. Calculus (Volume I), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT., LTD (2009).

Unit I: Chapter 3 (Full) & Chapter 7 (Sec 4)

Unit II: Chapter 10 (Sec 2.1 – 2.6)

2. Trigonometry, S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD.

Unit III: Chapter 3 (Full)

Unit IV: Chapter 4 (Full) & Chapter 5 (Sec 5)

3. Algebra (Volume II), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD.

Unit V: Chapter 2 (Sec 6.1 – 6.3, 9.1, 16, 16.3)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
II	RR2M2	Classical Algebra	6	5	Tamil and English

UNIT 1: Theory of equations: Imaginary roots occur in pairs – Irrational roots occur in pairs - Relation between the roots and coefficients – Symmetric functions – Sum of the r^{th} powers of the roots.

UNIT II: Transformation of equations –Diminishing, increasing, multiplying the roots - forming the equations with the given roots.

UNIT III: Reciprocal equations - Descartes rule of signs.

UNIT IV: Binomial and Exponential series: Summation and approximation of the series.

UNIT V: Logarithmic series: Summation and approximation of the series.

Text Book

Algebra (Volume I), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD, (2004).

Unit I: Chapter 6 (Sec 9 - 14)

Unit II: Chapter 6 (Sec 15, 17, 18, 20)

Unit III: Chapter 6 (Sec 16, 24)

Unit IV: Chapter 3 (Sec 10, 14) & Chapter 4 (Sec 2, 3)

Unit V: Chapter 4 (Sec 5 - 9)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
I & II	RR2M3	Integral Calculus and Analytical Geometry 3D	3	5	Tamil and English

UNIT I: Definite integrals: Properties – problems - Integration by parts – problems – Reduction formula.

UNIT II: Multiple integrals: Double integrals – change the order of integration – triple integrals – Beta and Gamma functions – properties - Integration using Beta and Gamma functions.

UNIT III: Plane: standard equation of the plane – intercept form – Normal form – Plane passing through the given points - angle between the planes – Plane through line of intersection of two planes.

UNIT IV: Straight line: Equation of a straight line in symmetrical form – Equation of a straight line passing through two given points - Coplanar lines – Equation of the Coplanar lines – Shortest distance between two skew lines – Equation of shortest distance.

UNIT V: Sphere: Standard equation – length of the tangent from any point – Plane section of a sphere - Sphere passing through a given circle – intersection of two spheres – Equation of the tangent plane to the sphere.

Text books

1. Calculus (Volume II), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2006).

Unit I: Chapter 2 (Sec 11 - 13)

Unit II: Chapter 5 (Sec 1, 2.1, 2.2, 4) & Chapter 7 (Sec 2.1 -2.3, 3, 4, 5)

2. Analytical geometry (Three Dimensions), T. K. Manickavachagom Pillay and T. Natarajan, S. Viswanathan PVT. LTD, (2006).

Unit III: Chapter 2 (Sec 1 – 9)

Unit IV: Chapter 3 (Sec 1 – 4, 7, 8)

Unit V : Chapter 4 (Sec 1 – 8)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
III	RR3M4	Differential Equations and Laplace Transforms	6	5	Tamil and English

UNIT I: Ordinary Differential equations – Particular integral of second and higher order Differential Equations with constant coefficients – Linear equations with variable coefficients.

UNIT II: Exact differential equations – First order and higher degree equations – Variation of parameters.

UNIT III: Partial Differential Equations: Formations of Partial Differential Equations – General, Particular and singular integral and four standard types – Lagranges equation – Charpit's equation (simple problems).

UNIT IV: Partial Differential Equations of the second order homogeneous equations with constant coefficient – particular integral of $F(D, D')z = f(x, y)$, where $f(x, y)$ is of the form e^{ax+by} , $\sin(ax + by)$, $\cos(ax + by)$, $F(x, y)$ and $F(x, y)e^{ax+by}$.

UNIT V: Laplace Transforms: Properties – Problems - Inverse Laplace Transforms - Problems –Solution of Ordinary Differential Equations using Laplace Transforms.

Text Books

1. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit I: Chapter 2 (Sec 1 – 4, 8)

Unit II: Chapter 1 (Sec 3- 5) & Chapter 2 (Sec 10)

Unit III: Chapter 4 (Sec 1- 3, 5 - 7)

Unit V: Chapter 5 (Sec 1, 2, 4 - 9)

2. Engineering Mathematics – III, M.K.Venkatraman, The National Publishing Company, Chennai.

Unit IV: Chapter -2 (Sec 13 - 19)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours / Week	No. of Credits	Medium of Instruction
IV	RR4M5	Numerical Analysis	6	5	Tamil and English

Unit I: Solutions of algebraic and transcendental equation: Bisection Method - Iteration Method -Method of False position - Newton - Raphson Method.

Unit II: Finite differences: Forward differences, Backward differences - Central differences - symbolic relations - Newton's formula for interpolation - Central Difference Interpolation formula – Gauss's, Stirling's and Bessel's Formulae - Interpolation with unevenly spaced points - Lagrange's Interpolation formula.

Unit III: Numerical differentiation: Computing first and second derivatives - Numerical integration: Trapezoidal rule and Simpson's 1/3 and 3/8 rules.

Unit IV: Solution of linear systems: Gaussian elimination Method - Gaussian Jordan Method - Iterative methods: Gauss Jacobi and Gauss Seidal Methods. Numerical solutions of Ordinary differential equations: Taylor's series method - Picards method of successive approximations – Euler's method - Modified Euler's method.

Unit V: Numerical solution of ordinary differential equations: Runge - Kutta method of second, third and fourth order – Predictor - Corrector Methods - Adams- Moulton method and Milne's method. Numerical solution of Partial Differential Equations: Finite Difference Approximations to Derivatives- Laplace's Equation-Jacobi's Method , Gauss-Seidel Method, successive over relaxation method- Alternating Direction Implicit method.

Text Book

Introductory Methods of Numerical Analysis, S.S. Sastry, Prentice Hall of India Pvt. Ltd, New Delhi, Third Edition (2003).

Unit I: Chapter 2 (Sec 2.2 - 2.5)

Unit II: Chapter 3 (Sec 3.3, 3.6, 3.7(3.7.1- 3.7.3), 3.9.1)

Unit III: Chapter 5 (Sec 5.2, 5.4(5.4.1 - 5.4.3))

Unit IV: Chapter 6 (Sec 6.3.2, 6.4) & Chapter VII (Sec 7.2 - 7.4)

Unit V: Chapter 7 (Sec 7.5, 7.6) & Chapter VIII (Sec 8.2, 8.3)

Reference

Numerical Methods, P.Kandasamy, K.Thilagavathy and K.Gunavathy, S.Chand & Company Ltd, New Delhi.

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
III & IV	RR4M6	Vector Analysis and Fourier Series	3	5	Tamil and English

UNIT I: Vector differentiation: Velocity and acceleration - Vector and scalar fields – Gradient of a vector- Directional derivative – divergence and curl of a vector - solenoidal and irrotational vectors –Laplacian operator – simple problems.

UNIT II: Vector integration: Tangential line integral –Conservative force field –scalar potential- Work done by force - Surface integral- Volume integral – simple problems.

UNIT III: Gauss Divergence Theorem – Stoke’s Theorem- Green’s Theorem – Simple problems and Verification of the theorems.

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 Cosine Series – Definition and problems – Half range Fourier Sine series – Definition and problems – Change of interval.

Text Books

1. Vector Algebra and Analysis, S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD.

Unit I: Chapter 4 (Sec 1, 2, 6 – 11)

Unit II: Chapter 6 (Sec 1 - 5)

Unit III: Chapter 6 (Sec 6 - 10)

2. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit IV: Chapter 6 (Sec 1 - 3)

UNIT V: Chapter 6 (Sec 4 - 6)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
V	RR5M7	Modern Algebra	5	5	Tamil and English

UNIT I: Group Theory: Subgroup – A Counting Principle – Normal subgroups and Quotient groups .

UNIT II: Group Theory: Homomorphisms – Automorphisms

UNIT III: Group Theory: Caley’s Theorem – Permutation groups – Another Counting Principle

UNIT IV: Ring Theory: Definition and Examples of Rings – Some Special Classes of Rings – Homomorphisms – Ideal and Quotient Rings – More Ideal and Quotient Rings – The Field of Quotients of an Integral Domain.

UNIT V: Vector Spaces And Modules: Elementary Basic Concepts – Linear Independence and Bases – Dual Spaces – Inner Product Spaces .

Text Book

Topics in Algebra, I. N . Herstein, John Wiley & Sons, 2nd Edition.

Unit I: Chapter 2 (Sec : 2.4 – 2.6)

Unit II: Chapter 2 (Sec : 2.7 – 2.8)

Unit III: Chapter 2 (Sec : 2.9 – 2.11)

Unit IV: Chapter 3 (Sec : 3.1 – 3.6)

Unit V: Chapter 4 (Sec : 4.1 – 4.4)

Reference

Algebra, S.Lang, 3rd Edition, Springer (India), 2004.

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
V	RR5M8	Real Analysis	5	4	Tamil and English

UNIT I: Equivalence: Countability – Definition of sequence and subsequence – Limit of a sequence – Convergent sequences – Divergent sequences – Bounded sequences – Monotone Sequences – Operations on convergent sequences – Cauchy sequences.

UNIT II: Convergence and Divergence: Series with nonnegative terms – Alternating series – Conditional convergence and absolute convergence – Tests for absolute convergence.

UNIT III: Limit of a function on the real line – Metric spaces – Limits in metric spaces – Functions continuous at a point on the real line – Functions continuous on a metric space – Open sets – Closed sets.

UNIT IV: Sets of measure zero – Definition of the Riemann integral – Existence of the Riemann integral – Properties of the Riemann integral.

UNIT V: Derivatives – Rolle's Theorem – The law of the mean – Fundamental theorems of calculus – Taylor's theorem.

Text Book

Methods of Real Analysis, Richard R . Goldberg, Oxford & IBH Publishing Co. PVT. LTD, New Delhi.

Unit I: Chapter 1 (Section : 1.5 , 1.7) & Chapter 2 (Section : 2.1 - 2.7 & 2.10)

Unit II: Chapter 3 (Section : 3.1 – 3.4 & 3.6)

Unit III: Chapter 4 (Section : 4.1 – 4.3) & Chapter 5 (Section : 5.1 & 5.3 - 5.5)

Unit IV: Chapter 7 (Section : 7.1 – 7.4)

Unit V: Chapter 7 (Section : 7.5 – 7.8) Chapter 8 (Section : 8.5)

Reference

Mathematical Analysis, Tom Apostol, Addison –Wesley Publishing company, London,1971

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
V	RR5M9	Statics	5	4	Tamil and English

UNIT I: Forces and Equilibrium: Forces – Resultant of two forces – Three forces related to a triangle – Equilibrium of a particle under three or more forces.

UNIT II: Forces on a rigid body: Moment – Equivalent Systems of forces – Parallel forces – Varignon's Theorem – Forces along a Triangle – Couples: Equilibrium of a rigid body under three coplanar forces – Reduction of coplanar forces into a force and a couple.

UNIT III: Friction: Laws of Friction – Coefficient of Friction - Angle and Cone of Friction – Limiting equilibrium of a particle on a rough inclined plane - Tilting of a body – Simple Problems.

UNIT IV: Virtual Work: Principles of Virtual Work – Applied to a body or a system of bodies in equilibrium – Equation of Virtual Work – Simple Problems.

UNIT V: Strings: Equilibrium of Strings under gravity – Common Catenary – Suspension bridge.

Text Book

Mechanics (Vector Treatment), P.Duraipandiyar, S . Chand & Co., June 1997 Edition.

Unit I: Chapter 2 & Chapter 3 (Sec 3.1)

Unit II: Chapter 4 (Sec 4.1 , 4.3 – 4.9) & Chapter 5 (Sec 5.1)

Unit III: Chapter 2 (Sec 2.1) , Chapter 3 (Sec 3.2) & Chapter 5 (Sec 5.2)

Unit IV: Chapter 8

Unit V: Chapter 9

Reference

Statics, M. K. Venkataraman, Agasthiyar Publications, 2002 .

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
V	RR5MEL1	Programming in C	5	4	Tamil and English

UNIT I: Introduction – Basic structure of C programming – Executing a C program – Character – C tokens – Key words and of variables – Assigning value to variables – Symbolic constants – All operators .(Related simple programs)

UNIT II: Arithmetic expression – Evaluation of expression – Precedence of arithmetic operators – some computational problems – Type conversion in expression – Mathematical function – Reading a character – Writing a character – Formatted input – Formatted output – Declaring and initializing string variable – Reading string from terminal – writing string to screen – comparison of two strings – string handling functions.(Related simple programs)

UNIT III: Decision making with IF statement – simple IF statement – IF...ELSE LADDER – Switch statement – The? : Operator – GOTO statement – While statement – Do statement – FOR Statement.

UNIT IV: Arrays: One dimensional arrays – Two dimensional arrays – Initializing two dimensional arrays – Multi dimensional arrays– User defined function: Need for user defined functions –A multi function program – The form of C function – Return values and their types calling functions – first three category of functions – Recursion.

UNIT V: Structure: Structure definition – Giving value to members structure initialization – comparison of structure variables – Arrays of structures – Arrays within structure – Structure within structure – File management: Introduction – Defining and opening of file – Closing a file – Input /Output operation on files.

Text Book

Programming in ANSI C, E. Balagurusamy, Tata McGraw – Hill publishing company Ltd, New Delhi, Second Edition.

Unit I: Chapter I (Sec 1.2, 1.4 - 1.6), Chapter II (Sec 2.2 - 2.10) & Chapter III (Sec 3.2 - 3.6)

Unit II: Chapter III(Sec 3.10 - 3.16), Chapter IV(Sec 4.2 - 4.5) & Chapter V(Sec 8.2, 8.4, 8.7, 8.8)

Unit III: Chapter V (Sec 5.2 - 5.9) & Chapter VI (Sec 6.2 - 6.4)

Unit IV: Chapter VII (Sec 7.2 - 7.5) & Chapter IX (Sec 9.2 - 9.10, 9.13)

Unit V: Chapter X (Sec 10.2 - 10.8) & Chapter XII (Sec 12.1 - 12.4)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
V	RR5MEL2	Discrete Mathematics	4	4	Tamil and English

UNIT I: Mathematical Logic: Introduction – Statements and Notations – Connectives – Logical capabilities of programming languages – Conditional and Biconditional – well-formed formulae – Tautology and Equivalence formulae.

UNIT II: Tautology and Normal Forms: Duality Law – tautological Implications – Formulae with distinct truth tables – Functionally complete sets of connectives – Other connectives – Normal forms – Disjunctive and Conjunctive Normal forms.

UNIT III: Theory of Inference for Statement Calculus: Introduction – Validity using truth tables – Rules of Inference – Consistency of premises – Indirect method of proof – Automatic theorem proving – Predicates – The statement Function - Variables and quantifiers .

UNIT IV: Predicate Formulae: Predicate formulae – Free and Bound variables – Universe of Discourse – Inference Theory of the predicate calculus – Valid formulas and Equivalences – Some valid formulas over finite Universes – Special valid formulas Involving quantifiers – Theory of inference for the predicate calculus –Formulas Involving more than one quantifier .

UNIT V: Functions and Recursion: Definition and Introduction – Composition of functions – Inverse functions – Recursive functions - sets and predicates .

Text Book

Discrete Mathematical Structures with Applications to Computer Science, J.P.Tremblay
R.Manohar

Unit I: Page no. 1 to 30

Unit II: Page no. 31 to 40 & 50 to 60

Unit III: Page no. 65 to 85

Unit IV: Page no. 86 to 103

Unit V: Page no. 192 to 204 & 232 to 241

Reference

Elements of Discrete Mathematics, C.L.Liu, Tata McGraw-Hill Publishing company
Limited, New Delhi, Second Edition.

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
VI	RR6M10	Complex Analysis	5	5	Tamil and English

UNIT I : Analytic Functions: Functions of a Complex variable – Limits –Theorems on limit – Continuous Functions – Differentiability – The Cauchy-Riemann Equations – Analytic Functions-Harmonic Functions.

UNIT II: Bilinear Transformations: Elementary Transformations –Bilinear Transformations-Cross Ratio – Fixed points of Bilinear Transformations – 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 – Zeros of an Analytic Function.

UNIT V: Calculus of Residues: Singularities – Residues- Cauchy's Residues Theorem – Problems.

Text Book

Complex Analysis, S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, Scitech Publication, Chennai.

Unit I: Chapter 2 (Sec 2.1 - 2.8)

Unit II: Chapter 3 (Sec 3.1 - 3.5)

Unit III: Chapter 6 (Sec 6.1 - 6.4)

Unit IV: Chapter 7 (Sec 7.1 - 7.3)

Unit V : Chapters 7 and 8 (Sec 7.4 , 8.1, 8.2)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
VI	RR6M11	Operations Research	5	4	Tamil and English

UNIT I: Mathematical Formulation of linear programming problems - Graphical method – simplex method – Big - M method – Two phase simplex method.

UNIT II: Transportation Problems: Introduction – Finding initial Basic feasible solution (North West Corner Rule, Least Cost Method, Vogel’s Approximation Method) – optimal solution (Modified Distribution Method) – Degeneracy in Transportation Problems – Assignment Problems: Introduction – Hungarian Algorithm – problems - Travelling salesman problem.

UNIT III: Network Scheduling by PERT/CPM: CPM: Introduction – Network and Basic components – Rules of Network construction – Time calculations in network – Critical Path Method – PERT calculations.

UNIT IV: Sequencing Problems: Introduction – problems with n jobs and 2 machines – problems with 2 jobs and n machines.

UNIT V: Replacement Problems: Introduction – Replacement of Equipment – Deteriorates gradually – Replacement of Equipment that fails suddenly.

Text Book

Operations Research, Kantiswarup, P.K. Gupta, Man Mohan Sultan Chand & Sons Educational Publishers New Delhi (2007).

Unit I: Chapter 2 (Sec 2.1 - 2.4) & Chapter 3 (Sec 3.1, 3.2) & Chapter 4 (Sec 4.3, 4.4)

Unit II: Chapter: 10(Sec 10.1, 10.2, 10.8, 10.9, 10.10, 10.12, 10.13) & Chapter 11 (Sect 11.1, 11.2, 11.3, 11.7)

Unit III: Chapter 25(Sec 25.1 – 25.8)

Unit IV: Chapter 12 (Sec 12.1 – 12.6)

Unit V: Chapter 18 (Sec 18.1 – 18.3)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
VI	RR6M12	Dynamics	5	4	Tamil and English

UNIT I: Kinematics Velocity – Relative Velocity – Acceleration – Coplanar Motion – Components of Velocity and Acceleration – Newton’s Laws of Motion .

UNIT II: Simple Harmonic motion - Simple Pendulum – Load suspended by a elastic string – Projectile – Maximum height reached - range - time of flight – Projectile up / down an inclined plane .

UNIT III: Impulsive force: Conversion of Linear momentum – Impact of a sphere and a sphere and a plane – Direct and Oblique Impact of two smooth spheres – Kinetic energy and Impulse .

UNIT IV: Central Orbit: Central force – differential equation to a central orbit in polar & pedal co-ordinates – Given the central orbit , to find the law of force – Kepler’s Laws of Planarity motions .

UNIT V: Motion of a rigid body – Moment of Inertia of simple bodies – Theorems of Parallel and Perpendicular axes – Motion in two-dimension – Motion of a body about a fixed axis .

Text Book

Mechanics (Vector Treatment), P.Duraipandiyar, S . Chand & Co., June 1997 Edition.

Unit I: Chapter 1 & Chapter 2 (Sections 2.1 , 2.1.1)

Unit II: Chapter 12 (Sections 12.1 - 12.3) & Chapter 13

Unit III: Chapter 14

Unit IV: Chapter 16

Unit V: Chapter 4 (Sections 4.2), Chapter 17 & Chapter 18

References

1. Dynamics, M. K. Venkataraman, Agasthiyar Book Depot, 1990

2. Dynamics, A. V. Dharmapadham, S. Viswanathan Publishers, 1981

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

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Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
VI	RR6M13	Analytic Number Theory	5	4	Tamil and English

UNIT I: The Fundamental Theorem of Arithmetic: Introduction – Divisibility – Greatest common divisor – Prime numbers – The Euclidean algorithm – The greatest common divisor of more than two numbers.

UNIT II: Arithmetical Functions and Dirichlet Multiplication: Introduction – The Mobius function $\mu(n)$ – The Euler totient function $\phi(n)$ – Multiplicative functions.

UNIT III: Congruencies: Definition and basic Properties of Congruencies – Residue classes and complete residue systems – Linear congruencies – Reduced residue systems and the Euler – Fermat Theorem – Polynomial congruencies modulo p - Lagrange's theorem – Applications of Lagrange's theorem – Simultaneous Linear Congruences - The Chinese remainder theorem.

UNIT IV: Quadratic Residues and the Quadratic Reciprocity Law: Quadratic residues – Legendre's symbol and its properties – Evaluation of $(-1/P)$ and $(2/P)$ – Gauss lemma – The quadratic reciprocity law – Applications of the reciprocity law.

UNIT V: Diophantine Equations: The Jacobi symbol – Applications to Diophantine equations – Gauss sums and the quadratic reciprocity law.

Text Book

Introduction to Analytic Number Theory, Tom M. Apostol, Narosa Publishing House.

Unit I: Chapter I: 1.1 to 1.5, 1.7, 1.8

Unit II: Chapter II: 2.1 to 2.5, 2.9

Unit III: Chapter V: 5.1 to 5.7

Unit IV: Chapter IX: 9.1 to 9.6

Unit V: Chapter IX: 9.7, 9.8, 9.9

Reference

A Course in Number Theory and Cryptography, Neal Koblitz, Springer, Second Edition.

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
VI	RR6MEL3	Graph Theory	4	4	Tamil and English

UNIT I: Graphs and Subgraphs: Introduction-The Konigsberg Bridge problem – Definitions and Examples – Degrees – Subgraphs – Isomorphism.

UNIT II: Independent sets and coverings – Intersection Graphs and line graphs – matrix representation of graphs – operations on graphs – Degree sequences – Graphic sequences.

UNIT III: Connectedness: Introduction – Walks, Trails and Paths – Connectedness and Components – Blocks - Connectivity.

UNIT IV: Eulerian, Hamiltonian Graphs and Trees: Introduction – Eulerian graphs – Hamiltonian graphs – Characterization of Trees – Centre of a tree.

UNIT V: Planarity: Introduction – Definition and Properties- Characterization of planar graphs - Thickness, Crossing and Outer planarity.

Text Book

Invitation to Graph theory, S.Arumugam and S.Ramachandran, Scitech Publications(India) Pvt.Ltd.

Unit I: Chapter 1(Sec 1.0, 1.1) & Chapter 2 (Sec 2.0 - 2.4)

Unit II: Chapter 2 (Sec 2.6 -2.9) & Chapter 3 (Sec 3.1 - 3.2)

Unit III: Chapter 4 (Sec 4.0 - 4.4)

Unit IV: Chapter 5 (Sec 5.0 - 5.2) & Chapter 6 (Sec 6.0 - 6.2)

Unit V: Chapter 8 (Sec 8.0 - 8.3)

Reference

Graph Theory, Narsingh Deo, PHI Pvt. Ltd., New Delhi (2002).

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

SYLLABUS

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NONMAJOR ELECTIVE PAPERS

(PHYSICS & CHEMISTRY MAJOR)

**(For students admitted from 2015-2016
onwards)**

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
V	RR5MELO1	Graph Theory (Non-Major Elective for Physics Major)	4	4	Tamil and English

UNIT I: Graphs And Subgraphs: Introduction-The Konigsberg Bridge problems – Definitions and Examples – Degrees – subgraphs – Isomorphism.

UNIT II: Independent Sets ,Coverings And Degree Sequences: Independent sets and coverings – Intersection Graphs and line graphs – matrices – operations on graphs – Degree sequences – Graphic sequences.

UNIT III: Connectedness: Introduction – walks, trails and paths – connectedness and components -Blocks- connectivity.

UNIT IV: Eulerian, Hamiltonian Graphs And Trees: Introduction – Eulerian graphs – Hamiltonian graphs – characterization of trees –centre of a tree.

UNIT V: Planarity: Introduction – definition and properties characterization of planar graphs-Thickness, crossing and outer planarity.

Text Book

Invitation to Graph theory, S.Arumugam, S.Ramachandran, Scitech Publications(India) Pvt.Ltd

Unit I: Chapter - 1 & 2 Sec:(1.0 to 2.4)

Unit II: Chapter – 2 & 3 sec:(2.7 to 2.9 , 3.1 to 3.2)

Unit III: Chapter – 4 Sec:(4.0 to 4.4)

Unit IV: Chapter 5 and 6 Sec:(5.0 to 5.2,6.0 to 6.2)

Unit V: Chapter : 8 Sec:(8.0 to 8.3)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Reference

Graph Theory, Narsingh Deo, PHI Pvt. Ltd., New Delhi (2002).

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Semester	Subject Code	Title of the Paper	Hours / Week	No. of Credits	Medium of Instruction
VI	RR6MELO2	Numerical Methods (Non-Major Elective for Chemistry Major)	4	4	Tamil and English

Unit I: Solution of Algebraic and Transcendental Equations: Bisection Method - Method of False position - Newton - Raphson Method.

Unit II: Finite differences: Forward Differences, Backward Differences - Newton's Formula for Interpolation - Lagrange's Interpolation Formula – Simple Problems.

Unit III: Numerical differentiation: Computing first and second derivatives - Numerical integration: Trapezoidal rule and Simpson's 1/3 and 3/8 rules.

Unit IV: Solution of linear systems: Gauss Elimination and Gauss Jacobi Methods - Iterative methods: Gauss Seidal Method and Gauss Jordan Method.

Unit V: Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method- Runge Kutta Method Second and Fourth Order Method.

Text Book

Introductory Methods of Numerical Analysis, S.S. Sastry. Third Edition Prentice Hall of India Pvt. Ltd, New Delhi.

Unit I : Chapter 2 (Sec 2.2, 2.4, 2.5)

Unit II : Chapter 3 (Sec 3.3(3.3.1, 3.3.2), 3.6, 3.9(3.9.1))

Unit III : Chapter 5 (Sec 5.2, 5.4(5.4.1 - 5.4.3))

Unit IV : Chapter 6 (Sec 6.3 (6.3.2), 6.4)

Unit V : Chapter 7 (7.2, 7.4(7.4.1&7.4.2 excluded), 7.5)

Reference

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Numerical Methods, P.Kandasamy, K.Thilagavathy and K.Gunavathy. S.Chand & Company Ltd, New Delhi.

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

SYLLABUS

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ALLIED MATHEMATICS PAPERS

**(PHYSICS, CHEMISTRY, STATISTICS & COMPUTER
SCIENCE MAJOR)**

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

**(For students admitted from 2015-2016
onwards)**

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
I	RR1ASM1	Differential Calculus, Differential Equations and Algebra (Allied Paper For Statistics Major)	4	4	English

UNIT I: Successive differentiation – Leibnitz’s theorem (Proof excluded) and its applications.

UNIT II: Ordinary Differential Equations: Particular integral of second order Differential Equations with constant coefficients.

UNIT III: Binomial and Exponential Series: Summation and Approximation of the Series.

UNIT IV: Matrices: Symmetric, skew – Symmetric matrices - Hermitian and skew – Hermitian matrices – Unitary Matrices - Orthogonal matrices – Problems.

UNIT V: Matrices: Eigen values and Eigen vectors – Cayley –Hamilton theorem (Proof excluded) - Verification of Cayley- Hamilton theorem.

Text Books

1. Calculus (Volume I), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT., LTD (2009).

Unit I: Chapter 3 (Full)

2. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit II: Chapter 2 (Sec 1 – 4)

3. Algebra (Volume I), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD, (2004).

Unit III: Chapter 3 (Sec 10, 14) & Chapter 4 (Sec 2, 3)

4. Algebra (Volume II), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD.

Unit IV: Chapter 2 (Sec 6.1 – 6.3, 9.1)

Unit V: Chapter 2 (Sec 16, 16.3)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
II	RR2ASM2	Vector Calculus, Laplace Transforms and Fourier Series (Allied Paper For Statistics Major)	4	4	English

UNIT 1: Vector differentiation: Velocity and acceleration - Vector and scalar fields – Gradient of a vector- Directional derivative – divergence and curl of a vector - Solenoidal and Irrotational vectors.

UNIT II: Gauss Divergence Theorem – Stoke’s Theorem - Simple problems - Verification of the above theorems (Proof excluded).

UNIT III: Laplace Transforms: Properties – Simple problems - Inverse Laplace Transforms- Problems –Solution of Ordinary Differential Equations using Laplace Transforms.

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 Cosine Series – definition and problems – Half range Fourier Sine series – Definition and problems.

Text Books

1. Vector Algebra and Analysis, S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD.

Unit I: Chapter 4 (Sec 1, 2, 6 – 10)

Unit II: Chapter 6 (Sec 6, 9)

2. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit III: Chapter 5 (Sec 1, 2, 4 - 9)

Unit IV: Chapter 6 (Sec 1 - 3)

UNIT V: Chapter 6 (Sec 4, 5)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
I & II	RR2ASM3	Integral Calculus, Analytical Geometry 3D (Allied Paper For Statistics Major)	3	4	English

UNIT I: Definite integrals: Properties – problems - Integration by parts – problems.

UNIT II: Multiple integrals: Double integrals – Simple problems (Change the order of integration excluded) – Triple integrals - Simple problems.

UNIT III: Plane: standard equation of the plane – intercept form – Normal form – Plane passing through the given points - angle between the planes – Plane through line of intersection of two planes.

UNIT IV: Straight line: Equation of a straight line in symmetrical form – Equation of a straight line passing through two given points - Coplanar lines – Equation of the Coplanar lines – Shortest distance between two skew lines – Equation of shortest distance.

UNIT V: Sphere: Standard equation – length of the tangent from any point – Plane section of a sphere - Sphere passing through a given circle – intersection of two spheres – Equation of the tangent plane to the sphere.

Text books

1. Calculus (Volume II), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2006).

Unit I: Chapter 2 (Sec 11, 12)

Unit II: Chapter 5 (Sec 1, 2.1, 2.2, 4)

2. Analytical geometry (Three Dimensions), T. K. Manickavachagom Pillay and T. Natarajan, S. Viswanathan PVT. LTD, (2006).

Unit III: Chapter 2 (Sec 1 – 9)

Unit IV: Chapter 3 (Sec 1 – 4, 7, 8)

Unit V : Chapter 4 (Sec 1 – 8)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours / Week	No. of Credits	Medium of Instruction
I	RR1AM1	Differential Calculus and Algebra (Allied Paper For Physics and Chemistry Major)	4	4	Tamil and English

UNIT I: Successive differentiation – Leibnitz’s theorem (Proof excluded) and its applications.

UNIT II: Curvature – Radius of Curvature in Cartesian and Polar Co-ordinates – Centre of Curvature – Evolute.

UNIT III: Binomial and Exponential Series: Summation and Approximation of the series.

UNIT IV: Matrices: Symmetric, Skew – Symmetric matrices - Hermitian and Skew – Hermitian matrices – Unitary Matrices - Orthogonal matrices – Problems.

UNIT V: Matrices: Eigen values and Eigen vectors – Cayley –Hamilton theorem (Proof excluded) - Verification of Cayley- Hamilton theorem.

Text Books

1. Calculus (Volume I), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT., LTD (2009).

Unit I: Chapter 3 (Full)

Unit II: Chapter 10 (Sec 2.1 – 2.6)

3. Algebra (Volume I), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD, (2004).

Unit III: Chapter 3 (Sec 10, 14) & Chapter 4 (Sec 2, 3)

4. Algebra (Volume II), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan PVT. LTD.

Unit IV: Chapter 2 (Sec 6.1 – 6.3, 9.1)

Unit V: Chapter 2 (Sec 16, 16.3)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
II	RR2AM2	Vector Calculus and Analytical Geometry 3D (Allied Paper For Physics and Chemistry Major)	4	4	Tamil and English

UNIT 1: Vector differentiation: Velocity and acceleration - Vector and scalar fields – Gradient of a vector- Directional derivative – divergence and curl of a vector - Solenoidal and Irrotational vectors.

UNIT II: Gauss Divergence Theorem – Stoke’s Theorem - Simple problems - Verification of the above theorems (Proof excluded).

UNIT III: Plane: standard equation of the plane – intercept form – Normal form – Plane passing through the given points - angle between the planes – Plane through line of intersection of two planes.

UNIT IV: Straight line: Equation of a straight line in symmetrical form – Equation of a straight line passing through two given points - Coplanar lines – Equation of the Coplanar lines – Shortest distance between two skew lines – Equation of shortest distance.

UNIT V: Sphere: Standard equation – length of the tangent from any point – Plane section of a sphere - Sphere passing through a given circle – intersection of two spheres – Equation of the tangent plane to the sphere.

Text Books

1. Vector Algebra and Analysis, S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD.

Unit I: Chapter 4 (Sec 1, 2, 6 – 10)

Unit II: Chapter 6 (Sec 6, 9)

2. Analytical geometry (Three Dimensions), T. K. Manickavachagom Pillay and T. Natarajan, S. Viswanathan PVT. LTD, (2006).

Unit III: Chapter 2 (Sec 1 – 9)

Unit IV: Chapter 3 (Sec 1 – 4, 7, 8)

Unit V : Chapter 4 (Sec 1 – 8)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Semester	Subject Code	Title of the Paper	Hours/Week	No. of Credits	Medium of Instruction
I & II	RR2AM3	Integral Calculus, Differential Equations, Laplace Transforms and Fourier Series (Allied Paper For Physics and Chemistry Major)	3	4	Tamil and English

UNIT I: Definite integrals: Properties – problems - Integration by parts – problems. Multiple integrals: Double integrals – Simple problems (Change the order of integration excluded) – Triple integrals - Simple problems.

UNIT II: Ordinary Differential Equations: Particular integral of second order Differential Equations with constant coefficients.

UNIT III : Laplace Transforms: Properties – Simple problems - Inverse Laplace Transforms-Problems –Solution of Ordinary Differential Equations using Laplace Transforms.

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 Cosine Series – definition and problems – Half range Fourier Sine series – Definition and problems.

Text Books

1. Calculus (Volume II), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2006).

Unit I: Chapter 2 (Sec 11, 12) & Chapter 5 (Sec 1, 2.1, 2.2, 4)

2. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit II: Chapter 2 (Sec 1 – 4)

Unit III: Chapter 5 (Sec 1, 2, 4 - 9)

Unit IV: Chapter 6 (Sec 1 - 3)

UNIT V: Chapter 6 (Sec 4, 5)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Semester	Subject Code	Title of the Paper	Hours / Week	No. of Credits	Medium of Instruction
I	RR1ACSM1	Numerical Methods and Operations Research (Allied Paper for Computer Science Major)	4	4	English

Unit I: Solutions of algebraic and transcendental equation: Bisection Method - Iteration Method -Method of False position - Newton - Raphson Method.

Unit II: Numerical differentiation: Computing first and second derivatives - Numerical integration: Trapezoidal rule and Simpson's 1/3 and 3/8 rules.

Unit III: Solution of linear systems: Gaussian elimination Method - Gaussian Jordan Method - Iterative methods: Gauss Jacobi and Gauss Seidal Methods. Numerical solutions of Ordinary differential equations: Taylor's series method - Picards method of successive approximations – Euler's method.

UNIT IV: Mathematical Formulation of linear programming problems - Graphical method –simplex method – Big - M method – Two phase simplex method.

UNIT V: Transportation Problems: Introduction – Finding initial Basic feasible solution (North West Corner Rule, Least Cost Method, Vogel's Approximation Method) – optimal solution (Modified Distribution Method) – Degeneracy in Transportation Problems – Assignment Problems: Introduction – Hungrain Algorithm – problems - Travelling salesman problem.

Text Books

1. Introductory Methods of Numerical Analysis, S.S. Sastry, Prentice Hall of India Pvt. Ltd, New Delhi, Third Edition (2003).

Unit I: Chapter 2 (Sec 2.2 - 2.5)

Unit II: Chapter 5 (Sec 5.2, 5.4(5.4.1 - 5.4.3))

Unit III: Chapter 6 (Sec 6.3.2, 6.4) & Chapter VII (Sec 7.2 - 7.4)

2. Operations Research, Kantiswarup, P.K. Gupta, Man Mohan Sultan Chand & Sons Educational Publishers New Delhi (2007).

Unit IV: Chapter 2 (Sec 2.1 - 2.4) & Chapter 3 (Sec 3.1, 3.2) & Chapter 4 (Sec 4.3, 4.4)

Unit V: Chapter: 10(Sec 10.1, 10.2, 10.8, 10.9, 10.10, 10.12, 10.13) & Chapter 11 (Sect 11.1, 11.2, 11.3, 11.7)

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
II	RR2ACSM2	Integral Calculus, Vector Calculus, Laplace Transforms and Fourier Series (Allied Paper For Computer Science Major)	4	4	English

UNIT 1: Definite integrals: Properties – problems - Integration by parts – problems. Multiple integrals: Double integrals – Simple problems (Change the order of integration excluded) – Triple integrals - Simple problems.

UNIT II: Vector differentiation: Velocity and acceleration - Vector and scalar fields – Gradient of a vector- Directional derivative – divergence and curl of a vector - Solenoidal and Irrotational vectors.

UNIT III: Gauss Divergence Theorem – Stoke's Theorem - Simple problems - Verification of the above theorems (Proof excluded).

UNIT IV: Laplace Transforms: Properties – Simple problems - Inverse Laplace Transforms- Problems –Solution of Ordinary Differential Equations using Laplace Transforms.

UNIT V: Fourier series- Definition - Fourier series expansion of periodic functions with Period 2π – Use of Odd and Even functions in Fourier Series. Half range Fourier Cosine Series – Definition and problems – Half range Fourier Sine series – definition and problems.

Text Books

1. Calculus (Volume II), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2006).

Unit I: Chapter 2 (Sec 11, 12) & Chapter 5 (Sec 1, 2.1, 2.2, 4)

2. Vector Algebra and Analysis, S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD.

Unit II: Chapter 4 (Sec 1, 2, 6 – 10)

Unit III: Chapter 6 (Sec 6, 9)

3. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2004).

Unit IV: Chapter 5 (Sec 1, 2, 4 - 9)

Unit V: Chapter 6 (Sec 1 - 5)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Signature of the HOD

(For Students admitted from 2015-2016 onwards)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Semester	Subject Code	Title of the Paper	Hours/ Week	No. of Credits	Medium of Instruction
I & II	RR2ACSM3	Probability and Statistics (Allied Paper For Computer Science Major)	3	4	English

UNIT I: Probability - Definition – Sample space – Independent Events – Addition theorem – Conditional Probability – Multiplication theorem – Baye’s theorem – Simple problems.

UNIT II: Random Variables – Distribution functions – Probability Mass Function – Probability density function – Two dimensional random variables – Simple problems.

UNIT III: Mathematical Expectation – Simple problems – Moment generating functions – Simple problems.

UNIT IV: Binomial Distribution – Mean and Variance – Moment generating function – Poisson Distribution – Mean and Variance – Moment generating function – Limiting case of Binomial Distribution – Normal Distribution – Mean and Variance – Moment generating function.

UNIT V: Correlating and Regression- Properties – Rank correlation – Regression Lines – Properties – Simple problems.

Text Book

Fundamentals of Mathematics Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand, Eleventh Edition (2010).

Unit I: Chapter 3 (Sec 3.8 – 3.13)

Unit II: Chapter 5 (Sec 5.1 - 5.5)

Unit III: Chapter 6 (Sec 6.1 – 6.6) & Chapter 7 (Sec 7.1)

Unit IV: Chapter 8 (Sec 8.4.1, 8.4.6, 8.4.7, 8.5, 8.5.2, 8.5.5) & Chapter 9 (Sec 9.2.5)

Unit V: Chapter 10 (Sec 10.4, 10.7) & Chapter 11 (Sec 11.2, 11.2.1, 11.2.2, 11.2.3)

Question Paper Pattern

Maximum Marks: 75

Examination Duration : 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/Or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)

Signature of the HOD