

Modified Syllabus

Placed at the Special Meeting
of the Academic Council
held on 25.06.2008

APPENDIX - BE

MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)

CHOICE BASED CREDIT SYSTEM

B.Sc. Mathematics (Semester)

REGULATIONS AND SYLLABUS

(This will come into force from the academic year 2008-2009)

1. QUALIFICATION FOR ADMISSION

Candidate should have passed the Higher secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other Examination accepted by syndicate, as equivalent thereto, with Mathematics as one of the subjects in Higher Secondary Education.

2. DURATION OF THE COURSE

The students shall undergo the prescribed course of study for a period of three academic years (six semesters)

3. MEDIUM OF INSTRUCTION

English/Tamil

4. SUBJECT OF STUDY

Part 1: Tamil / Arabic...

Part 2: English

Part 3: Core Subjects - Mathematics

Allied Subjects and Electives

Part 4: Skill Based Subjects, Environmental Studies and Value Education.

(The subjects offered are given in Annexure - I)

5. STRUCTURE OF THE QUESTION PAPER

The Internal and External marks should be allotted as 25:75. The Question paper will have three parts.

125


PRINCIPAL

Arulmigu Palaniendavar College
of Arts & Culture,
PALANI - 624 601

Section A: (10*1= 10)

Question No.1 to 10 (it can be True or False. Fill in the blanks and Multiple Choices).

Section B: (5*7= 35)

Answer all question choosing either (a) or (b)

Answers not exceeding two pages.

- (one question from each unit) 11(a) or 11(b)
12(a) or 12(b)
13(a) or 13(b)
14(a) or 14(b)
15(a) or 15(b)

Section C: (3*10= 30)

Answer any three out of five(one question from each unit)

Questions 16 – 20

1. The pattern for internal valuation may be: two tests – 15 marks each: average 15 marks.
2. Group Discussion / Seminar / Quiz – 5 marks
3. 2 Assignments: 5 mark each : average 5 marks
4. First Internal Assessment will be conducted in between 30th and 40th working days. Second test will be conducted in between 70th and 80th working days.

6. ELIGIBILITY FOR THE DEGREE

i) No candidate will be eligible for degree with out completing the prescribed courses of study, lab work etc., and passing all the prescribed external examinations.

ii) Attendance, progress and conduct certification from the head of the department will be required for the students to write the examination.

iii) The passing minimum is 35% (External: 23/ 75 and No minimum for Internal)

7. TRANSITORY PROVISION

Students joined in 2007- 2008 or earlier may be permitted to write their examinations in the old pattern up to April 2013.

Annexure 1 - Subjects of Study in B.Sc. Mathematics

Semester	Parts	Subjects	No. of Course	Hours/week	Credit	Max Marks
I	I	Tamil Paper I	1	6	3	100
	II	English Paper I	1	6	3	100
	III Core Subject	Calculus	1	6	4	100
	Allied Subject I	Physics I	1	6	4	100
	IV Skill Based Subjects	1) MS Office	1	2	2	100
		2) Arithmetic Ability	1	2	2	100
	Non Major Elective I	Fundamentals of Mathematics	1	2	2	100
TOTAL			7	30	20	700
II	I	Tamil Paper II	1	6	3	100
	II	English Paper II	1	6	3	100
	III Core Subject	Theory of Equations and trigonometry	1	6	5	100
	Allied Subject I	Physics - II	2	6	5	100+100(P)
	IV Skill Based Subjects	1) DBMS	1	2	2	100
		2) Astronomy	1	2	2	100
	Non major Elective II	Statistics and Operations Research	1	2	2	100
TOTAL			8	30	22	800
III	I	Tamil Paper III	1	6	3	100
	II	English Paper III	1	6	3	100
	III Core Subject	Mechanics	1	6	5	100
	Allied Subject I	Physics - III	1	6	4	100
	Allied Subject II	Applications of Mathematics I	1	6	5	100
			Programming in C (without practicals)			
TOTAL			5	30	20	500

(P.T.O)

Semester	Parts	Subjects	No. of Course	Hours/week	Credit	Max Marks
IV	I	Tamil Paper IV	1	6	3	100
	II	English Paper IV	1	6	3	100
	III Core Subject	3D and Vector Calculus	1	3	5	100
	Allied Subject I	Physics - IV	2	6	5	100+100(P)
	Allied Subject II	Applications of Mathematics II Programming in C++ with practicals	2	6	5	100+100(P)
		TOTAL	7	30	21	700
V	III Core Subject	1. Real Analysis	1	5	5	100
		2. Numerical Analysis	1	5	5	100
		3. Differential equation and Laplace Transform	1	5	5	100
		4. Modern Algebra	1	5	5	100
	Allied Subject II	Applications of Mathematics III Statistics-I	1	6	4	100
	IV Skill Based Subject	Applications of Differential Equations Environmental Studies	1 1	2 2	2 2	100 100
		TOTAL	7	30	28	700
VI	III Core Subject	1. Complex Analysis	1	5	5	100
		2. Graph Theory and Lattices Theory	1	5	5	100
		3. Operations Research	1	5	5	100
		4. Linear Algebra	1	5	5	100
	Allied Subject II	Applications of Mathematics IV Statistics-II	1	6	4	100
	IV Skill Based Subject	Mathematical Modeling Value Education	1 1	2 2	2 2	100 100
		Extension Activities	1	1	1	100
		TOTAL	8	30	29	800

SYLLABUS

(Semester - I)

CORE SUBJECTS

CALCULUS

UNIT-1: Successive Differentiation- Expansion of functions-Leibnitz-Formula-Maxima and Minima of functions of two variables.

UNIT-2: Sub tangent and Subnormal- Polar Co-ordinates- Angle between the radius vector and the tangent - slope of the tangent -Angle of intersection of two curves-Polar sub tangent and Polar subnormal-length of arc.

UNIT-3: Envelopes-Curvatures-Circle, radius and centre of curvature-Evolutes

UNIT-4 Polar-co-ordinates-Radius of curvature in Polar Co-ordinates-p-r equation- pedal equation of curves-Definite Integrals and their properties

UNIT-5: Reduction Formulae for $\sin^n x \cos^n x, \tan^n x, \operatorname{cosec}^n x, \sin^n x \cos^m x$ -Bernoulli's formula- double and triple integral problems(changing the order of integration is excluded).

Text Book:
Calculus Volume I & II by T.K.Manicavasagam pillay & S.Narayanan.
Publications: S.Viswanathan. 1996.

SKILL BASED SUBJECT

M.S.OFFICE

UNIT-1:

MS-Word Introduction-Word for Windows- Creating and Saving documents- Page setup- Print preview, Print, Edit- redo, cut, copy, paste, find and replace.

UNIT-2:

Views- Normal, Print layout, Ruler, Header and Footer. Insert – Page no, Picture, Text box, Word Art. Format fonts (size, colour, type). Bulleted numbering, border and shading. Columns and Change cases.

UNIT-3:

Tools- Spelling and Grammar mail merge. Table- draw insert, delete, select, split columns and rows.

UNIT-4:

Explanation for an Excel Page(rows, columns and cells) Entering data, usage of formulae and functions.

UNIT-5:

Creating an Excel chart, Data Manipulation and Types of Functions.

Text Book : " M.S.OFFICE" by C.Nellaikannan , Nels Publications, 3rd edition, 2004

ARITHMETIC ABILITY

UNIT-1:
Problems on numbers.

UNIT-2:
Problems on Ages.

UNIT-3:
Ratio and Pro- portion.

UNIT-4:
Time and Distance.

UNIT-5:
Permutations and Combinations.

Text Book: "Quantitative Aptitude for Competitive Examinations" by R.S.Agarwal.
Revised and Enlarged edition. S.Chand Publications, New Delhi, Reprint 2007.
Chapters:7,8,12,17 and 30.

Theory of Equations and Trigonometry

UNIT-1: Theory of Equations-Imaginary roots-Rational roots-Relation between the roots and co-efficients-Symmetric functions of the the roots

UNIT-2: Sum of the powers of the roots of an equation-Newton's Theorem-Transformations of equations -Roots multiplied by a given number-Reciprocal roots-Reciprocal equations-Standard forms to increase and decrease the roots of a given equation by a given quantity

UNIT-3: Removal of terms-Descartes' rule of sign-Roll's Theorem-Multiple roots-Sturm's theorem- General solution of cubic equations-Cardon's method.

UNIT-4: Ferrari's method of solving biquadratic equation—Expansions of $\sin^n x, \cos^n x, \tan^n x, \sin^n x \cdot \cos^n x$.

UNIT-5: Hyperbolic functions-Inverse Hyperbolic functions-Logarithm of Complex numbers-Gregory Series

Text Books:

1. Algebra Vol I & II T.K.M.Pillay & S.Narayan
 2. Trigonometry By T.K.M.pillay & S.Narayanan
- Publications: S.Viswanathan, 11th edition. Reprint 2006.

SKILL BASED SUBJECT

DATA BASE MANAGEMENT SYSTEM

UNIT-1:

Data base Definition - Use of a Data base- Data Definition Language ---Data Manipulation Languages.

UNIT-2:

Database Models – Relational , Hierarchical, Network and its Comparison.

UNIT-3:

Building a Database -- Creating, Opening, Database entering data and Retrieving Database Records.

UNIT-4:

Editing and Modifying Databases.

UNIT-5:

File Maintenance and Performance.

Text Book: "Computer Today" by Suresh K. Basandra. Galgotia Publishing Pvt Ltd, 1995. Chapter 9.

II semester

Skill Based Subject

Astronomy

Unit 1. Define- sphere- Great circles and small circles- Axis and poles of a circle, Distance between two points on a sphere- angle between two circles- Secondaries – Angular radius or spherical radius- Theorems i) The points of intersection of two great circles are the poles of the great circle joining their poles (Statement only) ii) The angle between two great circles is the angle between the tangents to the circles at a point of intersection (without proof) iii) The length of an arc of a small circle is equal to the corresponding arc on the parallel great circle multiplied by the sine of its spherical radius (without proof). Definition- Spherical Triangles – Polar triangles- If A'B'C' is the polar triangle of ABC then ABC is the polar triangle of A'B'C' (with proof) – Relations between the elements of a spherical triangle and its polar triangle (without proof)- properties of spherical triangles (without proof)- colunar and antipodal triangles - Relations between the sides and angles of a spherical triangle (without proof)

Unit II Five parts formula – Functions of half an angle – Functions of half a side (without proof) – Delambre's analogies and Napier's analogies with proof – Right angles spherical triangle – Napier's rules – Spherical co-ordinates – Relations between spherical and rectangular co- ordinates(without proof) – Simple problems.

Unit III Celestial co-ordinates – Horizontal system Equatorial system – Meridian system – Ecliptic system – Different systems of co-ordinate in the same figure – conversion of co-ordinate – Relation between right ascension and Longitude of the sun – Trace the changes in the sun in the course of a year – Find the Longitude of the sun on the day – simple problems.

Unit IV. Sidereal Time.

Unit V. Zones of Earth – Dip of Horizon – simple problems

Text Book. Astronomy by S. Kumaravelu & Susila Kumaravelu – 1996.Reprint 2006
Unit I Chapter 1. 1, 3to8, 9to11 (with out proof) 13 to 15, 16 to 17 (with out proof),

19, 20 (with out proof)

Unit. II Chapter 1. 25 to 27 (with out proof) 28.to30, 31 (with out proof) 32, 33, 34.

Unit III Chapter 2 60 to 68 simple problems

Unit IV Chapter 2. 69 to 79 simple problems

Unit. V. Chapter 3 87 to 90, simple problems, 106 to 109, simple problems.

SEMESTER-III

Statics

UNIT-1:

Forces acting at a point - Resultant and Components - Parallelogram law of forces - Triangle law of forces - converse of triangle law of forces- Lami's theorem

UNIT-2:

Resolution of a force - theorems of resolved parts - Resultant of any number of coplanar forces - Condition of equilibrium

UNIT-3:

Parallel forces - Resultant of two like and unlike parallel forces- Moment of a force - Varignon's theorem

UNIT-4:

Three forces acting on a rigid body.

UNIT-5:

Friction.

Text Book: Statics by M.K. Venkataraman.

Publications: Agasthiyar. 11th edition, July 2002.

Dynamics

UNIT-1:

Projectiles-Path of a Projectile-Maximum height-time taken by a particle- Time of Flight-Horizontal Range-simple problems.

UNIT-2:

Range on a inclined plane Impact- Laws of Impact - Impact in a fixed plane.

UNIT-3:

Direct and Oblique impact.

UNIT-4:

Simple Harmonic Motions-Equation of motion-composition of two S.H.M's.

UNIT-5:

Central orbits-Components of velocities and accelerations along and perpendicular to radius vector-Differential equation of a central orbit-Pedal equations.

Text Book: Dynamics by M.K. Venkataraman

Publications: Agasthiyar. 11th edition, Feb 2004.

III SEMESTER - Programming in C

Unit 1:

Overview of C: History of C-Importance of C-Basic structure of C-Programming style-Constants, Variables and Data types-declaration of variables, storage class-defining symbolic constants-declaring a variable as constant, volatile-overflow and underflow of data. Operators and expressions: arithmetic; relational, logical, assignment operators-increment and decrement operators-conditional operators, bitwise operators, special operators-arithmetic expression-evaluation of expressions-precedence of arithmetic operators-type conversion in expression-operator precedence and associativity-mathematical functions-managing I/O operations: reading and writing a character-formatted input, output.

Unit 2:

Decision making and branching: if statement, if...else statement-nesting of if...else statement- else if ladder- switch statement- the ?: operator-goto statement-the while statement- do statement- the for statement- jumps in loops.

Unit 3:

Arrays: one dimensional array- declaration, initialization- two dimensional array-multi dimensional array-dynamic arrays-initializations. Strings: declaration, initialization of string variables-reading and writing string-arithmetic operations on strings- putting strings together-comparison-string handling function- table of strings-features of string.

Unit 4:

User defined functions: need-multi function program-elements of user defined function-definition-return values and their types-function calls, declaration, category-all types of arguments and return values-nesting of functions-recursion-passing arrays, strings to functions-scope visibility and life time of variables-multi file programs. Structures and Unions: defining a structure-declaring structure variables-accessing structure members-initialization-copying and comparing-operations on individual members-arrays of structures-arrays within structures-structures within structures-structures and functions-unions-size of structures-bit fields.

SEMESTER – IV

Three dimension Analytical geometry and Vector Calculus

UNIT-1:

The plane-Angle between two planes—Length of perpendicular-Bisecting plane-Distance between two planes.

UNIT-2:

The straight line-symmetric form-Image of a point-Image of a line about a plane-The plane and the straight line-Angle between a plane and straight line.

UNIT-3:

Coplanar lines-Shortest distance between two lines-Skew lines.

UNIT-4:

The sphere-Equation of the sphere-Equation of the tangent plane -simple problems.

UNIT-5:

Vector Differentiation.Gradient-divergence-Curl-properties-vector Integration-Line integrals.

Text Book:

Analytical geometry of 3 dimensions and Vector Calculus by Dr. S. Arumugam.
Publications: New Gamma, Reprint 2006.

SEMESTER-V
Real Analysis

UNIT-1:

Sequences-Definitions and examples-Convergent and divergent sequences-Cauchy sequences(definitions only)Introduction of countable and uncountable sets-Holder's and Minkowski's inequalities-Metric space-Definition and examples.

UNIT-2:

Open sets and closed sets(definition and examples only)-Completeness-definition and examples-Cantor's intersection theorem and Baire's category theorem.

UNIT-3:

Continuity-Definition and Examples-Homeomorphism (Discontinuous functions on \mathbb{R} are not included)

UNIT-4:

Connected -Definition and examples-Connected subsets of \mathbb{R} -Connectedness and Continuity-Intermediate value theorem

UNIT-5:

Compactness -Definition and examples-Compact Subsets of \mathbb{R} -Equivalent characterization of Compactness.

Text Book:

Real Analysis by Dr.S.Arumugam
Publications: New Gamma, 2005.

Numerical Analysis

UNIT-1:

Numerical solutions of Algebraic and Transcendental equations-Iteration method-Newton-Method of false positions- Solutions of Simultaneous linear equations- Gauss method-Gauss' Jordan method-Iteration method- Gauss method.

UNIT-2:

Finite differences-forward difference and backward differences-Finite differences-Operators-Relations-Properties-Finding missing terms-Inverse operators-Factorial Notation.

UNIT-3:

Interpolation and Newton's forward and Backward formulae –divided differences and properties –Newton's divided difference formula –Gauss formula-Stirling formula-Bessel formula-Laplace Everret's formula-Lagrange formula-simple problems-Inverse interpolation using Lagrange formulation.

UNIT-4:

Numerical differentiation-Finding the first and second derivatives –Maximum and minimum values of a function for a given data

UNIT-5:

Numerical Integration –Newton's Cote's formula-Trapezoidal rule-Simpson's one third rule-Simpson's three eight rule-Weddle's rule.

Text Book:

Numerical Analysis by Dr.S.Arumugam, ThangaPandi Isaac and A.Somasundaram
Publications: New Gamma, 2006.

Differential Equation and Laplace Transform

UNIT-1:

Exact differential equations-Equations of the first order but of higher degree- Equations solvable for y -Equations solvable for x and p -Clairaut's form-Equations that do not contain x, y explicitly-Equation homogeneous in x and y -Linear equation with constant Coefficients.

UNIT-2:

Linear equation with variable coefficients-Equations reducible to the linear homogeneous equations-Simultaneous linear differential equations.

UNIT-3:

Linear equation of the second order- Reduction of the normal form -Removing the first derivative method-variation of parameters.

UNIT-4:

Partial differential equations of the first order-derivations of partial differential equation-Lagrange's method of solving the linear equation-Standard forms- Equations reducible to the standard forms.

UNIT-5:

Laplace Transforms-Theorems-Problems-Evaluation of integrals - inverse Laplace Transforms-Results-Solving ordinary differential equation with constant coefficient and variable coefficients-Simultaneous linear equations using Laplace Transforms
Text Book: "Calculus" Volume 2 by T.K. Manicka Vasagam Pillai and S. Narayanan.

Publications: S. Viswanathan. 1996.

Modern Algebra

UNIT-1:

Relations-Types of Relations-Functions-Binary Operations-Peano's postulates-principle of induction-Simple problems-Law of Trichotomy.

UNIT-2:

Subgroups – Definitions and examples – Center – Normalizer – Intersection and Union of Subgroups – Permutations – Cycles and Transpositions – Even and odd permutations – S_n and A_n – Cycle groups – Definition and examples – Cyclic groups are abelian – A group is cyclic if its order is equal to the order of one of its elements – Subgroups of cyclic groups are cyclic – Theorems on the number of generator of cyclic groups.

UNIT – 3:

Costs and their properties – Congruence relation modulo a subgroup – Lagrange's theorem and its consequences – The order of an element of a finite group divides the order of the group. A group of prime order is cyclic – A group has no proper subgroup if it is a cyclic group of prime order – Euler's theorem – Fermat's theorem. Normal subgroups – Equivalent conditions for a subgroup to be normal – Any subgroup of an abelian group is normal – A subgroup of index 2 is normal – Intersection of two normal subgroups – Intersection of a subgroup and a normal subgroup. If a subgroup has exactly one subgroup of given order then it is normal – Quotient group

UNIT – 4:

Homomorphism – Types of homomorphisms – Homomorphism with reference to identity – Inverse and order of an element – its properties – Kernel of homomorphism – Homomorphic image of an abelian group is abelian – and that of a cyclic group is cyclic – Isomorphism – Isomorphism is an equivalence relation among groups – Any infinite cyclic group is isomorphic to the group of integers – Any finite cyclic group of order n is isomorphic to Z_n .

UNIT – 5:

Cayley's theorem – The fundamental theorem of homomorphism – Rings – Definitions and examples – Elementary properties.

Text Book:

Modern Algebra by Dr.S.Arumugam

Publications: Sci Tech, 2006.

Statistics-I

UNIT-1: Measures of averages-Measures of dispersion-Skewness based on Moments.

UNIT-2: Correlation and Regression-Rank Correlation coefficient.

UNIT-3: Index Numbers and Time Series.

UNIT-4: Curve fitting(All types of curves)

UNIT-5: Theory of Attributes

Text Book::

Statistics by S.Arumugam
Publications: Sci Tech, 2006.

SKILL BASED SUBJECT

APPLICATIONS OF DIFFERENTIAL EQUATIONS

UNIT-1: Growth, decay and Chemical reaction

UNIT-2: Falling bodies and Brachistocrone

UNIT-3: Simple Electric Circuits, Dynamical Problems with Variable Mass.

UNIT-4: Kepler's Laws- Newton's Laws of Gravitation.

UNIT-5: Simple pendulum.

Text Book: Differential Equation and its Applications by T.K.Manicka Vasagam Pillai and S.Narayanan, Publications: S.Viswanathan, 1996.

SEMESTER - VI
Complex Analysis

UNIT-1:

Analytic function-C.R- equations-Sufficient conditions-Harmonic Functions.

UNIT-2:

Elementary Transformation-Bilinear Transformation-Cross ratio-fixed points-Special Bilinear Transformation-Real axis to real axis-Unit circle to unit circle and real axis to unit circle only

UNIT-3:

Cauchy's Fundamental theorem-Cauchy's integral formulæ and formulæ for derivatives-Morera's theorem-Cauchy's inequality-Liouville's theorem-Fundamental theorem of algebra

UNIT-4:

Taylor's theorem. Laurent's theorem-singular points-Poles-Argument principle-Rouche's theorem.

UNIT-5:

Calculus of residues-Evaluation of Definite integral

Text Book:

Complex Analysis by Dr.S.Arumugam, ThangaPandi Isaac and A.Somasundaram.
Publications: Sci Tech, Jan 2003.

VI SEMESTER – GRAPH THEORY

UNIT I :

Graphs – Degrees – Subgraphs, Isomorphism, Ramsey Numbers – Independent sets and Coverings – Intersection Graphs and line Graphs – Matrices of Graphs – Operation on Graphs.

UNIT II :

Degree sequences – Graphic Sequences - Walks, Trails, and Paths – Connectedness and Components – Blocks – Connectivity – Eulerian Graphs – Hamiltonian Graphs.

UNIT III :

Trees – Characterization of Trees – Centre of a Tree – Matchings – Matchings in Bipartite Graphs.

UNIT IV :

Planar Graphs and Properties – Characterization of Planar Graphs – Thickness – Crossing Numbers and Outer Planarity – Chromatic number and Chromatic index – Five colour Theorem and Four colour theorem.

UNIT V :

Chromatic Polynomials – Definition – Basic Properties of Digraphs – Paths and Connectedness in Digraphs – Matrices associated with Digraphs – Tournaments.

TEXT BOOK ;

S. Arumugam and S. Ramachandran, Invitation to Graph Theory, Scitech Publication, 7/3C, Madley Road, T. Nagar, Chennai 600 017.

Operations Research

UNIT-1:

Linear Programming Problem-Formulation of L.P.P.-Mathematical form -- Solution by 1.Graphical Method 2.The simplex method 3.Method of penalty 4.Two phase method.

UNIT-2:

Duality-Dual Simplex Method

UNIT-3:

Transportation problem-Mathematical form-Initial solutions by all methods-MODI method for both balanced and un balanced T.P.-The assignment problems.

UNIT-4:

Games theory-Two person zero sum game-saddle point- Game with saddle point-solution of game by using formula, graphical method, method of dominance and L.P.P. method

UNIT-5:

Sequencing -Replacement problem-Queuing Theory-Queuing system-elements of queuing system-classification of queuing models-poisson queuing system-Model I(M/M/I- FIFO)and Model II(M/M/I-N/FIFO)-simple problems

Text Book: Operations Research by Kanti Swarup and Man Mohan Publications: Sultan Chand, New Delhi, 2004.

Linear Algebra

UNIT-1: Vectorspaces-DefinitionandExamples-Subspaces-I.linearTransformation-
Fundamental theorem of Homomorphism.

UNIT-2: Span of a set-Linear independence – Basis and Dimension-Rank and Nullity-
Matrix and Linear Transformation.

UNIT-3: Inner product space- Definition and examples- Orthogonality- Orthogonal
Complement.

UNIT-4: Matrices- Elementarytransformation - inverse-Rank - Test for consistency -
Solving linear equations- Cayley's Hamilton's theorem-Eigen values and Eigen vectors.

UNIT-5: Bilinear forms-Matrix of a bilinear form-Quadratic-forms- Reduction to quadratic
forms.

Text Book:

Modern Algebra by Dr.S.Arumugam
Publications: Sci Tech, 2006.

Statistics-II

UNIT-1:

Theory of Probability-Sample space-Probability function-Laws of Addition-Boole's inequality-law of multiplication-Problems-Bayes's theorem-problems.

UNIT-2

Random variables-Distribution function-Discrete and Continuous random variables-Probability density function-Mathematical Expectation (one dimension only)

UNIT-3:

Moment generating function-Cumulants-Theoretical distributions-Binomial Poisson-Normal

UNIT-4:

Tests of significance of Large Samples

UNIT-5:

Tests of significance of Small samples-t-F-chi-square.

Text Book :

Statistics by Dr.S.Arumugam
Publications: Sci Tech, 2006.

VI SEMESTER – MATHEMATICAL MODELING

UNIT I :

Simple situations requiring mathematical modeling – The technique of mathematical modeling – Classification of Mathematical models – Some Characteristics of Mathematical models – Limitations of Mathematical modeling.

UNIT II :

Mathematical Modeling through Geometry - Mathematical Modeling through Algebra - Mathematical Modeling through Trigonometry - Mathematical Modeling through Calculus.

UNIT III :

Mathematical Modeling through Differential Equations – Linear Growth and Decay Models – Non-linear Growth and Decay models.

UNIT IV :

Situations that can be modeled through Graphs – Mathematical models in terms of Directed Graphs.

UNIT V :

Mathematical models in terms of Signed Graphs – Mathematical models in terms of Weighted Digraphs – Mathematical modeling in terms of Unoriented Graphs.

TEX BOOK: J. N. Kapur, Mathematical Modeling, Wiley Eastern Limited.

UNIT I : Chapter 1 – 1.1 to 1.4, 1.9.

UNIT II : Chapter 1 – 1.5 to 1.8.

UNIT III : Chapter 2 – 2.1 to 2.3.

UNIT IV : Chapter 7 – 7.1, 7.2.

UNIT V : Chapter 7 - 7.3 to 7.5.

**For B.Sc., Physics, Chemistry Major
Ancillary Mathematics**

I Semester : Instead of 1 paper with 4 credits under the title "Mathematics I" the same paper is given under the same title and Ancillary paper – I 3 credits

II Semester : Instead of 1 paper with 5 credits under the title : Mathematics –II two papers under the title

Ancillary paper-II
Ancillary paper - III

Each 3 credits each are given with the following syllabus.

SEM II Ancillary paper II credits 3

Unit 1 : Vector – Velocity – Acceleration, Vector differentiation – Gradient – Divergence – Curl and their Properties.

Unit 2 : Directional derivatives, Solenoidal – Irrotational Vectors

Unit 3 : Line integrals

Unit 4 : Matrices – consistency of equation

Unit 5 : Eigen values and Eigen Vectors

Text Book : Ancillary Mathematics Vol. II. Dr. S. Arumugam, New Gamma Publications, Edition 2006.

SEM II Ancillary Paper III Credits 3

Unit 1 : Curve fitting – correlations

Unit 2 : Rank Correlations – Regression

Unit 3 : Lagranges and Newton's method – interpolation

Unit 4 : Attributes and Index numbers

Unit 5 : Fourier Series – Trigonometric Series – Even and Odd functions – Half Range Fourier Series

Text Book : Ancillary Mathematics Vol. II. Dr. S. Arumugam, New Gamma Publications, Edition 2006.

III Semester: Instead of existing paper Mathematics III the following paper Ancillary Paper IV with Contacts as "Operation Research" as in Mathematics IV in the existing 4th semester paper with credit 3.

IV Semester : Instead of existing one paper Mathematics IV (Credits 5) the following papers Ancillary paper V (Credits 3).

Ancillary Paper VI (Credits 3) with the following syllabus.

(P.T.O)

Semester IV - Ancillary Paper V (Credits 3)

Unit 1 : Exact differential equation - Second order differential equations.

Unit 2 : Second order equation with RHS x^n , e^{ax} , $\sin ax$, $\cos ax$, $e^{ax}\sin bx$, $e^{ax}\cos bx$ etc.

Unit 3 : Laplace Transforms - Solution of differential equation using Laplace Transforms

Unit 4 : Partial Differential equation - formation - Solution - Standard Form
 $Pp + Qq = R$

Unit 5 : Growth - Decay - Chemical Reaction - Simple Electric Circuits and Planetary Motion

Text Book : Ancillary Mathematics Vol. III. Dr. S. Arumugam, New Gamma Publications, Edition 2006.

Semester IV - Ancillary Paper VI (Credits 3)

Unit 1 : Analytic Functions - Properties

Unit 2 : $C = R$ equations - Bilinear Transformations - Cross Ratio

Unit 3 : Groups - Abelian Groups - Sub Groups

Unit 4 : Permutation Groups including theorems

Unit 5 : Homomorphisms - Isomorphisms - Cyclic Groups

Text Book : Ancillary Mathematics Vol. III. Dr. S. Arumugam, New Gamma Publications, Edition 2006.

Placed at the Special Meeting
of the Academic Council
held on 25.06.208

APPENDIX - BG

MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)

Syllabus for all U.G. Courses in Fifth semester

Environmental Studies

A) Objectives:

To understand that Earth is the only planet so far identified with its unique characteristics supporting life- with abundant resources which can fulfill the needs but not the greeds of human beings.

To understand that living and non living things are interlinked from micro to macro level as an unbroken chain from sun to soil.

To understand that life is diverse and diversity makes the life successful, joyful, and beneficial and that destroying diversity is destroying humanity.

To understand that the exploitative human activity is polluting the environment locally and globally which needs attention and urgent action.

To understand that man has to live and progress till the earth survives and hence needs sustainable development to hand over to successive generations.

To prepare the individual and the society to face and escape from natural and man made disasters with scientific management and societal involvement.

Plan of Teaching and Evaluation:

Allotted hours: Total 30 hours, 25 hours may be allotted for theory and 5 hours for field study/Report writing/Internal Assessment.

Evaluation: Total		-100 Marks
External:		- 75 Marks
Internal:	Field Trip and Report/Case Study and Report	- 10 Marks
	Continuous Assessment Test	- 5 Marks
	Seminar/GD/Quiz	- 5 Marks
	Assignment(s)	- 5 Marks

B) Syllabus

UNIT-1: Earth and its Environment

- a) Earth-Formation and Evolution of Earth over time - Structure of Earth and its components: Atmosphere, Lithosphere, Hydrosphere and Biosphere
- b) Resources-Renewable and Non renewable resources.

UNIT-2: Ecology and Ecosystem concepts

- a) Ecology: definition – Ecosystem : Definition - Structure and function - Energy flow - Food Chain and Food web - one example for an ecosystem.
- b) Biogeochemical cycles - Nitrogen, Carbon, Phosphorous, Water.

UNIT-3: Biodiversity and India

- a) Introduction – Definition - Values of Biodiversity - Threats to Biodiversity - Conservation of biodiversity.
- b) Biodiversity of India - as a megadiversity nation - biogeographical distribution -Hot spots of biodiversity - National Biodiversity Conservation Board and its function.

UNIT-4: Pollution and Global Issues

- a) Definition, causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear pollution.
- b) Global issues: Global Warming and Ozone Layer Depletion.

Unit-5: Development and Disaster Management

- a) Sustainable Development - Sustainable Agriculture - Organic farming, Irrigation - Water harvesting and Waste recycling - Cyber waste and management.
- b) Disaster Management -. Flood and Drought - Earthquake and Tsunami - Landslides and Avalanches - Cyclones and Hurricanes - Precautions, Warnings Rescue and Rehabilitation.

References:

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2. Bharucha Rach, The Biodiversity of India, Publishing Pvt., Ltd., Ahmedabad - 380 013, India, Email: mapin@icenet.net ®
3. Brunner R.C., 1989, Hazardous Westel Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson, McGraw Hill Inc. 480p
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6. De. A.K., Environmental Chemistry, Wiley Eastern Ltd.,
7. Down to Earth, Centre for Science and Environmental (R)
8. Gleick, H.P. 1993, Water in crisis, Pacitif Institute for Studies in Dev., Environmental & Security. Stockholm Env. Institute Oxford Univ. Press 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai (R)
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11. Jadhav, H. & Bhosale, V.M. 1995 Environmental Protection and Laws, Himalaya Pub. House, Delhi 284p
12. Mckenney, M.L. & Schoel, R.M. 1996 Environmental Science System & Solutions, Web enhanced edition 639p
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr., Environmental Sciences, Wadsworth Publishing Co., (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology W.B. Saunders Co. USA, 574p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment Oxford & IBH Pub.; Co Pvt., Ltd., 345p.
17. Sharma B.K., 2001, Environmental Chemistry Goel Puibl. House, Meerut
18. Survey of the Environmental, The Hindu (M)
19. Townsend C., Harper J, and Michael Begon, Essentials of Econology, Blackwell Science (TB)
20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances an and Standards, Vol-I and II, Enviro. Media (R)
21. Trivedi R.K., and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB)
22. Wagner K.D., 1998 Environmental Management W.B. Sauders Co. Philadelphia, USA 499p

(M) Magazine

(R) Referece

(TB) Text Book



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Book-2

Dr. I. SINGARAM, M.A., (Soci.) M.A., (Pol.Sci.) M.Phil., Ph.D.,
Registrar

Palkalai Nagar
Madurai-625 021

Ref.No.2/ BOS/Maths (UG) 2008

6.11.2008

688

To

The Principals of affiliated colleges
offering B.Sc. Mathematics (semester) Course

Sir / Madam,

Sub: B.Sc. Mathematics and ancillary Mathematics (semester) course (Under
CBCS) revised syllabus – Modifications - intimated – reg.

I am to inform you that the Board of Studies in Mathematics (UG) has made some modifications in the revised syllabus for B.Sc. Mathematics (semester) and ancillary Mathematics (Semester) Under CBCS. These modifications come into immediate effect.

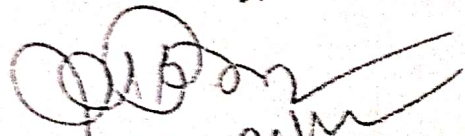
A copy of the modifications and scheme of examination for B.Sc. Mathematics is enclosed herewith for immediate adoption.

I request you to kindly incorporate the above corrections in the appropriate places in the revised syllabus of the above courses under CBCS.

I request you to kindly bring this to the notice of the staff and students of your college.

Kindly acknowledge the receipt.

Yours faithfully,


REGISTRAR
11/12
A. M.

B.Sc., Mathematics CBCS

- ❖ For B.Sc. Mathematics CBCS regarding I & II Semester there are no changes.
- ❖ III Semester :
In part III core subjects 2 papers Statics and Dynamics with $3+3=6$ credits is combined into single paper entitled Mechanics with 5 credits.
- ❖ Allied Subject-II "Statistics I" is renamed as Application of Mathematics I with Title: "Programming in C" credits 5 with existing syllabus (delete practical)
- ❖ IV Semester:
In part III Allied Subject-II "Statistics II" is renamed as Application of Mathematics II with Title: "Programming in C++ with practical with credits 5"
- ❖ V Semester :
In part III Allied Subject-II Programming in C with practical is renamed as Application of Mathematics III with Title : "Statistics I" with credits 4
- ❖ VI Semester :
In part III Allied Subject-II Programming in C++ with practicals is renamed as Application of Mathematics IV with Title: "Statistics II" with credits 4

Total Marks : 4400 reduced to 4200

Total Credits : 140



(26) 10th Dept. of Maths
MADURAI KAMARAJ UNIVERSITY
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Dr. I. SINGARAM, M.A., (Soci.) M.A., (Pol.Sci.) M.Phil., Ph.D.,
Registrar

9.1.2009

Ref.No.B-2/ BOS/ Maths.(UG)/09

BOOK - 4

To

The Principals of affiliated-colleges
offering B.Sc. Mathematics (semester) Course

Sir / Madam,

Sub: B.Sc. Mathematics (semester) course (Under CBCS) revised syllabus -
Modifications in the Skill Based Subject 'DBMS' - intimated - reg.

I am to inform you that the Board 'of Studies in Mathematics (UG) has made some modifications in the syllabus for the Skill Based Subject 'DBMS' from the II semester syllabus for B.Sc. Mathematics (semester) course under CBCS. These modifications come into immediate effect.

A copy of the modifications for B.Sc. Mathematics is enclosed herewith for immediate adoption.

I request you to kindly incorporate the above corrections in the appropriate places in the revised syllabus of the above course under CBCS.

I request you to kindly bring this to the notice of the staff and students of your college.

Kindly acknowledge the receipt.

Yours faithfully,

REGISTRAR

9.1.09 9.1.09

Copy to:
The Controller of Examinations
A.R. Confidential
Confidential section

Modified syllabus for

SKILL BASED SUBJECT 'DATA BASE MANAGEMENT SYSTEM' of

B.Sc MATHEMATICS (Semester) UNDER CBCS

UNIT I

Introduction → Traditional approach to information processing – Data Base approach to information processing – logical versus physical views of data storage.

UNIT II

Data Base – software – users – why data base? – Redundancy can be reduced – inconsistency can be avoided – Data can be shared – standards can be enforced – security restriction can be applied – Integrity can be maintained – conflicting requirements can be balanced – synchronization – data independence.

UNIT III

What is DBMS? – Elements of DBMS – Data Definition Language – Data Manipulation Language – utilities and ancillary software – How does a DBMS work? – data base models.

UNIT IV

Relational Data Base – Education Data Base example – Hierarchical Data Base – Network Data Base – comparison of models – Data Base Design – Applications.

UNIT V

Do I need a DBMS? – problems in a DBMS – Environment – selecting Data Base Software check list – feed back and review.

TEXT-BOOK

"Computer Today" by Suresh K Basandra, Galgotia Publishing Pvt Ltd, 1995, Chapter 9.



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Registrar

Palkalai Nagar
Madurai-625 021

Ref.No.1/BOS /Maths (UG)2009

22.4.2009

To

The Principals of affiliated colleges
offering B.Sc.Mathematics (semester) Course

Sir/Madam,

Sub: B.Sc. Mathematics (semester) course (Under CBCS) revised syllabus-
Modifications-intimated - reg

I am, by direction, to inform you that the Board of Studies in Mathematics (UG) has made the following modifications in the existing syllabi for B.Sc.Mathematics Semester(both CBCS and 2006-07syllabi).

1. For B.Sc. II semester the Skill Based Subject Astronomy in the CBCS syllabus has been modified.
2. For B.Sc.III semester the subject Programming in C in the CBCS syllabus has been modified.
3. For B.Sc.IV semester the subject Programming in C++ in the CBCS syllabus has been modified.
4. For B.Sc.III year students the syllabi for the subjects programming in C and Programming in C++ have been modified.
5. For B.Sc. students in CBCS the VI semester paper on Graph Theory and Lattices is renamed as Graph Theory and the syllabus has been modified accordingly.
6. For B.Sc.students in CBCS the VI semester paper on Mathematical Modelling the syllabus has been modified.

A copy of the modified syllabus for the above papers is enclosed herewith for adoption. These modifications will come into effect from the academic year 2009-10.

I request you to kindly bring this to the notice of the staff and students of your college.

Kindly acknowledge receipt.

Encl: as above.

Yours faithfully

REGISTRAR

Copy to:

II Semester

Skill Based Subject

Astronomy

Unit 1. Define- sphere- Great circles and small circles- Axis and poles of a circle, Distance between two points on a sphere- angle between two circles- Secondaries – Angular radius or spherical radius- Theorems i) The points of intersection of two great circles are the poles of the great circle joining their poles (Statement only) ii) The angle between two great circles is the angle between the tangents to the circles at a point of intersection (without proof) iii) The length of an arc of a small circle is equal to the corresponding arc on the parallel great circle multiplied by the sine of its spherical radius (without proof). Definition- Spherical Triangles – Polar triangles- If A'B'C' is the polar triangle of ABC then ABC is the polar triangle of A'B'C' (with proof) – Relations between the elements of a spherical triangle and its polar triangle (without proof) – properties of spherical triangles (without proof) – colunar and antipodal triangles – Relations between the sides and angles of a spherical triangle (without proof)

Unit II Five parts formula – Functions of half an angle – Functions of half a side (without proof) – Delambre's analogies and Napier's analogies with proof – Right angles spherical triangle – Napier's rules – Spherical co-ordinates – Relations between spherical and rectangular co- ordinates(without proof) – Simple problems.

Unit III Celestial co-ordinates – Horizontal system Equatorial system – Meridian system – Ecliptic system – Different systems of co-ordinate in the same figure – conversion of co-ordinate – Relation between right ascension and Longitude of the sun – Trace the changes in the sun in the course of a year – Find the Longitude of the sun on the day – simple problems.

Unit IV. Sidereal Time.

Unit V. Zones of Earth – Dip of Horizon – simple problems

Text Book. Astronomy by S. Kumaravelu & Susila Kumaravelu – 1996.Reprint 2006
Unit I Chapter 1. 1, 3to8, 9to11 (with out proof) 13 to 15, 16 to 17 (with out proof),

19, 20 (with out proof)

Unit. II Chapter 1. 25 to 27 (with out proof) 28.to30, 31 (with out proof) 32, 33, 34.

Unit III Chapter 2 60 to 68 simple problems

Unit IV Chapter 2. 69 to 79 simple problems

Unit. V. Chapter 3 87 to 90, simple problems, 106 to 109, simple problems.

III SEMESTER - Programming in C

Unit 1:

Overview of C: History of C-Importance of C-Basic structure of C-Programming style-Constants, Variables and Data types-declaration of variables, storage class-defining symbolic constants-declaring a variable as constant, volatile-overflow and underflow of data. Operators and expressions: arithmetic, relational, logical, assignment operators-increment and decrement operators-conditional operators, bitwise operators, special operators-arithmetic expression-evaluation of expressions-precedence of arithmetic operators-type conversion in expression-operator precedence and associativity-mathematical functions-managing I/O operations: reading and writing a character-formatted input, output.

Unit 2:

Decision making and branching: if statement, if...else statement-nesting of if...else statement- else if ladder- switch statement- the ?: operator-goto statement-the while statement- do statement- the for statement- jumps in loops.

Unit 3:

Arrays: one dimensional array- declaration, initialization- two dimensional array-multi dimensional array-dynamic arrays-initializations. Strings: declaration, initialization of string variables-reading and writing string-arithmetic operations on strings- putting strings together-comparison-string handling function- table of strings-features of string.

Unit 4:

User defined functions: need-multi function program-elements of user defined function-definition-return values and their types-function calls, declaration, category-all types of arguments and return values-nesting of functions-recursion-passing arrays, strings to functions-scope visibility and life time of variables-multi file programs. Structures and Unions: defining a structure-declaring structure variables-accessing structure members-initialization-copying and comparing-operations on individual members-arrays of structures-arrays within structures-structures within structures-structures and functions-unions-size of structures-bit fields.

Unit 5:

Pointers: accessing the address of a variable-declaring, initialization of pointer variables-accessing a variable through its pointers- chain of pointers and arrays-pointers and characters strings-simple programs. Files: defining, opening, closing a file. I/O operations on files-error handling during I/O operations-random access to file-command line arguments.

Text Book:

1. E.Balagurusamy, "Programming in ANSI C", Edition 3, Tata McGraw Hill Publishing Company, 2005.

Reference Book:

Programming with C (Schuman's outline series), Gottfried, Tata McGraw Hill.

IV SEMESTER - PROGRAMMING IN C++

UNIT I:

Principle of object oriented programming – software evolution – OOP paradigm – Basic concepts of OOP – object oriented languages – Application of OOP – Introduction to C++ - Tokens – keywords – Identifiers and Constants – basic data types – symbolic constants – type compatibility – Declaration – Scope resolution operator – Memory management operator – manipulators – type implicit conversions operators precedence and associativity – control structures.

UNIT II:

Functions in C++ - Main Functions – Function Prototyping – Call by reference – Return by reference – Inline function – Default arguments – Constant arguments – Function Overloading – Classes and Objects – Specifying a class – Defining Member Functions – Nesting of member functions – Arrays within a class – Static Data Members – Static Member Functions – Arrays of objects – Object as function Arguments - Friendly functions – Returning objects.

UNIT III :

Constructors – Parametrized Constructors – Multiple Constructors – Dynamic Initialization of Objects – Copy Constructor – Dynamic Constructors – Constructing Two dimensional arrays – Destructors – Defining Operator Overloading – Overloading Unary Operators, Binary Operators – Overloading Operators Using Friends – Manipulation of Strings using Operators – Rules – Types Conversion.

UNIT IV :

Inheritance – Single Inheritance – Multilevel, Multiple, Hierarchical Inheritances – Hybrid Inheritance – Virtual Base Classes – Abstract Class – Constructors in Derived Class – Nesting of Classes – Pointers to Objects – this Pointer – Pointers to Derived Class – Virtual Functions – Pure Virtual Functions.

UNIT V :

Managing Console I/O Operation – Unformatted and Formatted
Console I/O Operations – Managing Output with Manipulators – Working
with Files – Classes of File Stream Objects – Opening and Closing a file –
End of File Detections – File pointers and their manipulations. Error
Handling During File Operations – Command Line Arguments.

TEXT BOOK : E. BALAGURUSAMY, Object Oriented Programming with
C++, Tat McGraw Hill, New Delhi – Second Edition.

UNIT I : Chapter 1, 3.1- 3.5, 3.8 - 3.10, 3.14, 3.16, 3.18, 3.21, 3.23, 3.24.

UNIT II : Chapter 4.1, 4.9, 5.3 - 5.7, 5.11 - 5.16. .

UNIT III : Chapter 6.7.

UNIT IV : Chapter 8, 9.

UNIT V : Chapter 10, 11.1 – 11.6, 11.9 – 11.10.

VI SEMESTER – GRAPH THEORY

UNIT I :

Graphs – Degrees – Subgraphs, Isomorphism, Ramsey Numbers – Independent sets and Coverings – Intersection Graphs and line Graphs – Matrices of Graphs – Operation on Graphs.

UNIT II :

Degree sequences – Graphic Sequences - Walks, Trails, and Paths – Connectedness and Components – Blocks – Connectivity – Eulerian Graphs – Hamiltonian Graphs.

UNIT III :

Trees – Characterization of Trees – Centre of a Tree – Matchings – Matchings in Bipartite Graphs.

UNIT IV :

Planar Graphs and Properties – Characterization of Planar Graphs – Thickness – Crossing Numbers and Outer Planarity – Chromatic number and Chromatic index – Five colour Theorem and Four colour theorem.

UNIT V :

Chromatic Polynomials – Definition – Basic Properties of Digraphs – Paths and Connectedness in Digraphs – Matrices associated with Digraphs – Tournaments.

TEXT BOOK ;

S. Arumugam and S. Ramachandran, Invitation to Graph Theory, Scitech Publication, 7/3C, Madley Road, T. Nagar, Chennai 600 017.

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VI SEMESTER – MATHEMATICAL MODELING

UNIT I :

Simple situations requiring mathematical modeling – The technique of mathematical modeling – Classification of Mathematical models – Some Characteristics of Mathematical models – Limitations of Mathematical modeling.

UNIT II :

Mathematical Modeling through Geometry - Mathematical Modeling through Algebra - Mathematical Modeling through Trigonometry - Mathematical Modeling through Calculus.

UNIT III :

Mathematical Modeling through Differential Equations – Linear Growth and Decay Models – Non-linear Growth and Decay models.

UNIT IV :

Situations that can be modeled through Graphs – Mathematical models in terms of Directed Graphs.

UNIT V :

Mathematical models in terms of Signed Graphs – Mathematical models in terms of Weighted Digraphs – Mathematical modeling in terms of Unoriented Graphs.

TEX BOOK: J. N. Kapur, Mathematical Modeling, Wiley Eastern Limited.

UNIT I : Chapter 1 – 1.1 to 1.4, 1.9.

UNIT II : Chapter 1 – 1.5 to 1.8.

UNIT III : Chapter 2 – 2.1 to 2.3.

UNIT IV : Chapter 7 – 7.1, 7.2.

UNIT V : Chapter 7 - 7.3 to 7.5.

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(5)

VI SEMESTER – MATHEMATICAL MODELING

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UNIT III : Chapter 2 – 2.1 to 2.3.

UNIT IV : Chapter 7 – 7.1, 7.2.

UNIT V : Chapter 7 - 7.3 to 7.5.


PRINCIPAL
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of Arts & Culture,
PALANI - 624 601.