II - MATHS

B.Sc., ANCILLARY PHYSICS (SEMESTER) SYLLABUS

(With effect from 2009-2010)

THIRD SEMESTER

PAPER III

ELECTRICITY AND ELECTRONICS

UNIT I

Gauss law - proof - Applications - Field due to a charged sphere and an infinite plane sheet - Field near a charged conducting cylinder - Coulomb's theorem - Electric potential - Relation between potential and field - Capacitors - Expression for *C* of parallel plate, spherical (outer sphere earthed) and cylindrical capacitors - Energy of charged capacitor -Loss of energy due to sharing of charges.

UNIT II

Kirchoff's law - application of Wheatstone's network - sensitiveness of bridge - Carey Foster bridge - Measurement of resistance and temperature co-efficient of resistance - principle of potentiometer - Calibration of ammeter and voltmeter - low and high range - measurement of resistance using potentiometer.

UNIT III

Torque on a current loop - mirror galvanometer, dead beat and ballistic - current sensitiveness - voltage sensitiveness - B.G. theory - damping correction - experiments for charge sensitiveness - comparison of emf's and comparison of capacitors.

Electromotive force generated in a coil rotating in a uniform magnetic field - R.M.S and mean values - *LCR* circuit - impedance - Series and parallel resonant circuit - Power factor - Wattless current - Choke.

UNIT IV

Junction diodes - Forward and Reverse bias - Diode characteristics - Types of diodes - (LED and Zener) Bridge rectifier using diodes - Π filter - Transistors - Characteristics (CE mode

only) - Biasing and action of a single transistor (CE) amplifier Frequency response - Hartley oscillator - modulation (Qualitative study) - Op - amp and its characteristics - virtual earth - voltage amplifier in inverting mode - Op - amp as adder and subtractor.

UNIT - V

Binary number system - reason for using binary numbers - binary to decimal and decimal to binary conversions -addition and subtraction of binary numbers. Logic Circuits - Boolean algebra - De Morgan's theorem - OR, AND, NOT, NOR and NAND gates - NOR and NAND gates as universal buildings blocks - XOR gates.

Reference Books:

1.Solid state Electronics B.L.Theraja

2. Electricity and Magnetism Brijlal & N. Subramaniyam

I-MATHS

(iv)

B.Sc. ANCILLARY PHYSICS (SEMESTER) SYLLABUS
FIRST SEMESTER

Paper I

MECHANICS, PROPERTIES OF MATTER AND SOUND

UNIT - I

Forces in nature - Central forces - Gravitational and electromagnetic - Conservative and Non-conservative forces - Examples - Nuclear force - Friction - Angle of friction - Motion of bodies along an inclined plane - Work done by a force - Work done by a varying force - Expression for kinetic energy - Expression for potential energy - Power.

UNIT - II

Angular velocity - Normal acceleration (no derivation) - Centrifugal and Centripetal forces - Torque and angular acceleration - Work and power in rotational motion - Angular momentum - K.E. of rotation - Moment of inertia - Laws of parallel and perpendicular axes theorems - M.I. of circular ring. Circular disc, Solid sphere, hollow sphere and cylinder.

UNIT - III

Kepler's laws of planetary motion - Law of gravitation - Boy's method for G - Compound pendulum - Expression for period - Experiment to find g - Variation of g with latitude, altitude and depth - Artificial satellites.

UNIT - IV

Elastic moduli - Poisson's ratio - beams - Expression for bending moment - Determination of Young's modulus by uniform and non-uniform bending - I section girders. Torsion - Expression for Couple per unit twist - work done in twisting - Torsional pendulum - Derivation of Poiseuille's formula (analytical method) - Bernoulli's theorem - Proof; Applications - Venturimeter - Pitot tube.

UNIT - V

Simple harmonic motions - Progressive Waves, Properties - Composition of two S.H.M. and beats, Stationary Waves - Properties - Melde's experiments for the frequency of electrically maintained tuning fork - Transverse and longitudinal modes - Acoustics - Ultrasonics - Properties and application.

Reference Books:

1. Mechanics by D.S. Mathu
2. Properties of matter by Br S. Chand & Co.,
3. A Text Book of Sound by S. Chand & Co.,
4. Ancillary Physics by M. P
5. University Physics by Sea (Narosa Publishing House

Ancillary Physics Practic

Any 14 Experiments

1. Nonuniform bending - op
2. Uniform bending - pin an
3. Compound pendulum - D
4. Torsion Pendulum - deter
5. Thermal conductivity of
6. Melde's string - Frequen
7. Sonometer - verification
8. Calibration of Voltmeter
9. Calibration of ammeter -
10. Resistance and resistivity
11. Comparison of capacitan
12. Comparison of emf's - B
13. Carey Foster Bridge - res
14. Spectrometer - μ of pris
15. Comparison of co-efficie Viscometer
16. Co-efficient of viscosity

Each student should sub practical examination. The ma will be allotted as follows:

Practical record note (Internal)

Practical examinations : 80 m

Placed at the Meeting of the Academic Council held on 21.09.2012

APPENDIX - I

MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

CHOICE BASED CREDIT SYSTEM

B.Sc. Mathematics (Semester)

(Revised)

REGULATIONS AND SYLLABUS 2013-14

(This will come into force from the academic year 2012-2013)

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).

Xerox

3. **MEDIUM OF INSTRUCTION**

English/Tamil

4. **SUJECT OF STUDY**

Part 1: Tamil / Arabic…

Part 2: English

Part 3: Core Subjects – Mathematics

Allied Subjects and Electives

12 → Calculus
6 → Sequence
12 → Real Anal
13 → Numerical

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.

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 40% (External: 25 / 75 and No minimum for Internal)

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 Subjects	1.Calculus	1	6	4	100
	Allied Subject I	Physics I SPHBA11	1	6	4	100
	IV Skill based Subjects	1)Arithmetic Ability	1	2	2	100
		2) Sequences & Series	1	2	2	100
	Non Major Elective	Fundamentals of mathematics-I	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 Subjects	2.Theory of Equations &Trigonometry	1	6	5	100
	Allied Subject I	Physics II +Practical	2	6	4+1	100+100
	IV Skill based Subjects	3)Office Automation	1	2	2	100
		4) Ms Office Practical	1	2	2	100
	Non Major Elective	Fundamentals of Mathematics-II	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 Subjects	3.Mechanics	1	6	5	100
	Allied Subject I	Physics III 5PHBA31	1	6	4	100
	Allied Subject II	1.Programming in C	1	6	5	100
		Total	5	30	20	500
IV	I	Tamil Paper IV	1	6	3	100
	II	English Paper IV	1	6	3	100
	III Core Subjects	4.Analytical Geometry &Vector Calculus	1	6	5	100
	Allied Subject I	Physics IV +Practical	2	6	4+1	100+100
	Allied Subject II	2.Programming in C++ 3.Practical inC++	2	6	4+1	100+100
		Total	7	30	21	700

V	III Core Subjects	5.Real Analysis	1	5	5	100
		6.Numerical Analysis	1	5	5	100
		7.Differential equations &Applications	1	5	5	100
		8.Modern Algebra	1	5	5	100
	Allied Subject II	4.Statistics I	1	6	6	100
	IV Skill Based Subjects	5.Laplace Transforms &Fourier Series	1	2	2	100
		6.EnvironmentalStudies	1	2	2	100
		Total	7	30	30	700
VI	III Core Subjects	9.Complex Analysis	1	5	5	100
		10.Graph Theory	1	5	5	100
		11.Operations Research	1	5	5	100
		12.Linear Algebra	1	5	5	100
	Allied Subject II	5.Statistics II	1	6	4	100
	IV Skill Based Subjects	7.Boolean Algebra &Logic	1	2	2	100
		8.Value Education	1	2	2	100
		9.Extension Activities	1	--	1	100
		Total	8	30	29	800

Core Subjects

Paper-1--CALCULUS SMTDC11

UNIT – I

Successive differentiation – Expansion of functions – Leibnitz Formula – Maxima and Minima of functions of two variables.

UNIT – II

Envelopes – Curvatures – Circle, radius and centre of curvatures – Evolutes.

UNIT – III

Polar Co-ordinates – Radius of curvature in polar co-ordinates – p-r equation – Pedal equation of curves- Definite integrals and their properties.

UNIT – IV

Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^n x \cos^m x$ – Bernoulli'sformula – Double and triple integrals and their properties

UNIT – V

Change of order of integration, Beta and Gamma functions, Jacobian.

TEXT BOOK :

Calculus, Volumes I&II by T.K.Manicavasagam Pillai & S.Narayanan.
Publishers : S.Viswanathan,1996.

UNIT – I : Chapter 3 (Vol.I)

UNIT – II : Chapter 10, up to Section 2.5 (Vol.I)

UNIT – III : Chapter 3, Sections:2.6,2.7 (Vol.I) and Chapter 1, Section 11 (Vol.II)

UNIT – I V : Chapter 1, Sections:12,13,14.15.1 (Vol.II)
Chapter 5, Sections: 1,2,3,4 (Vol.II).

UNIT–V : Chapter6, Sections:1,2 (Vol.II)
Chapter7, Sections:2,3,4,5 (Vol.II).

Allied Subject-Paper-1

PROGRAMMING IN C- 6Hrs

UNIT-I:

Overview of C: History of C –Important 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 constants, Volatile- Overflow and under flow of data.Operators and Expression: Arithmetic, Relational,Logical, Assignment operators- Increment and Decrement operators- conditional operators,Bitwise operators,special operators- Arithmetic expression-Evaluation of expression- Precedence of arithmetic operators-Type conversion in expression-operator precedence and associativity- mathematical functions- Managing I/O operations: Reading and Writing a character-Formated input,output.

UNIT-II:

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-III:

Arrays: One dimensional array-Declaration, initialization-two dimensional array-Multidimensional 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 Structures-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:

E.Balagurusamy," PROGRAMMING IN ANSI C", Fourth Edition ,Tata McGraw Hill publishing company ,2007.

Unit-1—Chapter 1,sections 1.1-1.2,1.8-1.9

Chapter 2,3,4

Unit -2---Chapter 5,6

Unit—3—Chapters 7,8

Unit—4—Chapter 9,10

Unit—5—Chapter 11-sections-11.1-11.12

Chapter12

REFERENCE BOOK: PROGRAMMING WITH C (Schuman's outline series),Gottfried, Tata McGraw Hill.

Skill Based Subjects

Paper-1. ARITHMETIC & MENTAL ABILITY SMTDS11

UNIT-1:
Problems on numbers.

UNIT-2:
Problems on ages.

UNIT-3:
Ratio and proportion.

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.

Paper--2 SEQUENCES AND SERIES SMTDS12

Unit 1: Sequences-Bounded, convergent, divergent and Oscillating Sequences-subsequences(Definition only)

Unit 2: Cauchy's Sequences -Cauchy's general principle of Convergence.

Unit 3: Infinite series-Convergent, Divergent series –Alternating series (Definition and Examples only) .

Unit 4: Comparison test (statement only)-simple problems.

Unit 5: Tests of convergence-Kummer's Test, Raabe's Test(Statements only)-Simple problems.

TEXT BOOK:

SEQUENCES AND SERIES by Dr. S . Arumugam and Mr.Thanga Pandi IIsac(1997)

Publication: New Gamma Publishing House,Palayamkottai-627002.

Non-Major Elective

Fundamentals of Mathematics-I

UNIT-1:

Theory of indices , ratio and proportion.

UNIT-2:

Differential calculus and Integral calculus (Simple problems).

UNIT-3:

Theory of Matrices-Addition, Multiplication of two matrices.

UNIT-4:

Finding the n^{th} term and sum to n terms of an A.P and G.P-Arithmetic mean.

UNIT-5:

Solving the quadratic equations-finding the roots- forming the equation when roots are given (only second degree).

TEXT BOOKS:

Business mathematics by .M.Manoharan,.C.Elango ,Paramount publications-1994.

Business mathematics by .M.Manoharan,Dr.C.Elango, Palani Paramount publications-Third Revised Edition- 2002.

Business mathematics by .M.Manoharan,Dr.C.Elango and K.L.Eswaran,Paramount publications-Reprint 2007.

IV SEMESTER

Core Subjects

Paper-4--. Analytical geometry of Three Dimensions and Vector Calculus - 6Hrs

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 line about a plane- A plane and a straight line-

Angle between a plane and a straight line, Coplanar lines, -Shortest distance between two lines

UNIT-3:

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

UNIT-4:

VectorDifferentiation, Gradient-divergence-Curl-properties-Results

UNIT-5:

Vector Integration-Line integrals, Surface integrals, Volume integrals, simple problems using Green's, Gauss, Stoke's Theorems.

TEXT BOOK:

Analytical Geometry of Three Dimensions and Vector Calculus by Dr.s.Arumugam.

Publishers: New Gamma, Reprint 2006.

Allied Subject-Paper-2

Programming in C++ -6 Hours

UNIT-1:

Principle of object oriented programming-Software evolution-OOP paradign-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-Decalartion-Scope resolution operator-Memory management operator-Manipulators-type implicit conversions operators precedence and associaitvity-Control structures.

UNIT-2:

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-3:

Constructors- Parametrized Constructors-Multiple Constructors- Dynamic Initialization of objects-copy Constructor –dynamic Constructors- Constructring 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-4:

Inheritance-Single Inheritance-Multilevel, Mutiple,Hierarchical. Inheritance-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.

V Semester

Core Subjects

Paper-5- REAL ANALYSIS-(5Hrs).

UNIT-1:

Countable and uncountable sets-Holder's and Minkowski's inequalities-Metric space-Definition and examples- Open sets and closed sets(Definitions and examples only).

UNIT-2:

-Completeness- Definitions and examples-Cantor's intersection theorem and Baire's category theorem.

UNIT-3:

Continuity- Definitions and examples-Homeomorphism-Uniform Continuity

UNIT-4:

Connected- Definitions and examples-Connected subsets of R-Connectedness and continuity-Intermediate value theorem.

UNIT-5:

Compactness-Definition and examples-Compact substes of R-Equivalent Characterization of compactness.

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

Unit 1: Chapter 1-Sections 1.2-1.4

Chapter 2-Sections 2.1,2.4,2.7

Unit-2: Chapter 3

Unit-3: Chapter 4-Section 4.1-4.3

Unit-4: Chapter 5

Unit-5: Chapter 6-Sections 6.1-6.3

Paper-6--.Numerical Analysis-- (5Hrs).

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 differences 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 derivaties-Maximum and minimum values of a function for a given data.

UNIT-5:

Numerical Iteration- Newton's Cote's formula-Trapezoidal rule- Simpson's one third rule- Simpson's three eight rule-Weddels rule.

TEXT BOOK: Numerical Analysis by Dr.S.Arumugam,Thangapandi Issac and A.Somasundaram New Gamma Publications,edition 2006.

Paper-7--DIFFERENTIAL EQUATIONS

UNIT – I

Exact differential equations of first order but of higher degree – Equations solvable for y – Equations solvable for x – Clairaut's form – Equations that do not contain x,y explicitly, Equations homogeneous in x and y.

UNIT – II

Linear Equations with constant coefficients – Equations reducible to the linear homogeneous equations.

UNIT – III

Simultaneous Linear differential equations – First order and first degree – Linear equations of the second order- Reduction to the normal form- CHANGE OF INDEPENDENT VARIABLES.

UNIT – IV

Variation of parameters- Partial differential equations of the first order – Derivation of partial differential equations –Lagrange method of solving linear equations.

UNIT – V

Standard forms – equations reducible to the standard forms – Charpits method.

TEXT BOOK :

Differential equations and its Applications by T.K.Manicavasagam Pillai&S.Narayanan. Publication : S.Viswanathan,

UNIT – I : Chapter I , Section:6
Chapter IV & Chapter V,Sections:1,2,3,4.

UNIT – II : Chapter V, Sections:5,6 &
Chapter VI, up to Section6.

UNIT – III : ChapterVIII

UNIT – I V : Chapter XII, sections: 1,2,3,4,5.5

UNIT–V : ChapterXII,Section 6

Paper-8-- Modern Algebra –(5Hrs)

Unit—1:

Subgroups-Definitions, Examples-Theorems on Subgroups-Permutation Groups-Cycles and Transpositions-Even Permutations-Theorems on Permutations-S_n and A_n—Cyclic Groups-Definitions, Examples, Theorems—Order of an Element—Generators-Number of Generators of cyclic Groups.

Unit--2:

Cosets - Thorems on cosets, Lagrange's theorem, Problems using Lagrange's Theorem-Euler's, Fermat's Theorems—Normal Subgroups-Theorems on Normal subgroups-Quotient group

Unit—3:

Homomorphisms-Types and examples-Theorems on Homomorphisms—Isomorphisms—Fundamental theorem of Homomorphisms - Any infinite cyclic grop is isomorphic to $(Z,+)$.---Any finite group is isomorphic to $(Z_n,+)$-- Cayley's Theorem

Unit—4:

Rings—Definition and examples-Elementary Properties-Isomorphism-Types of Rings-Integral Domains, Fields-Zero divisors—Theorems on Integral Domains and fields, Characteristic of a Ring.

Unit—5

Subrings-Ideals-Quotient rings-maximal and prime ideals--Field of Quotient of an Integral Domain—

Text Book: Modern Algebra by Dr.S.Arumugam & A.T.Isacc—Scitech Publications—Reprint—July 2008

Unit—I---Sections— 3.4 to 3.7

Unit—2---sectons—3.8 &3.9

Unit—3—Sections—3.10 &3.11

Unit—4—Sections—4.1 to 4.5

Unit—5—Sections—4.6 to 4.11

Allied Subjects

Paper-4--STATISTICS-I –(6 hours).

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:

Curvefitting(all types of curves)

UNIT-5:

Theory of attributes

TEXT BOOK:

STATISTICS by Dr.S.Arumugam, A.Thangapandi Isaac

Publishers: New Gamma Publishing House—July--2009.

Unit-1—Chapters 2,3,4

Unit-2---Chapter 6

Unit—3---Chapters 9,10

Unit—4—Chapter 5

Unit—5—Chapter 8

Skill Based Subjects

Paper 5---LAPLACE TRANSFORMS AND FOURIER SERIES

Unit I:
Laplace Transforms-Theorems-Problems-Evaluation of integrals.

Unit 2:
Inverse Laplace Transforms – Results.

Unit 3:
Solving ordinary differential equation with constant coefficient and variable coefficients-simultaneous linear equations using Laplace Transforms.

Unit 4:
Fourier Series –Trignomentric series-Even and odd functions.

Unit 5:
Half range Fourier Series-extension to intervals of length $2\prod$.

TEXT BOOK:
Differential equationsss and its Applications by T.K.Manicka Vasagam Pillai and S.Narayanan Publications S.Viswanathan.1996.

Paper-6-- Environmentel Studies--(2Hrs).

Refer University Communication

VI SEMESTER

Core Subjects

Paper-9-COMPLEX ANALYSIS-(5 Hrs)

UNIT-1:

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

UNIT-2:

Elementry Transformation-Bilinear Transformation-Cross ratio-ixed points-Special Bilinear Transformation –Real axis to axis-Unit circle to unit circle and real axis to unit circle only.

UNIT-3:

Cauchy's Fundamental theorem- Cauchy's integral formulae and formulae for derviates-Morera's theorem-Cauchy's in equality-Lioville's theorem-Fundamental theorem of algebra.

UNIT-4:

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

UNIT-5:

Calculus of residues-Evalution of definite integral.

TEXT BOOK:

Complex Analysis by Dr.S.Arumugam, Thanga pandi Issac and A.Smasundaram.

Publishers: SciTech, Jan 2003.

Paper—10--GRAPH THEORY –(5Hrs)

UNIT-1:
Graphs-Degree-Subgraphs ,Isomorphism,RamseyNumbers-Independent sets and coverings-Intersection graphs and line graphs -Matrices of graphs -Operation on graphs.

UNIT-2:
Degree sequences- graphic sequences-Walks,Trials,and Paths-Connectedness and compents-Blocks-Connectivity-Eulerian graphs -Hamiltion graphs.

UNIT-3:
Trees- Characterization of trees-centre of a tree-Matchings-Matchings in Bipartite graphs

UNIT-4:
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-5:
Chromatic polynomials-Definition-Basic properties of Digraphs-Paths and connectedness in

Digraphs Matrices associated with Digraphs –Tournaments.

TEXT BOOK:
Invitation to graph theory, by Dr.S.Arumugam,S.Ramachandran,Scitech publication,7\3c,Madley Road,T.Nagar,Chennai 600017.

Paper-11-OPERATIONS RESEARCH

UNIT- I:

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

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..

TEXT BOOK: Operations Research

KANTI SWARUP

P.K.GUPTA

MAN MOHAN

Publications: Sultan Chand & Sons, New Delhi. Edition, 2004.(Reprint 2006)

Paper—12- LINEAR ALGEBRA -(5Hrs).

UNIT-1:

Vector Spaces-Definition and examples- Sub Spaces-Linear Transformation-Fundamental theorem of Homomorphism.

UNIT-2:

Span of a set-Linear independence-Basis and Dimension-Rank and Nullity-Matrix and Linear Transformations.

UNIT-3:

Inner product Space- Definition and examples-Orthogonality –Orthoganal complement.

UNIT-4:

Matrices-Elementary Transformation-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.

TEXTBOOK:

Modern Algebra by Dr.s.Arumugam

Publications:Sci Tech,2006.

Allied Subject

Paper—5--. STATISTICS II-(6Hrs).

UNIT-1:

Theorey of Probability-Sample Space- Probability function-Laws of Addition-Boole's inequality-Law of multiplication-Baye's theorem-Problems.

UNIT-2:

Random Variables-Distribution function-Discrete and continuous random variables- Probability density function-Mathematical Expectation(One dimensional only).

UNIT-3:

Moment generating function-Cumulants- theoretical distributions-Binomial – Poisson-Normal.

UNIT-4:

Test of Significance of Large samples.

UNIT-5:

Test of Significance of smali samples.- t-F-Chi-square.

TEXTBOOK:

STATISTICS by Dr.S.Arumugam, A.Thangapandi Isaac

Publishers: New Gamma Publishing House—July--2009.

Unit-1—Chapter 11

Unit-2---Chapter 12 sections 12.1-12.4

Unit—3---Chapters 12 sections 12.5-12.6,Chapter 13

Unit—4—Chapter 14

Unit—5—Chapter 15,16

III Semester: **(6Hrs/week)**

4.Ancillary Mathematics-IV

OPERATIONS RESEARCH

UNIT-1:

Definition-Nature and scope –modesl-Definition of a standard programming problems-Definition of feasible solution-Optimal solution-basic feasible solutions-Degenerate solution of a L.P.P

UNIT-2:

Mathematical Formulation of a LPP-Slack and surplus variables-Graphical solution of a LPP.

UNIT-3:

Simplex method of solving a LPP-Charnes method of penalities-Concept of Duality- Formation of Dual LPP-the dual of the dual is the primal(only problems).

UNIT-4:

Transportation problem-Finding Initial feasible solution by north west corner method and Vogel's Approximation method-Optimal solution of Tranportation problem.

UNIT-5:

Assignment problem-solution of Assignment problems-Travelling sales man problem.

TEXT BOOK:" OPERATIONS RESEARCH" by Kanti Swarup, Sultan Chand Publications,2006.

IV Semester: **(3 Hours)**

5. ANCILLARY MATHEMATICS V

UNIT-1:

Exact Differential equation-Second order differential equations.

UNIT-2:

Second order equation with RHS x^n,e^{ax} ,sinax,cosax, e^{ax}sinax, e^{ax}cosbx 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 IIIs by Dr.S.Arumugam, New Gamma Publications, edition 2006.

Skill Based Subjects

Paper-7-- BOOLEAN ALGEBRA & LOGIC –(2 Hrs).

UNIT I: Propositional Calculus

Statements,Basic operations-Truth value of compound Statements- Propositions and Truth tables.

UNIT II:

Tautologies and contradictions-Logical equivalence- Negation,DeMorgan's Laws-Algebra of Propositions-Conditionals, $p \rightarrow q$.

UNIT III:

Biconditional $p \leftrightarrow q$. Arguments, Arguments and statements-Logical Implication-Quantifiers.

UNIT IV:

Boolean Algebra,Logic Gates:Basic definitions and theorems-order and Boolean Algebras- Boolean Expressions,Sum of-products form.

UNIT V:

Logicgates-Logic circuits-Minimal Boolean Expressions, Prime implicants-Karnaugh maps-Minimal AND-OR circuits.

TEXT BOOK:

Discreate Mathematics,Seymour Lipschutz ,Marcs Lars Lipson,Schaum's series,McGraw-Hill, International Editions 1999.

UNITS I, II, III :Chapter 4

UNITS IV, V :Chapter 15.

Paper-8--VALUE EDUCATION-(2Hrs)

Refer University communication

Che [IInd semester Maths-2/2nd paper
Even semester: TY 13.3.15:

2.Ancillary Mathematics-III (3Hrs/week)

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 by Dr.S.Arumugam, New Gamma Publications,1999,Reprint 2006.

6.Ancillary Mathematics-VI (3Hrs/week)

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 by Dr.S.Arumugam, New Gamma

Publications,edition 2006.

Placed at the Meeting of the Academic Council held on21.09.2012

APPENDIX - J

MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

CHOICE BASED CREDIT SYSTEM

Subjects of Study in B.Sc. (Mathematics with Computer Applications)

(Revised)

REGULATIONS AND SYLLABUS

(This will come into force from the academic year 2012-2013)

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. **SUJECT OF STUDY**

Part 1: Tamil / Arabic...
Part 2: English
Part 3: Core Subjects – Mathematics
Allied Subjects and Electives

Paper-6--.Numerical Analysis-- (5Hrs).

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 differences 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 derivaties-Maximum and minimum values of a function for a given data.

UNIT-5:
Numerical Iteration- Newton's Cote's formula-Trapezoidal rule- Simpson's one third rule- Simpson's three eight rule-Weddels rule.

TEXT BOOK: Numerical Analysis by Dr.S.Arumugam,Thangapandi Issac and A.Somasundaram New Gamma Publications,edition 2006.

Core Subjects

Paper-1--CALCULUS SMTDC11

UNIT – I

Successive differentiation – Expansion of functions – Leibnitz Formula – Maxima and Minima of functions of two variables.

UNIT – II

Envelopes – Curvatures – Circle, radius and centre of curvatures – Evolutes.

UNIT – III

Polar Co-ordinates – Radius of curvature in polar co-ordinates – p-r equation – Pedal equation of curves- Definite integrals and their properties.

UNIT – IV

Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^n x \cos^m x$ – Bernoulli'sformula – Double and triple integrals and their properties

UNIT – V

Change of order of integration, Beta and Gamma functions, Jacobian.

TEXT BOOK :

Calculus, Volumes I&II by T.K.Manicavasagam Pillai & S.Narayanan.
Publishers : S.Viswanathan,1996.

UNIT – I : Chapter 3 (Vol.I)

UNIT – II : Chapter 10, up to Section 2.5 (Vol.I)

UNIT – III : Chapter 3, Sections:2.6,2.7 (Vol.I) and Chapter I, Section 11 (Vol.II)

UNIT – I V : Chapter 1, Sections:12,13,14.15.1 (Vol.II)
Chapter 5, Sections: 1,2,3,4 (Vol.II).

UNIT–V : Chapter6, Sections:1,2 (Vol.II)
Chapter7, Sections:2,3,4,5 (Vol.II) .