

*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

(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

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: $\frac{27}{75}$ 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	1	6	4	100
	IV Skill based Subjects	1) Arithmetic Ability	1	2	2	100
			2) Sequences & Series	1	2	2
	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	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

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.Environmental Studies	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.Booleam Algebra & Logic	1	2	2	100
		8.Value Education	1	2	2	100
		9.Extension Activities	1	--	1	100
			Total	8	30	29

Core Subjects

SMT0C11 Paper-1--CALCULUS

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's formula – 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) .

Skill Based Subjects

Paper-1. ARITHMETIC & MENTAL ABILITY

UNIT-1:

Problems on numbers.

SMT OS 11

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

SMT DS 12
SMT 812

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.

II semester

Core Subjects

SMTDC21

Paper 2-- Theory of Equations and Trigonometry- 6Hrs

UNIT-1:

Theory of equations- Imaginary roots-Rational roots- Relation between the roots and co-efficients- Symmetric functions of the roots.

UNIT-2:

Sum of the power 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 equations by a given quantity.

UNIT-3:

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

UNIT-4:

Ferrari's method of solving biquadratic equation-Expansions of $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^n x \cos^m x$.

UNIT-5:

Hyperbolic functions -Inverse Hyperbolic functions-logarithm of complex numbers-Gregory series.

TEXT BOOKS:

1. Algebra-- Volume I &II by T.K.Manivasagam pillay & S.Narayanan.

2. Trigonometry by T.K.Manivasagam pillay & S.Narayanan

Publishers: S.Viswanathan, 11th edition, Reprint 2006.

Paper 3--. OFFICE AUTOMATION

UNIT-1:

Ms-Word Introduction- Word for Windows- Creating and Saving a Document – 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 font(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 of 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: "MS.OFFICE" by C.Nellaikannan ,Nels Publications, 3rd edition,2004.

Paper 4--. MS OFFICE PRACTICAL

List of Programs

1. Design a document with at least two pages using MS word with different font style, different font sizes, header and footer, with page number.
2. Design an invitation with two column break, use word to insert picture, design border and shading.

3. Create a daily attendance sheet of a class room for a week with heading , day, period etc.
4. Create a main document and database of addresses and merge them using Mail-merge tools.
5. Create a yearly salary report in Excel worksheet, use auto fill to enter the month and to sum the column and row total ,to calculate DA and others, to insert data and time function in the footer.
6. Create Students Mark list for three subjects and to list the result and rank by using string function and logical function.
7. Create a yearly budget of a company and create different types of chart for the data.
8. Present the college details or any publishing work using Auto content wizard.
9. Create a slide show using blank representation with at least 20 slides.

Non-Major Elective

Fundamentals of Mathematics-II-Statistics

Unit-1: Statistics - Averages-Mean and Median.

UNIT-2: Dispersion-Range, Quartile deviation, Standard deviation

UNIT-3: Correlation-Pearson's Coefficient of Correlation, rank Correlation Coefficient

UNIT-4: Index numbers-Calculation of indices using simple aggregate method and average of price relative methods-Weighted index numbers- Laspeyre's, paasche's and Fisher's index numbers.

UNIT-5: Curve Fitting- Fitting of a Straight line and parabola.

TEXT BOOK:

Statistics by Dr.S.Arumugam

Publications: SciTech,2006.

SMT DA/21

SMFA
SMFDc31

III Semester:

Core subjects

Paper-3. Mechanics-6Hrs

UNIT-I:

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. Resolution of a force -Theorems of Resolved parts-Resultant of any number of coplanar forces- Condition of equilibrium.

UNIT-II:

Three forces acting on a rigid body-Friction.

UNIT-III:

Projectiles-Path of a Projectile-Maximum height-Time taken by a particle -Time of flight- Horizontal Range-simple problems.Range on a inclined plane impact-Laws of impact-Impact in a Fixed plane.

UNIT-IV:

Direct and oblique impact.

UNIT-V:

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

TEXT BOOKS:

1). STATICS by M.K. Venkataraman.

Publications: Agasthiyar, 10th Edition, July 2002.

2). DYNAMICS by M.K. Venkataraman.

Publications: Agasthiyar, 11th Edition, Feb 2004.

Allied Subject-Paper-1

SMTDA32

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-Formatted 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.

IV SEMESTER

SMTJc41

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:

Vector Differentiation, 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.

SMTDAAH1

Allied Subject-Paper-2
Programming in C++ -6 Hours

UNIT-1:

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-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- 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-4:

Inheritance-Single Inheritance-Multilevel, Multiple, 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.

UNIT-5:

Managing console I|o operation-Unformatted and formatted console I|o operations
–managing Output with manipulators-Working with files –classes of file stream
objects-Operating and closing a file- End of file Detections-File pointers and their
manipulations.Error Handling During file Operations-Command line Arguments.

TEXT BOOK: " Object Oriented Programming With C++" by E.Balagurusamy, Third
Edition -2007,Tata McGraw Hill New Delhi.

Unit—1—Chapters 1, 3

Unit-2—Chapter 5 Sections 5.1 -5.16

Unit—3—Chapters 6, 7

Unit—4—Chapters 8, 9

Unit—5—Chapters 10, 11

Allied Subject-Paper-3

PROGRAMMING IN C & C++ PRACTICALS

SMIDR&P

List of programs for Practical examination

The Question Paper will consists of TWO parts – Part A and Part B. Each part will consist of 3 questions from the list of Programs in C & C++. Students are asked to answer any THREE choosing at least one from each part. Each question will carry 25 marks.

C-Practical list

Write a C Program to calculate Simple interest and compound interest

Write a C Program to calculate Salesman's Commission problem using if and ternary operator.

Write a C Program for Finding the roots of the quadratic equation using Switch....case statements.

Write a C Program for Write a C Program Testing a given number as a prime or not and Finding the prime number between one and any number. ✓

Write a C Program for finding a sine value or cosine value.

Write a C Program for finding the sum of two matrices.

Write a C Program for finding the product of two matrices.

Write a C Program for Arranging the given numbers in ascending order.

Write a C Program for Arranging the given Names in alphabetical order.

Write a C Program to Find the number of words and characters in a given text. ✓

Write a C Program to check whether a given string is a palindrome or not. ✓

• C++ -Practical list

Write a C++ program to create a student file using fwrite statement.

Write a C++ Program to find the simple interest.

Write a C++ Program to convert the given Temperature in Fahrenheit into Celsius.

Write a C++ Program to find the large number by using nesting of member function.

Write a C++ Program to find the variance and standard deviation for given n numbers.

Write a C++ Program to display the following output.

1

2 2

3 3 3

4 4 4 4

5 5 5 5 5

Write a C++ Program to add two complex numbers by using operator overloading.

Write a C++ Program for unary minus operator .

Write a C++ Program to illustrate the Friend function.

Write a C++ Program for creating employee's details using single inheritance.

Write a C++ Program to illustrate the macro definition.

Write a C++ Program for bank transaction.

Write a C++ Program to create a student file.

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 \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: 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).

SM T DE 52

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 derivatives-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 53

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)

54

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 - Theorems 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 group is isomorphic to $(\mathbb{Z}, +)$.---Any finite group is isomorphic to $(\mathbb{Z}_n, +)$ -- 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—1---Sections— 3.4 to 3.7

Unit—2---sections—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).

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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

SMT 0551

Skill Based Subjects

Paper 5---LAPLACE TRANSFORMS AND FOURIER SERIES

Unit 1:

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 –Trigonometric series-Even and odd functions.

Unit 5:

Half range Fourier Series-extension to intervals of length 2π .

TEXT BOOK:

Differential equations and its Applications by T.K.Manicka Vasagam Pillai and S.Narayanan Publications S.Viswanathan.1996.

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

Refer University Communication

VI SEMESTER

Core Subjects

Paper-9-COMPLEX ANALYSIS-(5 Hrs)

SMT Dec 61

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 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 derivatives-Morera's theorem-Cauchy's inequality-Liouville'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-Evaluation of definite integral.

TEXT BOOK:

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

Publishers: SciTech, Jan 2003.

Unit I - chap 2 ; 2.0 - 2.8

Unit II - chap 3 3.0 - 3.5

Unit III - chap 6 6.2 - 6.4

Unit IV - chap 7 7.1 - 7.4, 8.2

Unit V - chap 8 8.2 8.3

Skill Based Subjects

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

SMTD561

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:

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

TEXT BOOK:

Discrete Mathematics, Seymour Lipschutz, Marc's 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

ANCILLARY MATHEMATICS

(For B.Sc(Physics) & B.Sc(Chemistry))

SM78A11

I Semester:

1. Ancillary Mathematics-I

(6Hrs/week)

UNIT-1: Algebra

Theory of equations-An n^{th} degree equation has exactly n roots-Relation between the roots and the coefficients.

UNIT-2: Algebra

Finding the roots upto two decimals by Newton's & Horner's method.

UNIT-3: Calculus

Radius of curvature, center of curvature of plane curves-Definite integrals-Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^n x \cos^m x$ and simple problems.

UNIT-4: Trigonometry

Expansions-Hyperbolic functions-Logarithm of complex numbers.

UNIT-5: Analytical Geometry of Three Dimension

Direction cosines, direction ratios of a line-angle between two straight line equation a plane, equation of straightline, Angle between a plane and a line, co-planar lines-shorter distances.

TEXT BOOK: "ANCILLARY MATHEMATICS" vol I by Dr.S.Arumugam, New Gamma Publications, 1999, Reprint 2006.

SATID CBH

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 –Orthogonal
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.

SMTDAG 1

Allied Subject

Paper—5---. STATISTICS II-(6Hrs).

UNIT-1:

Theory of Probability-Sample Space- Probability function-Laws of Addition-Boole's inequality-Law of multiplication-Bayes'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 small 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

SMTR 662

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 -Hamilton 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,73c,Madley Road,T.Nagar,Chennai 600017.

Paper-11-OPERATIONS RESEARCH

SMTD 63

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.

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)

II semester:

2.Ancillary Mathematics-II

(3Hrs/week)

SMT 8A2)

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

III Semester:

4. Ancillary Mathematics-IV

(6Hrs/week)

OPERATIONS RESEARCH

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SMTBA31

UNIT-1:

Definition-Nature and scope –modes-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 penalties-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 Transportation 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:

5. ANCILLARY MATHEMATICS V

(3 Hours)

UNIT-1:

Exact Differential equation-Second order differential equations.

SM18A41
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UNIT-2:

Second order equation with RHS $x^n, e^{ax}, \sin ax, \cos ax, e^{ax} \sin ax, e^{ax} \cos bx$ 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 IIIs by Dr.S.Arumugam,
New Gamma Publications, edition 2006.

6.Ancillary Mathematics-VI

(3Hrs/week)

UNIT-1:

Analytic Functions-Properties.

SMI8A43

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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.