



SOURASHTRA COLLEGE, MADURAI- 625004

(An Autonomous Institution Re-accredited with 'B' grade by NAAC)

B.Sc., MATHEMATICS- SYLLABUS

(Under CBCS w.e.f. 2017 – 2018 onwards)

200

I SEMESTER

Sl. No.	Sub. Code	Nature	Subject Title	Hrs / Week	Duration of Exam (hrs)	CA	SE	Tot	Crd
1	17UACT11	Part I	Tamil	6	3	25	75	100	3
	17UACH11		Hindi						
	17UACS11		Sanskrit						
2	17UAC E11	Part II	English	6	3	25	75	100	3
3	17 UMS C11	Core1	Calculus	7	3	25	75	100	5
4	17 UMS S11	SBS1	Arithmetic Ability	3	3	25	75	100	3
5	17 UMS A11	Allied1	Mathematics – I	6	3	25	75	100	5
6	14 UAC VE1	Part IV	Value Education	2	3	25	75	100	2
			Total	30					21

Passed in the BOS Meeting
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201

PART - III CORE	Title : CALCULUS	Subject Code : 17 UMS C11
Semester : I	HOURS : 7 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge of differential and integral calculus. To understand the concepts of curvatures, tangents and normal.

Unit – 1

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

Unit – 2

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 – Radius of curvature in Polar Co-ordinates - Evolutes.

Unit – 4

Definite Integrals and their properties- double and triple integral simple problems only (change the order of integration is excluded)

Unit – 5

Reduction Formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sec^n x$, $\sin^n x \cos^m x$ – Bernoulli's formula – Beta and Gamma functions and its properties.

Text Book:

Calculus Volume I by T.K.Manivasagam Pillay & S.Narayanan .

Publications : S.Viswanathan, 2011. (unit – 1,2,3)

Calculus Volume II by T.K.Manivasagam Pillay & S.Narayanan .

Publications : S.Viswanathan, 2014.(unit – 4,5)

Unit-1 chapter 3 (page number 69 to 81), Chapter 5 (page number 226 to 236), chapter 7 (page number 163 to 175).

Unit -2 chapter 9 (page number 267 to 280)

Unit –3 chapter 10 (page number 281 to 308)

Unit -4 chapter 1 (page number 66 to 73), chapter 5 (page number 207 to 212 and 221 to 223).

Unit -5 chapter 1 (page number 79 to 100), chapter 7 (page number 279 to 290).

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202

PART - IV SKILL BASED	Title : ARITHMETIC ABILITY	Subject Code : 17 UMS S11
Semester : I	HOURS : 3 hours / Week	CREDITS : 3

Objectives:

To enable the students to acquire the knowledge of arithmetic ability. To make the students to understand the basic concepts in arithmetic for real world problems.

UNIT I:

Problems on numbers, Logarithms.

UNIT II:

Problems on ages, Area.

UNIT III:

Ratio and proportion, Volume

UNIT IV:

Time and distance, Surface Area.

UNIT V:

Problems on trains, Probability.

Text Book: Quantitative Aptitude by R.S. AGGARWAL (Example Problems Only)



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203

PART - III ALLIED	Title : MATHEMATICS-I	Subject Code : 17 UMS A11
Semester : I	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in fourier series, correlation and matrices.

Unit I:

Correlation – Rank Correlation – Theory of Attributes (Simple problem only).

Unit II:

Fourier series – even and odd functions – sine & cosine series.

Unit III:

Index numbers.

Unit IV:

Matrices – Rank of a matrix- Consistency of equations.

Unit V:

Cayley – Hamilton theorem. Eigen values and Eigen vectors.

Text Book:

Ancillary Mathematics – Paper II & III (Revised) by Dr. S. Arumugam & Issac



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II SEMESTER

Sl. No.	Sub. Code	Nature	Subject Title	Hrs / Week	Duration of Exam (hrs)	CA	SE	Tot	Crd
1	17UACT21	Part I	Tamil	6	3	25	75	100	3
	17UACH21		Hindi						
	17UACS21		Sanskrit						
2	17 UAC E21	Part II	English	6	3	25	75	100	3
3	17 UMS C21	Core2	Theory of Equations and Trigonometry	7	3	25	75	100	5
4	17 UMS A21	Allied2	Mathematics – II	6	3	25	75	100	5
5	17 UMS S21	SBS2	Vector Analysis and Fourier Series	3	3	25	75	100	3
6	14 UAC ES1	Part IV	Environmental studies	2	3	25	75	100	2
			Total	30					21

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205

PART - III CORE	Title : THEORY OF EQUATIONS AND TRIGONOMETRY	Subject Code : 17 UMS C21
Semester : II	HOURS : 7 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in theory of equations and trigonometry. To understand the concepts of relation between the roots and coefficients, symmetric functions and hyperbolic functions.

UNIT-1:

Theory of Equations – Imaginary roots – Rational roots – Relation between the roots and coefficients – Symmetric functions of 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 – General solution of cubic equations – Cardon's method – Horner's Method.

UNIT-4:

Ferrari's method of solving biquadratic equation – Expansions of $\sin nx$, $\cos nx$, and $\tan nx$ -
Expansions of $\sin^n x$, $\cos^n x$, $\tan^n x$, - Expansions of $\sin x$, $\cos x$, $\tan x$ in powers of x .

UNIT-5:

Hyperbolic functions – Inverse Hyperbolic functions – Logarithm of Complex numbers .

Text Books:

1. Algebra Vol T.K.M. Pillay and T.Natarajan.
2. Trigonometry by S.Arumugam and Isaac

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206

PART - III ALLIED	Title : MATHEMATICS-II	Subject Code : 17 UMS A21
Semester : II	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge of LPP various methods, transportation problems and assignment problems.

Unit – I

Introduction - Definition of a LPP – Formulation of LPP – Mathematical formulation of LPP (simple problems only) – Slack and surplus variables - Definition of a Standard linear programming problem.
(Pages 3-1 to 3-8, 3-31 to 3-41).

Unit – II

Solutions of a LPP - Definition of Basic solution -Basic feasible solution – Optional Solution – Optimum basic feasible solution – Degenerate solutions of a LPP (Theorems not included) – Graphical solution of a LPP.
(Pages 3-42 to 3-47, 3-68 to 3-81).

Unit – III

– Simplex method (simple problems only) - Big – M method (Method of penalties) (simple problems only).
(Pages 3-86 to 3-101, 3-107 to 3-111, 3-116 to 3-144).

Unit – IV

Transportation problem – Finding IBFS by North West Corner method, and Vogel's Approximation method – Solving by MODI method
(Only minimization cases) (Pages 4-1 to 4-27, 4-38-4-49)

Unit – V

Assignment problem – Solving Assignment Problem by Hungarian method.
(Pages 5-1 to 5-6, 5-8 to 5-24).

Text Book : Topics in Operations Research by Arumugam and Isaac

Unit – I : Chapter 3 : Sections 3.1, 3.2.(Theorems not included)

Unit – II : Chapter 3: Sections 3.3 (Theorems not included), 3.4 (Problems only)

Unit – III : Chapter 3: Sections 3.5, 3.6

Unit – IV : Chapter 4: Sections 4.0, 4.1

Unit – V : Chapter 5: Sections 5.0,5.1,5.2.

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207

PART - IV SKILL BASED	Title : VECTOR ANALYSIS AND FOURIER SERIES	Subject Code : 17 UMS S21
Semester : II	HOURS : 3 hours / Week	CREDITS : 3

Objectives:

To enable the students to acquire the knowledge of vector analysis and fourier series.
To understand the concepts of gradient, divergence, curl and its properties.

UNIT – I:

Gradient – Divergence and Curl – Theorems and Problems.

UNIT-II :

Vector integration – Line integrals- Surface integrals.

UNIT III:

Green's Theorem, Stoke's Theorem, Gauss Divergence Theorem (Statement only) – Simple problems.

UNIT IV:

Fourier series- Definitions, Problems, Even and odd functions – Definition and problems.

UNIT V:

Half range Fourier Sine and Cosine series.

TextBook 1:

Analytical Geometry and Vector Calculus by Arumugam and Issac (unit 1,2,3)

Text book II :

Trigonometry and fourier series by Arumugam and Issac (Unit 4,5)

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III SEMESTER

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1	17UACT31/ H31/S31	Part I	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	17UACE31	Part II	English	6	3	25	75	100	3
3	17UMSC31	Core 3	Mechanics	4	3	25	75	100	4
4	17UMSC32	Core 4	Analytical Geometry of 3D	4	3	25	75	100	4
5	17UMSSP1	SBS3	MS Office LAB	3	3	40	60	100	3
6	17UMSA31	Allied3	Graph theory	5	3	25	75	100	5
7	17UMSN31	NME1	BASIC MATHEMATICS - 1	2	3	25	75	100	2
			Total	30					24

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209

PART - III CORE	Title : MECHANICS	Subject Code : 17 UMS C31
Semester : III	HOURS : 4 hours /week	CREDITS : 4

Objectives:

To enable the students to acquire the knowledge of Application of Mathematics in various field.

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.

Unit II Resolution of a force – Theorems of resolved parts – Resultant of Any number of forces – Condition of equilibrium

Unit III Parallel forces – Resultant of two like and unlike parallel forces – Moment of a force – Varignon's theorem.

Unit IV Projectile- Path of a projectile – Maximum height – Time taken by a particle – Time of flight – Horizontal Range – Simple problems.

Unit V Simple Harmonic motions – equation of motion – composition of two SHM.

TEXT BOOK:

Statics and Dynamics by M. K. VENKATARAMAN Publication: Agasthiyar

STATICS:

Unit – I : Chapter 2 (Section: 1 to 9, Page:1 to 20)

Unit – II : Chapter 2 (Section: 11 to 16, Page:36 to 47)

Unit – III : Chapter 3 (Section: 1 to 13, Page:52 to 74)

DYNAMICS:

Unit – IV : Chapter 6, (6.1 to 6.8, Page: 139 to 151, 156 to 161)

Unit – V : Chapter 10 (10.1 to 10.7, Pages: 309 to 330)

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210

PART - III CORE	Title : ANALYTICAL GEOMETRY OF THREE DIMENSIONS	Subject Code : 17 UMS C32
Semester : III	HOURS : 4 hours /week	CREDITS : 4

Objectives:

To study Analytical geometry and to develop the skill on problems in straight line and sphere.

Unit I

The plane – Angle between two planes – Length of perpendicular – Bisecting Plane – Distance between two planes

Unit II

The straight line – symmetric form – Image of a point – Image of a line about a plane.

Unit III

The plane and straight line – Angle between a plane and straight line. Coplanar lines – Shortest distance between two lines – Skew lines.

Unit IV

The sphere – Equation of the sphere – Equation of the tangent plane – Simple Problems.

Unit V

Right circular cone- Right circular cylinder

TEXT BOOK:

1. THREE DIMENSION ANALYTICAL GEOMETRY AND VECTOR CALCULUS by Dr.S. Arumugam Issac Publication: New gamma, 2006
2. Text book of Analytical geometry three dimension (For Unit V only) by T.K.M. Pillai and T. Natrajan

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211

PART - IV Skill Based	Title : MICROSOFT OFFICE PRACTICAL	Subject Code : 17 UMS SP1
Semester : III	HOURS : 3 hours /week	CREDITS : 3

OBJECTIVES:

To enable the students to acquire the knowledge of use of office softwares.

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 10 slides.
10. Creating a data base (student marks) and queries

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212

PART - III ALLIED	Title : GRAPH THEORY	Subject Code : 17 UMS A31
Semester : III	HOURS : 5 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge of graphs and coloring.

UNIT – I

Graphs – Degrees – subgraph, isomorphism – Ramsey numbers – independent sets and Coverings – Intersection graphs and linegraphs.

UNIT – II

Matrix of graphs – operations on graphs – Degree Sequences – Graphic Sequences – Walks, trails and paths – Connectedness and components Blocks – Connectivity.

UNIT – III

Eulerian graphs – Hamiltonian graphs – Tress – characterization of trees – center of tree.

UNIT - IV

Matching – Matching in bipartite graphs planar graphs and properties – characterization of planes graphs

UNIT - V

Chromatic numbers and index – Five colour theorem – Four colour theorem – chromatic polynomials.

Text Book:

Invitation to Graph Theory by S.Arumugam and others (Sci - Tech Publications)

- UNIT I : Units 2.0 to 2.7 (pages : 5 to 24)
- UNIT II : Units 3.0 to 4.4 (pages : 24 to 47) & Section 2.8, 2.9
- UNIT III : Units 5.0 to 6.2 (pages : 48 to 65)
- UNIT IV : Units 7.0 to 8.3 (pages : 66 to 82)
- UNIT V : Units 9.0 to 9.4 (pages : 85 to 98)



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213

PART - IV NME	Title : BASIC MATHEMATICS - 1	Subject Code : 17UMSN31
Semester : III	HOURS : 2hours	CREDITS : 2

Objective:

To enable the students to acquire the basic knowledge in mathematics.

Unit I:

Theory of indices (pages 54 to 65)

Unit II:

Differential calculus (pages 192 to 204)

Unit III:

Theory of matrices (pages 329 to 375)

Unit IV:

Theory of sets (pages 8 to 44)

Unit V:

Quadratic equations-forming quadratic equations when roots are given.

- 1) Business mathematics by M.Manoharan, Dr C.Elango & K.L.Eswaran (unit I to IV)
- 2) Introduction to business mathematics by Sunderasan&Jeyaselan (unit V)

Sultan Chand publications.



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IV SEMESTER

Sl. No	Sub. Code	Nature	Subject Title	Hrs / Week	Duration of Exam (hrs)	CA	SE	Tot	Crd
1	17UACT31/ H31/S31	Part I	Tamil/Hindi/ Sanskrit	6	3	25	75	100	3
2	17UACE41	Part II	English	6	3	25	75	100	3
3	17UMSC41	Core 5	Differential Equations	4	3	25	75	100	4
4	17UMSC42	Core 6	Programming in C Theory	4	3	25	75	100	4
4	17UMSSP1	SBS4	Programming in C Practical	3	3	40	60	100	3
5	17UMSA41	Allied4	Sequence and series	5	3	25	75	100	5
6	17UMSN41	NME2	Basic Mathematics II (For Science)	2	3	25	75	100	2
	17UMSN42		Basic Mathematics II (For Arts)						
7		Part-V	Extension Activities					100	1
			Total	30					25

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215

PART - III	Title : DIFFERENTIAL	Subject Code : 17 UMS C41
CORE	EQUATIONS	
Semester : IV	HOURS : 4 hours / Week	CREDITS : 4

Objectives:

To study some important technique in solving differential equations and its applications.

Unit I

Exact differential equations of first order but of higher degree – Equations solvable for y – Equations solvable for x – Clairaut's form

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

Unit IV

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

TEXT BOOK:

Differential equations and its Applications by T.K.Manicavasagam Pillai&S.Narayanan. Publication: S.Viswanathan,(Reprint 2015)

- UNIT – I : Chapter I, Section: 6.1 to 6.3
Chapter IV & Chapter V, Sections: 1,2,3,4.
- UNIT – II : Chapter V, Sections: 4,5,6
Chapter VI, Sections: 1 to 6
- UNIT – III : Chapter VIII, Sections: 1 to 3
- UNIT – IV : Chapter XII, sections: 1,2,3,4,5.5
- UNIT – V : Chapter XII, Section 6
Unit – 5: Chapter 9 (Sections 9.13), Chapter 10 (Sections 10.2 – 10.9)

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216

PART - III CORE	Title : PROGRAMMING IN C THEORY	Subject Code : 17 UMS C42
Semester : IV	HOURS : 4 hours /week	CREDITS : 4

Objectives:

To enable the students to be familiar with programming in C and learn to use Arrays, strings, functions and structures.

Unit I

Constants, Variables and data types – operators and expressions.

Unit II

Managing input and output operators, decision making and branching.

Unit III

Decision making and looping – arrays.

Unit IV

Handling of character strings – user defined functions.

Unit V

Recursion – Structures

TEXT BOOK:

Programming in ANSI C by E.Balagurusamy.

Unit – 1: Chapters 2 : (Sec 2.2 to 2.10) Chapter 3: (Sec 3.1 to 3.12, 3.14 to 3.16)

Unit – 2: Chapters 4: (Sec 4.2 to 4.5), Chapter 5:(Sec 5.2to 5.7,5.9).

Unit – 3: Chapters 6:(Sec6.2to6.5), Chpter 7 (Sec 7.1 to 7.5)

Unit – 4: Chapters 9 (Sections 9.2 – 9.10) Chapter 8 (Sec 8.2 to 8.5,8.7,8.8)

Unit – 5: Chapter 9 (Sections 9.13) , Chapter 10 (Sections 10.2 – 10.9)

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PART - IV Skill Based	Title : PROGRAMMING IN C PRACTICAL	Subject Code : 17 UMS SP1
Semester : IV	HOURS : 3 hours /week	CREDITS : 3

OBJECTIVES:

To enable the students to design and implement C programs for simple applications.

PROGRAMMING IN C – LIST OF PROGRAMS

- 1) Write a program to calculate Simple Interest and Compound Interest
- 2) Write a program to calculate Compound Interest
- 3) Write a program to find the biggest number among 3 numbers
- 4) Write a program to calculate the temperature from Celsius to Fahrenheit
- 5) Write a program to calculate the temperature from Fahrenheit to Celsius
- 6) Write a program to solve quadratic equation
- 7) Write a program for Salesman's salary
- 8) Write a program for pay-bill calculation
- 9) Write a program to print multiplication table
- 10) Write a program to print 10x10 binomial coefficients
- 11) Write a program to arrange the numbers in ascending order.
- 12) Write a program to find mean and standard deviation
- 13) Write a program to find median
- 14) Write a program to find the product of two $n \times n$ matrices.
- 15) Write a program to produce a table showing popularity of various cars in 4 cities

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218

PART - III	Title : SEQUENCES AND	Subject Code : 17 UMS A41
ALLIED	SERIES	
Semester : IV	HOURS : 5 hours / Week	CREDITS : 5

Objectives:

To provide the students an idea about the principle of sequence and series.

Unit I

Sequences – Bounded sequences – monotone sequences – convergent sequences – Divergent and oscillating sequences

Unit II

The Algebra of limits – Behavior of monotone sequences

Unit III

Cauchy's first limit theorem – Cauchy's second limit theorem – Cauchy's sequences

Unit IV

Infinite series – comparison test – Kummer's test

Unit V

Root test and condensation test – Alternating series – absolute convergence

Text Book:

Sequences and Series by S. ARUMUGAM & ISSAC

Unit – 1: Chapter 3 (Sections 3.1 – 3.5)

Unit – 2: Chapter 3 (Sections 3.6 – 3.7)

Unit – 3: Chapter 3 (Sections 3.8 – 3.11)

Unit – 4: Chapter 4 (Sections 4.1 – 4.3)

Unit – 5: Chapter 4 (Sections 4.4), Chapter 5 (Sections 5.1 – 5.2)

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PART - IV NME	Title : Basic Mathematics II	Subject Code : 17UMSN41
Semester : IV	HOURS : 2hours	CREDITS : 2

Objective:

To enable the students to acquire knowledge of mathematics for competitive examinations.

Unit I:

HCF & LCM (page 30 to 33)

Unit II:

Profit & Loss (pages 251 to 255)

Unit III:

Ratio & proportions (pages 294 to 295)

Unit IV:

Transportations problem –Finding IBFS using NWCR, LCEM & VAM
(pages 4.1 to 4.15 & 4.20 to 4.25)

Unit V:

Assignment problem (pages 5.1 to 5.20)

Text Book:

1. Quantitative aptitude by R.S.Agarwal. (UNIT 1 to UNIT 3)
2. Topics in Operations Research (Linear Programming) by S.Arumugam& others
(UNIT 4 & UNIT 5)

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V SEMESTER

Sl. No	Sub. Code	Nature	Subject Title	Hrs / Week	Duration of Exam (hrs)	CA	S E	Tot	Crd
1	17UMSC51	Core 7	Modern Algebra	6	3	25	75	100	5
2	17UMSC52	Core 8	Real analysis	6	3	25	75	100	5
3	17UMSC53	Core 9	Numerical Analysis	6	3	25	75	100	4
4	17UMSE51	Elective 1 *	Statistics I	6	3	25	75	100	5
5	17UMSE52	Elective 2 *	Programming C++ (Theory)	4	3	25	75	100	3
	17UMSEP1	Elective 2	Programming in C++ (Practical)	2	3	40	60	100	2
6	17UMSE53	Elective 3 *	Boolean Algebra & Logic	6	3	25	75	100	5
7	16USS S51		Soft Skills	-	-	-	-	100	-
TOTAL				30					24

***Note: Two Elective subjects to be chosen from the three elective subjects.**



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221

PART - III CORE	Title : MODERN ALGEBRA	Subject Code : 17 UMS C51
Semester : V	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in groups and its properties.

Review:

Groups – definitions and examples (not for examination)

UNIT I:

Subgroups – Definitions and examples – Center – Normalizer – Intersection and Union of Subgroups – Permutations – Cycles and Transpositions – Even and odd permutations – S_n and A_n .

UNIT II:

Cyclic groups – order of an element – Cosets and Lagrange's theorem

UNIT III:

Normal subgroups and quotient groups – Homomorphisms

UNIT IV:

Isomorphisms – rings – definition and examples.

UNIT V:

Elementary properties of rings – isomorphism – types of rings

TEXT BOOK:

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

Unit – 1 : Sections - 3.4 and 3.5

Unit – 2 : Sections - 3.6 to 3.8

Unit – 3 : Sections -3.9 and 3.11

Unit – 4 : Sections – 3.10 and 4.1

Unit—5 : Sections - 4.2 to 4.4

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222

PART - III CORE	Title : REAL ANALYSIS	Subject Code : 17 UMS C52
Semester : V	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in metric space and continuity.

Unit I

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 II

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

Unit III

Continuity- Definitions and examples-Homeomorphism-Uniform Continuity

Unit IV

Connected- Definitions and examples-Connected subsets of \mathbb{R} -Connectedness and continuity-Intermediate value theorem.

Unit V

Compactness-Definition and examples-Compact subsets of \mathbb{R} -Equivalent Characterization of compactness.

Text Book:

Analysis - 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

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223

PART - III CORE	Title : NUMERICAL ANALYSIS	Subject Code : 17 UMS C53
Semester : V	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in interpolations and difference equations.

UNIT-1:

Numerical solutions of Algebraic and Transcendental equations-Iteration method – Newton –Raphson - Method of false positions- Solutions of Simultaneous linear equations- Gauss elimination method-Gauss' Jordan method- Gauss Seidel 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 - Lagrange formula - Simple problems - Inverse interpolation using Lagrange formula.

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-Weddels rule.

TEXT BOOK:

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



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224

PART - III ELECTIVE	Title : STATISTICS - I	Subject Code : 17 UMS E51
Semester : V	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To acquire the students the knowledge in correlation and probability.

UNIT-1:

Central tendencies - Measures of dispersion- moment, skewness and kurtosis.

UNIT-2:

Curvefitting(all types of curves)

UNIT-3:

Correlation and regression

UNIT - 4:

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

UNIT - 5:

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

TEXT BOOK:

STATISTICS by Dr.S.Arumugam, A.Thangapandi Isaac Publishers: New Gamma Publishing House—July--2013.

Unit – 1 : Chapters 2,3,4

Unit – 2 : Chapter 5

Unit – 3 : Chapters 6

Unit - 4 : Chapter 11

Unit - 5 : Chapter 12 sections 12.1-12.4

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225

PART - III ELECTIVE	Title : PROGRAMMING IN C++	Subject Code : 17 UMS E52
Semester : V	HOURS : 4 hours / Week	CREDITS : 3

Objectives:

To enable the students to be familiar with the basic C++ concepts of constructors, destructors and inheritance.

UNIT I:

Tokens, expressions and control structures

UNIT II:

Functions in C++, classes and objects

UNIT III:

Constructors and destructors

UNIT IV:

Operator overloading and type conversion

UNIT V:

Inheritance

TEXT BOOK:

Object oriented programming in C++ by E.Balagurusamy.

Unit – 1 : Chapter 3(Sec 3.2 to 3.20,3.24)

Unit – 2 : Chapters 4 (Sec 4.3 to 4.11) Chapter 5 (Sec 5.3 to 5.16)

Unit – 3 : Chapter 6 (Sections 6.2 – 6.11)

Unit – 4 : Chapter 7 (Sections 7.2 – 7.8)

Unit – 5 : Chapter 8 (Sections 8.2 – 8.12)

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226

PART - III ELECTIVE	Title : PROGRAMMING IN C++ LAB	Subject Code : 17 UMS EP1
Semester : V	HOURS : 2 hours / Week	CREDITS : 2

Objectives:

To enable the students to design and implement C++ programs for simple applications.

- 1) Write a program to calculate Simple Interest and Compound Interest
- 2) Write a program for shopping list
- 3) Write a program to find the biggest number using class
- 4) Write a program to overload unary minus operator
- 5) Write a program to overload binary plus operator
- 6) Write a program to add two complex numbers using friend function
- 7) Write a program to add two time and hours.
- 8) Write a program to calculate EB charge
- 9) Write a program to calculate product of two complex numbers
- 10) Write a program for employee details
- 11) Write a program for bank transaction
- 12) Write a program for students file

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227

PART - III ELECTIVE	Title : BOOLEAN ALGEBRA AND LOGIC	Subject Code : 17 UMS E53
Semester : V	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in discrete mathematics.

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, Marcs Lars Lipson, Schaum's series, McGraw-Hill, International Editions 1999.

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VI SEMESTER

Sl. No.	Sub. Code	Nature	Subject Title	Hrs / Week	Durati on of Exam (hrs)	CA	SE	Tot	Crd
1	17UMSC61	Core 10	Linear Algebra	6	3	25	75	100	5
2	17UMSC62	Core 11	Complex Analysis	6	3	25	75	100	5
3	17UMSC63	Core 12	Operations Research	6	3	25	75	100	5
4	17UMSC64	Core 13	Programming in JAVA (Theory)	4	3	25	75	100	3
5	17UMSCP1	Core 13	Programming in JAVA (Practical)	2	3	40	60	100	2
5	17UMSE61	Elective 4 *	Statistics II	6	3	25	75	100	5
	17UMSE62	Elective 5 *	Discrete Mathematics						
6	16UGK B61		General Knowledge	-	-	-	-	100	-
TOTAL				30					25

***Note: One Elective subjects to be chosen from the two elective subjects.**



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229

PART - III	Title : LINEAR ALGEBRA	Subject Code : 17 UMS C61
CORE		
Semester : VI	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge vector space and inner product space.

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 of a 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 and A.T.Isaac Publications: SCITECH,2008.

Unit-1—Chapters 5, 5.0,5.1,5.2,5.3

Unit-2---Chapter 5, 5.4 ,5.5,5.6,5.7,5.8

Unit—3---Chapters 6,6.0,6.1,6.2,6.3

Unit—4—Chapter 7, 7.3,7.4,7.5 7.6,7.7,7.8

Unit—5—Chapter 8, 8.1,8.2

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PART - III CORE	Title : COMPLEX ANALYSIS	Subject Code : 17 UMS C62
Semester : VI	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To provide the students a comprehensive idea about analytic functions and residues.

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, Laurent’s theorem (Statement only) - Singular points – Poles - Argument principle - Rouché’s Theorem.

UNIT-5:

Calculus of residues - Evaluation of definite integral (the following types only) $\int_0^{2\pi} f(\cos\theta, \sin\theta) d\theta$ and $\int_{-\infty}^{\infty} f(x) dx$ where $f(x) = \frac{g(x)}{h(x)}$ and $g(x), h(x)$ are polynomials in x and degree of $h(x)$ exceeds that of $g(x)$ by at least two.

TEXT BOOK:

Complex Analysis by Dr.S.Arumugam, Thanga pandi Issac and A.Somasundaram.
 Publishers: SciTech.

- Unit-1 – Chapters 2 (sections 2.6, 2.7, 2.8)
- Unit-2 - Chapter 3 (sections 3.1 to 3.5)
- Unit-3 - Chapters 6 (sections 6.1 to 6.4)
- Unit - 4 - Chapter 7 (sections 7.1 to 7.4)
- Unit - 5 - Chapter 8 (sections 8.1 to 8.3)



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231

PART - III CORE	Title : OPERATIONS RESEARCH	Subject Code : 17 UMS C63
Semester : VI	HOURS : 6 hours /week	CREDITS : 5

Objectives:

To enable the students to acquire the basic knowledge in operations research. To make the students to understand the concepts of linear programming problem, Graphical solution to linear programming problem, the simplex method, duality, transportation problem and assignment problem

UNIT-1:

Introduction- Mathematical formulation of Lpp – simple examples of LPP – Graphical solutions – Simplex method.

UNIT-2:

Charne's method of penalties – Two phase simplex method (Simple Problems only) – Duality – Dual of the dual is primal.

UNIT-3:

Transportation problem – Finding IBFS using North West Corner method, Least cost Method and Vogel's Approximation Method – Degeneracy in Transportation problem – MODI Method.

UNIT-4:

Assignment problem – Mathematical formulation of AP – getting initial solution using Hungarian method – getting optimal solution of an assignment problems – Maximization case also included.

UNIT-5:

Game theory – Two persons zero sum games – saddle point – Games with saddle point – solution of Games without saddle point by using Formula method, Graphical Method and method of Dominance

TEXTBOOK:

Operations Research by Kanti Swarup, P.K. Gupta, Man mohan Publications: Sultan chand & sons.



PART - III CORE	Title : JAVA PROGRAMMING	Subject Code : 17 UMS C64
Semester : VI	HOURS : 4 hours /week	CREDITS : 3

Objectives:

To enable the students to learn the basic concepts of java programming.

UNIT I: Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens – Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments. Constants – Variables – Data types – Declaration of Variables – Giving Values to variables – Scope of Variables – Symbolic Constants – Type Casting.

UNIT II: Operators and Expressions: Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operators – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Operator Precedence And Associativity – Mathematical Functions. Decision Making and Branching: Decision Making with If statement – Simple. If Statement – If else Statement – Nesting If Else Statement – the ElseIf Ladder – The switch Statement – The?: operator. Decision Making and Looping: The while statement – The do statement – The for statement – Jumps in Loops.

UNIT III: Class, Objects and Methods: Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing class members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance. Arrays and Strings : One-dimensional Arrays – creating an Array – Two Dimensional Arrays – Strings.

UNIT IV: Interfaces: Multiple Inheritance: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

Packages: Java API Packages – Using system Packages _ Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a class to a Package.

UNIT V: Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority. Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing our own Exceptions – Using Exceptions for debugging.

Text Book

1. Programming with Java, A Primer, 3e, E.Blagurusamy, TATA McGraw-Hill Company, 2008.

- UNIT I : Chapters : 3,4
- UNIT II : Chapters : 5,6,7
- UNIT III : Chapters : 8,9
- UNIT IV : Chapters : 10,11
- UNIT V : Chapters : 12,13



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PART - III CORE	Title : JAVA PROGRAMMING LAB	Subject Code : 17 UMS CP1
Semester : VI	HOURS : 2 hours /week	CREDITS : 2

OBJECTIVES:

To enable the students to learn the basic concepts of java Lab

LIST OF PROGRAMS

Write programs in Java for the following:

1. To perform addition of complex numbers using class and objects.
2. To perform multiplication of matrices using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. Write a program to fill names into a list. Also, copy them in reverse order into another List. If the name contains any numeric value throw an exception "InvalidName".
6. Using multilevel inheritance process student marks
7. Implement multiple inheritance for payroll processing
8. Create a package called "Arithmetic" that contains methods to deal with all Arithmetic operations. Also, write a program to use the package
9. Create two threads such that one of the thread print even no's and another prints Odd no's up to a given range.
10. Define an exception called "Marks Out of Bound" Exception, that is thrown if the Entered marks are greater than 100.
11. String manipulation using string methods (Use of any five string methods preferred)
12. Write a program in Java to grade the students using Switch statement
13. Write a program in Java to calculate the Simple interest and Compound Interest

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PART - III ELECTIVE	Title : STATISTICS - II	Subject Code : 17 UMS E61
Semester : VI	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in sampling theory.

UNIT - 1:

Theory of attributes

UNIT - 2:

Index numbers.

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 and Chi-square.

TEXTBOOK:

STATISTICS by Dr.S.Arumugam, A.Thangapandi Isaac Publishers: New Gamma Publishing House—July--2013.

Unit—1—Chapter 8

Unit—2—Chapter 9

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

Unit—4—Chapter 14

Unit—5—Chapter 15,16

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235

PART - III ELECTIVE	Title : DISCRETE MATHEMATICS	Subject Code : 17 UMS E62
Semester : VI	HOURS : 6 hours / Week	CREDITS : 5

Objectives:

To enable the students to acquire the knowledge in automata theory and lattice theory.

UNIT -I

RELATIONS: Cartesian product of two sets- Relations- Representation of relations- Operations of relations- Composite relations- Equivalence relations.

UNIT-II

CODING THEORY: Introduction- Hamming distance- Encoding message- Group codes- Decoding and error correction-An example of single error – Correcting code.

UNIT-III

True false statements – connectives – Atomic compound statements – Parsing trees – Truth table of formula – Tautology – Tautological implementations and formulae – Replacement process.

UNIT-IV

Normal forms – Disjunctive normal form and conjunctive normal form – Principle disjunctive normal form and principle conjunctive normal form.

UNIT-V

Lattices – Hasse diagram – Properties of Lattices – New lattices – Lattice homomorphism.

TEXT BOOK: DISCRETE MATHEMATICS

AUTHOR : Dr.M.K.VENKADARAMAN, Dr.N.SRIDHARAN, V.CHANDRASEKARAN.

PUBLICATIONS: THE NATIONAL PUBLISHING COMPANY-2012

UNIT	CHAPTER	SECTION
I	2	2,3,4,5
II	8	1-7
III	9	2-9
IV	9	11-12
V	10	1-3

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