ARULMIGU PALANIANDAVAR ARTS COLLEGE FOR WOMEN

(Autonomous)
(Re-Accredited with 'A' Grade by NAAC)
(A Government Aided College - Affiliated to Mother Teresa Women's University, Kodaikanal)
CHINNAKALAYAMPUTHUR (PO), PALANI -624 615.

DEPARTMENT OF MATHEMATICS

SYLLABUS

2016-2019

OBJECTIVES:

- To impart value based education.

- To provide strong foundation in Mathematics.

- To make the students move towards higher academic ambitions in advanced Mathematics, technology, Bio informatics etc.

- To develop the students logical, systematic and critical way of thinking to assist in problem solving in their chosen career.

- To provide students scope for acquiring extra credits.

ELIGIBLITY FOR ADMISSION:

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

DURATION OF THE COURSE:

The student shall undergo the prescribed course of study for a period of three academic years (VI Semesters)

MEDIUM OF INSTRUCTION:

English.

GENERAL FRAMEWORK:

Course study-Part I, II, III, IV, V Subjects.

REGULATIONS:

1. Maximum Marks for theory and practical paper is 100 each.
2. The external examinations will be conducted at end of each semester for the duration of three hours per paper**.**

EVALUATION:

For each course there will be Continuous Internal Assessment (CIA) and final semester examinations.
Continuous Internal Assessment (CIA) carries 25 marks.

The components of CIA are as follows:

Test	:	15
Seminar	:	5
Assignment	:	5
Total	:	25
Total Marks for External is	:	75

Question Paper Pattern :

Duration	:	3 Hours
Maximum Marks	:	75

PATTERN	MARKS
Part A:Answer all 10 Questions (Each carrying 1 mark)	10x 1= 10
Part B:Answer 5 out of 7 (Each carrying 3 marks)	5X 3 = 15
Part C:Answer 4 out of 6 (Each carrying 5 marks)	4X 5 = 20
Part D:Answer 3 out of 5 (Each carrying 10 marks)	3X10= 30

- For the LAB papers, internal marks will be 25 and external marks will be 75, totaling 100.

ELIGIBLITY OF DEGREE:

- No candidate will be eligible for degree without completing the prescribed courses of study, lab work etc., and passing all the prescribed external examinations.
- The candidate requires 75% of attendance to attend the semester exam.
- Three internal exams will be conducted and best of two will be considered for the internal mark consolidation.
- The passing minimum is 40% in each paper.
- To complete the course the students should earn a minimum of 140 credits.

Semester	Title of the paper	Hours	Credits	Marks/Grade		
				CIA	CE	Total
I	Part – I Tamil Paper -I	6	3	25	75	100
	Part – II English Paper -I	6	3	25	75	100
	Part – III Core subjects Paper 1-Calculus	5	4	25	75	100
	Paper 2-Theory of equations Trigonometry & Fourier Series	5	4	25	75	100
	Allied : Physics Paper-I Theory Practical	3 2	3 -	25 -	75 -	100 -
	Part – IV :Skill Based Course Mathematics for competitive Examinations Value Education (theory - practical)	2 1	2 -	25 -	75 -	100 -
	Total	30	19			600
II	Part – I Tamil Paper -II	6	3	25	75	100
	Part – II English Paper -II	6	3	25	75	100
	Part – III Core subjects Paper 3-Analytic Geometry & Vector Calculus	5	4	25	75	100
	Paper 4-Sequences and Series	5	4	25	75	100
	Allied Physics Paper-II Theory Practical	3 2	3 4	25 40	75 60	100 100
	Part – IV :Skill Based Course Theory of Numbers Value Education (theory - practical	2 1	2 2	25 25	75 75	100 100
	Total	30	25			800

Semester	Title of the paper	Hours	Credits	Marks/Grade		
				CIA	CE	Total
III	Part – I Tamil Paper –III	6	3	25	75	100
	Part – II English Paper –III	6	3	25	75	100
	Part – III Core subject Paper 5- Modern Algebra Paper 6-Statics Allied : Statistics -I	5 4 5	4 4 5	25 25 25	75 75 75	100 100 100
	Part IV: Non Major Elective-I Mathematics for competitive Examinations	2	2	25	75	100
	SBC: Entrepreneurship Development	2	2	25	75	100
IV	Total	30	23			700
	Part – I Tamil Paper –IV	6	3	25	75	100
	Part – II English Paper –IV	6	3	25	75	100
	Part – III Core subjects Paper 7- Differential Equations and It's Applications Paper 8-Dynamics Allied : Statistics-II	6 5 5	5 4 5	25 25 25	75 75 75	100 100 100
	Part –IV Skill Based Course Solar System And Stellar Universe	2	2	25	75	100
	Part – V Extension Activities	-	1	100	-	100
	Total	30	23			700

Semester	Title of the paper	Hours	Credits	Marks/Grade		
				CIA	CE	Total
V	**Part –III Core Subjects** **Paper IX : Real Analysis**	6	5	25	75	100
	Paper X-Linear Algebra	6	4	25	75	100
	Paper X1-Programming in'C' **Theory**	4	3	25	50	75
	Practical	2	1	-	25	25
	Elective-I **Operations Research-I**	5	5	25	75	100
	Elective -II **Graph Theory**	5	5	25	75	100
	Part IV : SBC **Fuzzy Mathematics**	2	2	75	25	100
	Total	30	25			600
VI	**Part –III Core Subjects** **Paper XII :Complex Analysis**	7	5	25	75	100
	PaperXIIINumericalAnalysis	6	5	25	75	100
	Paper XIV:Object Oriented Programming in C++ **Theory**	4	3	25	50	75
	Practical	2	1	-	25	25
	Elective-III **Operations Research-II**	5	5	25	75	100
	Part IV : SBC **Project**	2	2	25	75	100
	Environmental Studies	2	2	25	75	100
	NME –II **Operations Research**	2	2	25	75	100
	Total	30	25			700

SEMESTER I - PAPER - I

Hours: 5
Credits:4

CALCULUS

Objectives:

To lay a strong foundation in calculus by introducing the concept of curvature and multiple integrals.

To provide techniques in solving problems using Jacobions.

UNIT 1:

Successive Differentiation - Expansion of Functions - Leibnitz Formula - Maxima and Minima of Functions of Two Variables.

TB 1 : (Chapter 3 : 1.1 to1.6 & 2.1, 2.2) (Chapter 7: 1.2 to 1.4 &Chapter 8: 4.1)

UNIT 2:

Curvature –Circle, Radius and Centre of Curvature –Evolutes and Involutes-Radius of Curvature in Polar Coordinates- p-r Equations.

TB 1 :(Chapter 10 : 2.1 to 2.8)

UNIT 3:

Definite Integrals and their Properties –Integration by Parts – Reduction Formula $\sin^n x$, $\cos^n x$, $\sin^m x\cos^n x$-Bernoulli's Formula.

TB 2 : (Chapter 1: 11, 12, 13.1 to 13.10, 14, 15.1)

UNIT 4:

Double and Triple Integrals – Change of Variables

TB 2 : (Chapter 5 : 2.1 , 2.2, 3.1 , 3.2 , 4) ,(Chapter 6 : 1.1 , 1.2 , 2.3 , 2.4)

UNIT 5:

Beta and Gamma functions : Definitions–Convergence of $\int(n)$-Reccurence formula of Gamma functions-Properties of Beta functions-Relation between Beta and Gamma functions-Definite Integrals by using Gamma functions.

TB 2 : (Chapter 7 : 2.1to 2.3, 3, 4, 5, 6)

Prescribed Text Books:

1 . **"CALCULUS –VOL I"** by**K.S.Narayanan and T.K.ManicavachagomPillay,** S.Viswanathan (Printers & Publishers) PVT Ltd., Chennai ,2008 .

2 . **"CALCULUS –VOL II"** by**K.S.Narayanan and T.K.ManicavachagomPillay,** S.Viswanathan (Printers & Publishers) PVT Ltd., Chennai,2010.

SEMESTER I-PAPER II

Hours :5

Credits:4

THEORY OF EQUATIONS, TRIGONOMETRY AND FOURIER SERIES

Objectives:

To acquaint the students with the tools in mathematics to understand and solve problems.

UNIT 1:

Theory of equations - Imaginary roots- Rational roots - Relation between the roots and co-efficient of equation - Symmetric functions of the roots - Sum of the power of the roots of an equation - Newton's theorem.
TB 1 (Chapter 6 : 1 to 14).

UNIT 2:

Transformation of equations - Roots multiplied by a given number - Reciprocal roots-Reciprocal equations - Standard forms to increase and decrease the roots of given equation by a given quantity. TB 1 (Chapter 6 : 15, 16, 17).

UNIT 3:

Descarte's rule of signs - Numerical solution by Horner's method and Newton's method -Solution of cubic and bi-quadratic equations.
TB 1 (Chapter 6 : 24, 30, 32, 33, 34, 35) & TB 3 (Chapter 5 : 5.10)

UNIT 4:

Expansion of functions – sinnx, cosnx, tannx, $\sin^n x$, $\cos^n x$, series of sinx, cosx, tanx – Hyperbolic functions - Logarithm of complex numbers.
TB 2 (Chapter 1 : 1.2, 1.3, 1.4), (Chapter 2 & Chapter 3)

UNIT 5:

Definition – Even and odd functions – Half range Fourier series – Expansion in any interval. TB 2 (Chapter 5)

Prescribed Text Books:

1.**"ALGEBRA VOL I"** by**T.K.ManickavachagomPillay, T.Natarajan and K.S. Ganapathy.** S. Viswanathan (printers & publishers) PVT, Ltd.,Chennai. 2008

2.**"TRIGONOMETRY & FOURIER SERIES"** by **Dr. S. Arumugam& others,** Gamma Publishing House, Palayamkottai.

3. **"THEORY OF EQUATIONS AND TRIGONOMETRY"** by **Dr. S. Arumugam& others,** Gamma Publishing House, Palayamkottai.2006

SEMESTER I – PART IV - SKILL BASED COURSE

Hours: 2

Credits: 2

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

UNIT 1:

Non – verbal Reasoning Tests – Completion of series, Classification, Non- verbal analogy.(TB 1)

UNIT 2:

Verbal Reasoning tests – Series completion- verbal classification – Verbal analogy.(TB 1)

UNIT 3:

Coding and decoding – Blood relationship.(TB 1)

UNIT 4:

Average problems on ages – Percentage profit and loss.(TB 2)

UNIT 5:

Ratio and proportion – Time and work.(TB 2)

Reference Books:

1.**"Quantitative Aptitude"** by **R.S. Aggarwal.**
Seventh Edition. S.Chand&Company LTD.
2.**"Test of Reasoning for competitive examinations"** by**Edgar Thorpe.**Third
Edition   Tata McGraw-Hill Publishing Company Limited,New Delhi.

SEMESTER II-PAPER III

Hours:5
Credits:4

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

Objectives:

To learn about three dimension geometry and to solve problems.

To appreciate idea of hierarchy in 3D.

Review:

Direction cosines, direction ratios of a straight line – Plane equations – Angle between two planes – Length of the perpendicular – Distance between two planes.

UNIT 1:

Two Dimensional Analytic Geometry : Polar Co-ordinates – Distance between the points – Area of Triangles – Equation of straight line, Circle, Conic – Simple Problems involving chords and Tangents.

TB 1 (Chapter 9 : 1 to 10).

UNIT 2:

The straight line – Symmetrical form – Image of a point – Image of a line about a plane – The plane and straight line – Angle between a plane and a straight line- Coplanar lines – Shortest distance between two lines.

TB 2 (Chapter 4 : 4.1 & 4.2).

UNIT 3:

The sphere – Equations of the sphere, tangent line – Plane section of a sphere – Equation of the circle on a sphere – Intersection of a two spheres – Equation of a tangent plane- Equation and Properties of a cone.

TB 2 (Chapter 5 &Chapter 6 : 6.1)

UNIT 4:

Differentiation – Gradient – Divergent- Curl and Connected Identities.

TB 2(Chapter 7).

UNIT 5:

Vector Integration – Line integeral – Surface integrals – Volume integerals – Green's theorem – Gauss's theorem- Stoke's theorem (proof not expected) – Simple problems. TB 2(Chapter 8).

Prescribed Text Books:

1. **"ANALYTICAL GEOMETRY OF 2D"** by**T.K. ManicavachagomPillay&**
T.Natarajan. S.Viswanathan (printers & Publishers) PVT., Ltd.

2.**"ANALYTICAL GEOMETRY OF 3D AND VECTOR CALCULUS"** by
Dr.S. Arumugam& Others, Gamma Publishing House, Palayamkottai.2008

SEMESTER II-PAPER IV

Hours: 5
Credits: 4

SEQUENCES AND SERIES

Objectives:

To acquire an in-depth knowledge in theory of vectors and apply the concepts in solving problems.

UNIT 1:

Sequences – Limit of sequence – Bounded sequences – Monotonic sequences – Convergent Sequences – Divergent and Oscillating Sequences - Algebra of limits.
(Chapter 3 : 3.1 to 3.6).

UNIT 2:

Behavior of monotonic sequences – Some Theorems on Limits- Subsequence – Limit Points -Cauchy's Sequences - Cauchy's general principle of convergence.
(Chapter 3:3.7 to 3.11).

UNIT 3:

Series – Convergence, divergence, oscillation of a series – Comparison test.
(Chapter 4 : 4.1, 4.2).

UNIT 4:

Kummer's Test- D' Alembert's ratio test — Raabe's test- Root Test - Condensation test
(Chapter 4 : 4.3, 4.4).

UNIT 5:

Integral Test - Alternating series – Absolute convergence – Conditional convergence – Leibnitz's test.
(Chapter 4 : 4.5 & Chapter 5 : 5.1 & 5.2).

Prescribed Text Book:
"SEQUENCES ANDSERIES"byDr.S.Arumugam& others,
Gamma publishing house, Palayamkottai.

SEMESTER II – PART IV - SKILL BASED COURSE

Hours: 2

Credits: 2

THEORY OF NUMBERS

UNIT 1:

Theory of numbers – Prime and Composite numbers – The sieve of Eratosthenes – Divisors of a given number – Simple problems .
(Chapter 5 : §1 to §7).

UNIT 2:

Euler's function – Integral part of a real number –The highest power of a prime p contained in n! - Simple problems **--**Product of r consecutive integers is divisible by r!
(Chapter 5 : § 8 to §11).

UNIT3:

Congruence - Criteria of divisibility of number - Simple problems - Numbers in arithmetic progression .
(Chapter 5: §12 to § 14).

UNIT 4:

Fermat's theorem – Simple problems – Generalization of Fermat's theorem.
(Chapter 5: §16 , §16.1).

UNIT 5:

Wilson's theorem—Lagrange's theorem—Simple problems.
(Chapter 5: §17 , §18).

Prescribed Text Book:
"ALGEBRA VOL II" by T.K.Manicavachagompillay, T.Natarajan, K.S.GanapathiS.Viswanathan(printers & publishers) Pvt.Ltd.2011

Hours: 5
Credits:4

MODERN ALGEBRA

Objectives:

To deal with elementary principles of the subject through concrete examples making abstract ideas and definitions natural.

Review:

Relations and definitions – Types of relations – Functions-Types of functions-Binary operations-Groups : Definition and examples-Elementary properties of a group (questions not expected)

UNIT 1:

Subgroup-Examples-Centre-normalize-Intersection and union of subgroups-Permutations-Cycles and transposition-Permutations as a product of disjoint cycles and transpositions-Even and odd permutations-S_n and A_n –Cyclic groups-Examples- properties-Number of generators of cyclic groups.
(Chapter 3 : 3.4, 3.5, 3.6)

UNIT 2:

Cosets and their properties – Congruence relation modulo a subgroup – Lagrange's theorem and its consequences – Euler's theorem – Fermat's theorem – Normal subgroups – Centre is a normal subgroup – Quotient groups.
(Chapter 3 : 3.8, 3.9).

UNIT 3:

Homomorphism – Kernel of a homomorphism – Isomorphism, Automorphism – Cayley's theorem – Fundamental theorem of homomorphism.
(Chapter 3 : 3.10, 3.11).

UNIT 4:

Rings – Definition and examples – Elementary properties of rings – Division rings and fields – Zero divisors of a ring – Zero divisors of Z_n – Integral domain – Cancellation laws – Any field is an integral domain – Any finite integral domain is a field – Characteristic of a ring – Characteristic of integral domain is either zero or a prime number. (Chapter 4 : 4.1, 4.2, 4.4, 4.5).

UNIT 5:

Ideals – Quotient rings – Maximal and prime ideals – Homomorphism of rings – Field of quotients of an integral domain. (Chapter 4 : 4.7, 4.11).

Prescribed Text Book:

"MODERN ALGEBRA" by **Dr.S.Arumugam& Others,**
Gamma Publishing House, Palayamkottai.

SEMESTER III - PAPER-VI

Hours: 4
Credits: 4

STATICS

Objectives:

To promote logical thinking and to understand basic principle of statics to be applied to do problems.

UNIT 1:

Forces acting a point – Parallelogram law – Triangle law of forces - Polygon law of forces - Lami's Theorem –Resolution of a force – conditions of equilibrium. (Chapter 2 : §1 to §9 , §11 to §16).
UNIT 2:

Forces action on a rigid body parallel forces- Moment of forces – Varigon's theorem - Couples- Equilibrium of two couples-Equivalence of two couples - Resultant of a couple and a force.(Chapter 3 : § 1 to § 13 & Chapter 4).
UNIT 3:

Three equilibrium forces acting on a rigid body – Three coplanar forces theorem – Two trigonometrically theorems – problems on parallel forces (Chapter 5 : §1 to §7 Simple problems only).
UNIT 4:

Laws of friction – Co-efficient of friction - Angle of friction – Cone of friction -Equilibrium of a particle on a rough inclined plane- Equilibrium of a body on a rough inclined plane under a force parallel to the plane. (Chapter 7: §1 to §11 Simple problems only).
UNIT 5:

Equilibrium of a body on a rough inclined plane under any force Problems on Frictions (Chapter 7 : §12 , §13 Simple Problems only).

Prescribed Text Book:

"STATICS" by **M.K. Venkataraman,** Eleventh edition**,**
Agasthiar Publications.2005

SEMESTER III – ALLIED PAPER

Hours: 5
Credits: 5

STATISTICS – I

Objectives:

    To develop an ability in the students to understand more concepts in statistics and to test hypothesis of different types.

UNIT 1:

    Skewness - Definition of skewness -Tests of Skewness-Measure of Skewness-Karl Pearson's Coefficient of Skewness-Kurtosis Moments-Simple problems only.
(Vol I - Chapter 9 : Page No.332 to 352)
UNIT 2:

    Correlation - Karl Pearson's coefficient of correlation - Correlation of grouped data, Rank correlation - Regression, Regression equations.
(Vol I - Chapter 10 : Page No. 386 to 390 : 394 to 398 ; 404 to 411 ;
Chapter 11 : Page No : 439 t0 451)
UNIT 3:

    Conditional Probability - Baye's theorem - Mathematical Expectation-Random Variables and Probability distribution-simple problems only
(Vol II - Chapter 1 : Page No : 765 to 774)
UNIT 4:

    Binomial Distribution - Properties of Binomial Distribution - Mean, Mode, Variance, Moment, Moment Generating Function - Fitting a Binomial Distribution
(Vol II - Chapter 2 : Page No : 809 to 824)
UNIT 5:

    Poisson Distribution-Mean & Variance - Role of the Poisson Distribution - Fitting a Poisson Distribution - Poisson Distribution as an Approximation of the Binomial Distribution
(Vol II - Chapter 2 : Page No : 826 to 835)

Prescribed Text Book:

    "STATISTICAL METHODS" by **S.P.Gupta**S.Chand& sons.

SEMESTER III – PART IV   NON-MAJOR ELECTIVE-I

Hours: 2

Credits: 2

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

UNIT 1:

Non – verbal Reasoning Tests – Completion of series, classification, Non- verbal analogy.(TB 1)

UNIT 2:

Verbal Reasoning tests – Series completion- verbal classification – Verbal analogy.(TB 1)

UNIT 3:

Coding and decoding – Blood relationship.(TB 1)

UNIT 4:

Average problems on ages – Percentage profit and loss.(TB 2)

UNIT 5:

Ratio and proportion – Time and work.(TB 2)

Reference Books:

1.“Quantitative Aptitude” by **R.S. Aggarwal.**
Seventh Edition. S.Chand&Company LTD.
2.“Test of Reasoning for competitive examinations” by**Edgar Thorpe.**Third
        Edition   Tata McGraw-Hill Publishing Company Limited,New Delhi.

SEMESTER IV – PAPER VII

Hours: 6

Credits: 5

DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS

Objectives:

To expose differential equation as powerful tool in solving problem in physical, social and Managerial Sciences.

Review:

Linear equations, with constant co-efficient – second order equations with constant Co-efficient.

UNIT 1:

Exact differential equations – equations of the first order but of higher degree – equations solvable for p, x and y – Clairaut's form – equation that do not contain x, y explicitly – equation homogeneous in x and y.
(Chapter 1: 1.2(TYPE-b), 1.3, 1.7).

UNIT 2:

Linear equations with variable co-efficient – removal of the first derivative – variation of parameters – simultaneous linear differential equation.
(Chapter II: 2.5 (TYPE- A, B, D), 2.6).

UNIT 3:

Partial differential equations – formation of partial differential equations – classification of integrals – standard form $Pp + Qq = R$ – standard types – Charpit's method.
(Chapter IV: 4.0, 4.1, 4.2, 4.3, 4.4 (TYPE-1, 2, 3, 4), 4.5).

UNIT 4:

Laplace transform – theorems – problems – inverse Laplace transforms – results – problems – Solving ordinary differential equations with constant co-efficient and simultaneous linear equations by using Laplace transform.
(Chapter III: 3.0, 3.1, 3.2, 3.3).

UNIT 5:

Applications of differential equations –growth, decay and chemical reactions – falling bodies and other rate problems – simple electric circuits – dynamical problems with variable mass – Newton's law of gravitation and motion of planets.
(Chapter VI: 6.2, 6.6, 6.7, 6.11, 6.12).

Prescribed Text Book:

- **DIFFERENTIAL EQUATIONS AND ITS APPLICATIONS**
  Dr.S. Arumugam& others, Gamma Publishing House, Palayamkottai.

SEMESTER IV – PAPER VIII

Hours: 5

Credits: 4

DYNAMICS

Objectives:

Enable students to apply Laws, Principles, and Postulates governing the Dynamics in Physical reality**.**

UNIT 1:

Newton laws of motion and applications.
(Chapter 4 : 4.1 to 4.36).

UNIT 2:

Projectiles – Equation of path of a projectile – Characteristics – Maximum horizontal range – Two possible directions of projections to obtain a given horizontal range – Range of a particle projected on an inclined plane – Maximum range on an inclined plane.
(Chapter 6 : 6.1 to 6.8, 6.12 to 6.16).

UNIT 3:

Impulses – Impact in a fixed plane – Direct and oblique impacts – Loss in kinetic energy.
(Chapter 7 : 7.1 & 7.2.Chap 8: 8.1 to 8.9).

UNIT 4:

Simple harmonic motion: Equation of motion – Composition of two simple harmonic motions – Simple Pendulum.
(Chapter 10 : 10.1 to 10.7 & 10.12 to 10.16).

UNIT 5:

Central orbits – Component of velocity and accelerations along and perpendicular to the radius vector – Differential equations of a central orbit - Pedal equation.
(Chapter 11 : 11.1 to 11.11).

Prescribed Text Book:

"**DYNAMICS**" by **M.K. Venkataraman.**Twelth Edition, Agasthiar Publications.

Note: Simple problems only.

SEMESTER IV – ALLIED PAPER

Hours: 5
Credits: 5

STATISTICS - II

Objectives:

To make students experts in data collections, classifications, tabulation, analysis and interpretation of numerical data to arrive at reasonable conclusions.

UNIT 1:

Normal distribution - Importance of Normal Distribution -Properties of Normal Distribution - Condition for normality - Area under the normal curve - Fitting of normal distribution (Method of Ordinates and Method of Areas).
(Chapter 2 : Page No: 836 to 858)

UNIT 2:

Hypothesis Testing - Procedure of Testing Hypothesis - Standard Error and Sampling Distribution - Tests of Significance for Attributes - Test of Significance for Large Samples.
(Chapter 3 : Page No: 882 to 890 & 895 to 910)

UNIT 3:

Test of Significance for Small Samples - Student's t-Distribution and its Applications - To Test the significance of Single Mean Difference of two Means for both Dependent and Independent Samples - Testing the Significance of an Observed Correlation Coefficient –T he Variance Ratio Test-F-test.
(Chapter 3 : Page No: 910 to 923)

UNIT 4:

Uses of Chi-Square Test-Chi-Square test as of Independence - 2.Chi-square test as a test of goodness of fit - 3.Chi-square test as a test of Homogeneity - Chi-Square test for Specified value of Population Variance.
(Chapter 4 : Page No: 960 to 972)

UNIT 5:

Analysis of Variance-One Way Classification-Two Way Classification -Latin Squares.
(Chapter 5 Page No: 1009 to 1038 & Chapter 6 : Page No: 1044 to 1048)

Prescribed Text Book:

"STATISTICAL METHODS" by **S.P.Gupta**S.Chand& sons.

SEMESTER V – SKILL BASED COURSE

Hours: 2
Credits: 2

SOLAR SYSTEM AND STELLAR UNIVERSE

Objective:

     To introduce the students to space science and to encourage them to become astronomers.

UNIT 1: Sun and Planets.

UNIT 2: Comets – Asteroids – Meteors – Zodiacal light.

UNIT 3: Eclipses – causes – conditions – comparison – different kinds of Eclipses.

UNIT 4: The Stellar Universe.

UNIT 5: Constellations – Zodiacal Constellations.

BOOKS FOR REEFERENCES:

1. Astronomy: G.V. Ramachandran.
2. Astronomy: Kumaravelu&SuseelaKumaravelu.
3. Why the sky is blue? – Scientific publications.

SEMESTER V – PAPER IX

Hours: 6
Credits: 5

REAL ANALYSIS

Objectives:

To introduce the basic concepts in analysis.
To make the students understand fundamental ideas and theorems
on metric spaces.

UNIT 1:

Introduction – Countable and uncountable sets – Inequalities of Holder&Minkowski – Metric space – Definition and examples – Open sets – Equivalent metric.
(Chapter 1, Chapter 2: Section 2.1 to 2.4)

UNIT 2:

Closed sets – Closure – Limit point – Dense sets – Completeness – Definition and examples – Cantor's intersection theorem – Baire's category theorem. (Chapter 2: Section 2.7 to 2.10 &, Chapter 3)

UNIT 3:

Continuity : Definition and examples – Uniform continuity – Homeomorphism
(Chapter 4: Section 4.1 to 4.3)

UNIT 4:

Connectedness – Definition and examples – Connected subsets of R – Connectedness and continuity – Intermediate value theorem.
(Chapter 5)

UNIT 5:

Compactness – Definition and examples – Compact subsets of R- equivalent characterization for compactness, continuity and compactness.

(Chapter 6)

Prescribed Text Book:

"**MODERN ANALYSIS**" **by Dr.S. Arumugam&Issac**,

Gamma Publishing House, Palayamkottai.

SEMESTER V – PAPER X

LINEAR ALGEBRA

Objectives:

The of this course is to be enable the students to understand the basis ideas of vector spaces, Linear transformations and their relation to matrices.

UNIT 1:

Elementary basic concept-Vector Space-Subspace-Homomorphism-Isomorphism-Ring of Linear Transformation-Internal Direct Sum-External Direct Sum.
(Chapter 4: 4.1).

UNIT 2:

Linear Independence and Bases-Linear Combination-Linear Span-Finite Dimensional-Linearly Dependent-Linearly Independent-Dimension.
(Chapter 4: 4.2).

UNIT 3:

Dual Spaces-Annihilator-System of Linear Homogeneous equations .
(Chapter 4: 4.3).

UNIT 4:

Inner Product Spaces -Norm- Orthogonality- Orthogonal Complement-Orthonormal Gram-Schmidt Orthogonalization process.
(Chapter 4: 4.4).

UNIT 5:

R-Module – Direct sum – Cyclic – Finitely generated.
 (Chapter 4: 4.5)

. **Prescribed Text Book:**
  "TOPICS IN ALGEBRA" by**I.N.Herstein** Second edition JohnWiley& Sons

SEMESTER V – PAPER XI

PROGRAMMING IN C

Objectives:

In order to make the students user – friendly with the key of the most powerful programming C language.

UNIT 1:

Constants, Variables and Data Types : Introduction – Character Set – C tokens – Keywords and identifiers – Constants – Variables – Data types – Declaration of variables – Assigning values to variables – Defining symbolic constants-Declaring a variable as constant-Declaring a variable as Volatile - Overflow and underflow of data.
(Chapter 2)

UNIT 2:

Operators and Expression : Introduction – Arithmetic of 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 – Some Computational Problems – Types conversions in expressions – Operator precedence and associativity – Mathematical functions. Managing input and output operators: Reading a character – Writing a character – Formatted input – Formatted output.
(Chapter 3 & Chapter 4)

UNIT 3:

Decision Making and Branching : Decision making with IF statement – simple IF statement – The IF ELSE statement – Nesting of IF……ELSE statement – The ELSE IF ladder – The Switch statement – The ? : Operator – The GOTO statement. Decision Making and Looping : The WHILE statement – The DO statement – The FOR statement – Jumps in loops-Concise Test Expressions .
(Chapter 5 &Chapter 6)

UNIT 4:

Arrays :One- dimensional arrays – Two – dimensional arrays – Initialization of one – dimensional arrays and two – dimensional arrays – Multidimensional arrays- Dynamic Arrays-More about Arrays. Character Arrays and Strings : Introduction- Declaring and initializing string variables – Reading strings from terminal – Writing strings to screen .

(Chapter 7 & Chapter 8 : 8.1 to 8.4)

UNIT 5:

User – defined functions : Need for user – defined functions – A multi-function program – The form of C functions – Return values and their types – Calling a function – category of functions- No arguments and no return values – handling of non–-Accessing the address of a variable – declaring and initializing pointers – Accessing a variable through its pointers – Pointer expressions.

(Chapter 9 & Chapter 11 :11.1 to 11.8)

Prescribed Text Book:

"PROGRAMMING IN C"by**E. Balagurusamy**, Fifth Edition.
        Tata McGraw - Hill Publishing company limited

PRACTICALS IN C

1. Write a program to calculate the Simple Interest.
2. Write a program to calculate Salesman commission.

Amount of Sales	Commission
10,000	5%
15,000	8%
More than 15,000	10%

3. Write a program to find the sum of the digits.
4. Check whether the given number is prime or not.
5. Write a program to find the roots of the quadratic equation.
6. Write a program to reverse the given string and checking palindrome.
7. Write a program to evaluate sine function.
8. Write a program to find the nc_r value using functions.
9. Write a program to sort the numbers (Ascending & Descending)
10. Write a program to add &subtract the two given matrices.
11. Write a program to multiply the two given matrices.
12. Write a program to find the determinant of the given matrix.
13. Write a program to count the number of words, characters and lines in the given text.
14. Write a program to count the occurrence of the character in a string

SEMESTER V – ELECTIVE-I

Hours: 5
Credits: 5

OPERATIONS RESEARCH - I

Objectives:

To create a logical foundation.

To make the students familiar with the scientific approach and techniques   in decision making problems.

To provide them a quantitative model for solving managerial problems.

UNIT 1:

Mathematical formulation of a LPP – Graphical solution to a LPP – extreme points – Convex sets simplex method.
(Chapter 2 : 2.1 to 2.4, chapter 3: 3.1 to 3.5, chapter 4: 4.1 & 4.3).

UNIT 2:

Artificial variables – Big M method – Two phase method.
 (Chapter 4: 4.4 & 4.5)

UNIT 3:

Duality – Formulation of primal – Dual pairs – Duality and simplex method – Dual simplex method – Fundamental theorem of duality.
 (Chapter 5: 5.1 to 5.7, 5.9)

UNIT 4:

Mathematical formulation of transportation problem – Finding initial basic feasible solution – Degeneracy in LPP – Optimum solution – Modi method – Unbalanced transportation problem.
 (Chapter 10: 10.1 to 10.13)

UNIT 5:

Mathematical formulation of Assignment problem – Assignment algorithm – Travelling salesman problem.
 (Chapter 11: 11.1 to 11.4 & 11.7)

Prescribed Text Book:
"OPERATIONS RESEARCH" byKantiswaroop, P.K. Gupta &Manmohan.
Sixteenth Edition ,Sultan Chand & Sons.

SEMESTER V – ELECTIVE-II

Hours: 5
Credits: 5

GRAPH THEORY

Objectives:

To enable the students to acquire the general techniques of Graph Theory.
To make them understand its applications to a wide variety of subjects.

UNIT 1:

Graphs – Pictorial   representation –Sub graphs – Isomorphism and Degree –Connectedness: Walks Trails and paths –Cycle –Connectedness and Components   –Cutpoint and Cutedge.
(Chapter 2:2.1 to 2.4, chapter 4: 4.1 & 4.2).

UNIT 2:

Blocks - Connectivity– Eulerian graphs – Fleury's algorithm.
(chapter 4: 4.3,4.4 & Chapter 5: 5.1).

UNIT 3:

Hamiltonian graphs –Matching- Matching in Bipartite graphs – Marriage problem.
(Chapter 5: 5.2, & Chapter 7: 7.1, 7.2)

UNIT 4:

Trees- Characterisation of Trees-Centre of a Tree-– Planar graphs – Euler formulas. (Chapter 6: 6.1, 6.2 & Chapter 8: 8.1).

UNIT 5:

Director graphs – Connectivity in Digraphs strong orientation of graphs – Eulerian Digraphs. (Chapter 10: 10.1 & 10.2).

Prescribed Text Book:

"Invitation to Graph theory" by **S. Arumugam& Others**

Scitech Publishers, India PVT. Ltd, 2000.

SEMESTER V- SKILL BASED COURSE

Hours: 2
Credits: 2

FUZZY MATHEMATICS

UNIT 1:

Introduction – Crisp sets - properties - Introduction - Fuzzy sets – Basic types of Fuzzy sets- Basic concepts (Chapter 1 : 1.1 to 1.4).

UNIT 2:

Fuzzy sets verses crisp sets – Additional properties of α – cuts

(Chapter 2 : 2.1).

UNIT 3

Representations of Fuzzy sets – Extension Principle for Fuzzy sets.

(Chapter 2 : 2.2 & 2.3).

UNIT 4:

Operations of Fuzzy sets – Types of operations – Fuzzy complements – First Characterization Theorem – Second Characterization Theorem.

(Chapter 3 : 3.1 & 3.2).

UNIT 5:

Fuzzy Intersection : t-norms - Fuzzy unions: t – Co norms – Fuzzy numbers

(Chapter 3 : 3.3,3.4 & 4.1).

TEXT BOOK:

"FUZZY SETS AND FUZZY LOGIC Theory and Applications" by

George J.Klir/Bo Yuan PHI Learning Private Limited

SEMESTER VI – PAPER XII

Hours: 7
Credits: 5

COMPLEX ANALYSIS

Objectives:

To provide the students an introduction to Complex Analysis of one variable.

To introduce the theory of analytic function, complex integration and some bilinear transformations.

UNIT 1:

Continuous function – Differentiability – C-R equations in Cartesian and polar co-ordinates – Analytic function – Harmonic functions – Conformal mapping.

(Chapter 2 : 2.1 to 2.9).

UNIT 2:

Circles and straight lines – Elementary transformations – Bilinear transformation – Cross ratio – Fixed points-Special bilinear Transformations

(Chapter 1: 1.7 & Chapter 3: 3.1 to 3.5)

UNIT 3:

Complex integration - Cauchy's integral theorem- Cauchy's integral formula – Higher derivatives – Cauchy's inequality – Liouville's theorem – fundamental theorem

(Chapter 6)

UNIT 4:

Taylor's series – Laurent's series – zeros of an analytic function – singularities.

(Chapter 7)

UNIT 5:

Residues – Cauchy's residue theorem – Argument theorem – Rouche's theorem – Evaluation of definite integrals.

(Chapter 8: 8.1,8.2,8.3 Type 1 only)

Prescribed Text Book:

"**COMPLEX ANALYSIS**"by **Dr. S. Arumugam**.

Scitech Publication (India) PVT Ltd., Chennai.

SEMESTER VI – Paper XIII

Hours: 6
Credits: 5

NUMERICAL ANALYSIS

Objectives:

    To provide knowledge of applied Mathematics with Numerical side of Mathematical analysis.

UNIT 1:

    Solution of algebraic and transcendental equations – Iteration method – Newton Raphson method – method of false positions – solutions of simultaneous linear equations – Direct method – Gauss elimination method, Gauss Jordan method – Iteration method – Jacobi method , Gauss – Seidel method.
(Chapter 3 & Chapter 4:4.2, 4.7 to 4.9)

UNIT 2:

    Newton's forward and backward interpolation formula – Central Difference Interpolation Formulae(For equal intervals) – Gauss's forward and backward formula – Stirling's formula.
(Chapter 6: 6.2 to 6.6 & Chapter 7: 7.3 to 7.5)

UNIT 3:

    Interpolation with unequal intervals – Divided differences –
Lagrange's formula – Numerical differentiation up to second order– Maxima and minima. (Chapter 8 & Chapter 9: 9.2 to 9.6)

UNIT 4:

    Numerical integration – Quadrature (Cote's) formula – Trapezoidal rule – Simpson's one-third rule – Three-eight rule – Weddle's rule.
(Chapter 9: 9.7 to 9.15)

UNIT 5:

    Numerical solution of differential equation – Taylor series method – Euler's method – Modified Euler's method – Runge -Kutta method for second and fourth order D.E. (Chapter 11: 11.1 to 11.15)

Prescribed Text Book:

   "NUMERICAL METHODS" byDr.P.Kandasamy , Dr.K.Thilagavathy &Dr.K.GunavathiS.Chand&Company LTD

SEMESTER VI – PAPER XIV

Hours:6
Credits:4

OBJECT ORIENTED PROGRAMMING WITH C++

Objectives:

To offer significant software engineering benefits over C and to present the concept of object oriented analysis and design of systems.

UNIT 1:

Fundamentals of C++ - Structure of C++ program – Creating of source file – Compiling and linking – Tokens – Keywords identifiers – Basic data types – User defined data types – Derived data types – Symbolic constants – Types compatibility – Declaration of variables – Dynamic initialization of variables – Reference variables – Operators – C++ - Conversions operator overloading – Control structures .   (Chapter 2 & Chapter 3)

UNIT 2:

The main function – Function prototyping – Inline – Inline functions – Function overloading – Friend and virtual function.   (Chapter 4)

UNIT 3:

Specifying a class – Defining member functions – Marketing an outside function inline – Nesting of member functions – Private member functions arrays within a class-Memory allocation for objects – Static data members static member functions arrays of objects – Objects as function – Arguments friendly functions – Returning objects constant member functions – Pointers to members.
(Chapter 5)

UNIT 4:

Constructors – Parameterized constructors – Multiple – Constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Constructing two dimensional arrays – Destructors - Defining operator overloading – Overloading unary operators – Overloading binary operators – overloading binary operators using friends – Manipulation of strings using operators – rules for overloading operators – Type conversions (Chapter 6& Chapter 7)

UNIT 5:

Inheritance: Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance-Virtual base classes-Abstract classes-Constructors in derived classes-Nesting of classes   (Chapter 8)

Prescribed Text Book:

   "OBJECT ORIENTED PROGRAMMING WITH C++"

by **E. Balagurusamy**. Fourth Edition, Tata McGraw - Hill Publishing company limited

PRACTICALS IN C++

1. Write a program to convert temperature Fahrenheit into Celsius.

2. Write a program to print the following output using for loops.
    ```
    1
    2 2
    3 3 3
    4 4 4 4 and so on.
    ```

3. Write a program to calculate variance and standard deviation of n numbers.

4. Write a macro that obtains the largest of three numbers.

5. Write a program to maintain the stock details using class.

6. Write a program to add complex numbers using operator overloading.

7. Write a program to multiply complex numbers using operator overloading.

8. Write a program to the unary minus operator is overloaded.

9. Write a program to maintain the employees information using inheritance.

10. Write a program to find the largest value of two numbers using nesting of member function.

11. Write a program for shopping list using classes and objects.

12. Write a program to maintain the library details using constructor and destructor.
13. Write a program to overloading operators using friends

SEMESTER VI – ELECTIVE-III

OPERATIONS RESEARCH-II

Objectives:

To expose the Mathematical tools applied to social and managerial Sciences**.**

UNIT 1:

Sequencing problem – Problems with n jobs 2 machines – n jobs 3 machines – n jobs m machines – Replacement problem – Replacement of items whose maintenance cost increase with time (with/without change in the value of money) – Replacement of items which fail completely – Individual and group replacement.
TB 1(Chapter 12: 12.1 to 12.5 & Chapter 18: 18.1 to 18.3)

UNIT 2:

Game theory two person zero sum game – Pay off matrix – Solution of a game - The Maxmin – Minimax principles – Saddle points – Solution of a rectangular game with saddle point – without saddle points by the following methods 1)Using formula2) Graphical method   3) Approximation by intersection 4) Algebraic method   5) L.P. method.
TB 1(Chapter 17: 17.1 to 17.9)

UNIT 3:

Queuing theory – Introduction – Types of Queue discipline – Steady state probabilities in each classification of queuing problem.

1) $(M/M/1) : (\infty/FIFO)$
2) $(M/M/1) : (N/FIFO)$
3) $(M/M/C) : (\infty/FIFO)$
4) $(M/M/C): (N/FIFO)$ Birth-Death process.

TB 1 (Chapter 21: 21.1 to 21.4, 21.7, 21.8, 21.9(Model I to Model VI)

UNIT 4:

Inventory control – Selective control techniques — Economic lot size problem – Problem of EOQ with shortage –Inventory control technique (uncertain demand) - ABC analysis. TB 2 (Chapter 7),

UNIT 5:

PERT, CPM : Applications – Network – Critical path method – Total float – Free float PERT calculations.TB 1 (Chapter 25: 25.1 to 25.8)

Prescribed Text Books:

1. **"OPERATIONS RESEARCH"** by **Kantiswarup, P.K Gupta &Manmohan Sultan Chand.**
2. **"OPERATIONS RESEARCH"** by **DharaniVenkatakrishnan**.

SEMESTER VI – NON MAJOR ELECTIVE-II

Hours : 2

Credits : 2

OPERATIONS RESEARCH

UNIT 1:

Sequencing problem – Basic terms – Processing n jobs through 2 machines processing n jobs through 3 machines.
(Chapter 10 : 10.1 to 10.4)

UNIT 2:

Games - Strategies – Introduction – Two person zero – Sum games.
(Chapter 17 :17.1 to 17.3)

UNIT 3:

The Maxmin – Miinimax Principle – Games without Saddle Point – Mixed strategies.
(Chapter 17 : 17.4&17.5)

UNIT 4:

Graphical solution of 2xn and mx2 games-Dominance Property.
(Chapter 17 : 17.6 & 17.7)

UNIT 5:

Replacement of equipment / Asset that Deteriorates gradually – Replacement of equipment that fails suddenly.
(Chapter 18 : 18.2,18.3)

Prescribed Text Book:

"OPERATIONS RESEARCH "by **KantiSwarup, P.K. Gupta&Manmohan,** Sixteenth Edition, Sultan Chand & Sons.

Note: Problems only.

SEMESTER I – PAPER I

Hours:5
Credits:5

ALLIED MATHEMATICS
(B.Sc., Physics &Chemistry)
THEORY OF EQUATIONS, MATRICES, FINITE DIFFERENCES,TRIGONOMETRY AND DIFFERENTIAL CALCULUS
Objectives:

To understand the fundamental concepts of Algebra & Finite Differences.

To introduce the fundamental concepts of Trigonometry & Differential Calculus.

UNIT 1:

Theory of equations : n^{th} degree has exactly n roots – Relation between roots and co-efficient – Transformation of equations- Reciprocal equations – Newton - Raphson Method.

(Chapter : I, II, III)

UNIT 2:

Matrices : Fundamental Concepts – Type of Matrices – Inverse of the Matrices –Rank of Matrices –Linear equations –Homogeneous and Non-Homogeneous linear equations.

(Chapter : I, II, III)

UNIT 3:

Interpolations : Newton's forward, backward interpolation – Lagrange's interpolation

(Chapter : II,III)

UNIT 4:

Trigonometry : Hyperbolic functions - Logarithm of Complex Quantities. (Chapter : II,III)

UNIT 5:

Differential Calculus :Jacobians -Polar Curves - Curvature – Radius of curvature in Cartesians – Parametric Form.

(Chapter : II,III ,IV)

Prescribed Text Book:

"ALLIED MATHEMATICS"PAPER-IFirst semester by

P .Kandasamy , K . ThilagavathyS.Chand 2008.

SEMESTER II – PAPER II
ALLIED MATHEMATICS
(B.Sc., Physics &Chemistry)
INTEGRAL CALCULUS,DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORMS & VECTOR ANALYSIS.

Hours:5

Credits:5

Objectives:

To acquaint the students become familiar with tools in Mathematics to understand problems.

UNIT 1:

Integral calculus : Methods of integration-Definite integrals of the form $\int \frac{f'(x)}{f(x)}dx$, $\int \frac{f'(x)}{\sqrt{f(x)}}dx$ $\int \frac{a\cos x+b\sin x}{\alpha\cos x+\beta\sin x}dx$, $\int e^x[f(x)+f'(x)\,dx]$ only - Integration by parts-Properties of Definite Integrals - Reduction formulae $\sin^n x, \cos^n x$ only
[Chapter : 1 Pg.No : 1 to 19 & 46 to 51] ; [Chapter : 2 Pg.No : 53 to 60] ;
[Chapter : 3 Pg.No : 61 to 64]

UNIT 2:

Fourier series – Even and Odd functions.
[Chapter : 6 Pg.No : 140 to159]

UNIT 3:

Equations of first order and of degree higher than one –Total Differential Equation-Partial Differential equations.
[ODE - Chapter : 1,2 Pg.No:160 to 179] ,
[PDE- Chapter : 1 (1.1 to 1.4)Pg.No:186 to 195]

UNIT 4:

Laplace Transforms – Inverse Laplace Transforms
[Chapter : 1 Pg.No : 234 to272]

UNIT 5 :

Vector Analysis : Differentiation of Vectors - Gradient , Divergence and Curl   [Chapter : 1,2   Pg.No:299 to320]

Prescribed Text Book:

"ALLIED MATHEMATICS"PAPER-IIsecond semester by
P .Kandasamy , K . ThilagavathyS.Chand 200 8.

EXTERNAL QUESTION PATTERN FOR CORE, ALLIED
AND ELECTIVES PAPERS

Maximum: 75 marks   **Time: 3 hours**

SECTION – A   (10 X 1 = 10)

Answer **ALL** questions   (Two Questions from each Unit)

   This may include multiple choice, true or false ,fill up, very short answer and simple examples.

SECTION – B   (5X3 = 15)

Answer any **FIVE** questions out of **SEVEN** questions.

   (Each Unit must have one or two questions)

SECTION – C   (4 X 5 = 20)

Answer any **FOUR** questions out of **SIX** questions.

   (Each Unit must have one or two questions)

SECTION – D   (3 X 1 0= 30)

Answer any **THREE** questions out of **FIVE** questions.

   (One question from each Unit)

INTERNAL QUESTION PAPER PATTERN

Time: 1 hour   **Total Marks: 25**

Section A: 5X1= 5   No choice
Section B: 2X5=10   2 out of 4 questions
Section D: 1X10=10   1 out of 2 questions

EXTERNAL QUESTION PATTERN FOR SKILL BASED COURSE AND NON-MAJOR ELECTIVE -II

Maximum: 75 marks   **Time: 3hours**

SECTION– A   (5 X 3 = 15)

Answer any **Five**questions out of **Eight** questions

   (Each Unit must have one or two questions)

SECTION– B   (5 X 6 = 30)

Answer any **Five**questions out of **Eight** questions

   (Each Unit must have one or two questions)

SECTION– C   (3 x 10 = 30)

Answer any **Three** questions out of **Five** questions.

   (One question from each Unit)

INTERNAL QUESTION PAPER PATTERN

Time: 1 hour   **Total Marks: 25**

Section A: 1X3= 3   1 out of 2 questions
Section B: 2X6=12   2 out of 4 questions
Section D: 1X10=10   1 out of 2 questions

EXTERNAL&INTERNAL QUESTION PATTERN FOR
NON-MAJOR ELECTIVE-I &SEMESTER I   SKILL BASED COURSE

(MATHEMATICS FOR COMPETITIVE EXAMINATION)

EXTERNAL QUESTION PATTERN :

    Maximum: 75 marks   **Time: 3 hours**

    Answer ALL the questions (75 X 1 = 75)

(Objective type Only)

INTERNAL QUESTION PATTERN :

    Maximum   : 25 marks   **Time: 1 hour**

        Test   **: 25 marks   (25 x 1 =25)**
    Question Pattern   : Objective type Only