GOVERNMENT COLLEGE FOR WONMEN(A), KUMBAKONAM
PG & RESEARCH DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS – REVISED COURSE STRUCTURE UNDER CBCS
(For the Candidates admitted from the Academic year – 2017 – 2018 onwards)

Department : MATHEMATICS   **Programme Code: USMA**

SEMESTER – I

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	**LC**	17GT1	Tamil-1	6	3	3	25	75	100
II	ELC	17GE1	English-I	6	3	3	25	75	100
III	CC-I	17MC101	Differential and Integral Calculus	6	5	3	25	75	100
III	CC-II	17MC202	Analytical Geometry (3D) and Trignometry	3	*	-	-	-	-
III	AC-I	AACH1/ 171ACS	Allied Chemistry I / Allied Comp.Science I	6	4	3	25	75	100
III	AC-II	BACH2P/1 72ACS2P	Chemistry / Comp.Science (Practical)	3	*	-	-	-	-
			TOTAL	30	15				400

SEMESTER - II

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	**LC**	17GT2	Tamil-II	6	3	3	25	75	100
II	ELC	17GE2	English-II	6	3	3	25	75	100
III	CC-II	17MC202	Analytical Geormetry (3D) and Trignometry	3	5	3	25	75	100
III	CC-III	17MC203	Theory of Equations and	5	5	3	25	75	100

III	AC-II	BACH2P/172ACS2P	Chemistry / Comp.Science (Practical)	2	3	3	40	60	100
III	AC-III	BACH3/172ACS3	Allied Chemistry I / Allied Comp.Science I	4	3	3	25	75	100
IV	AEC	18UVE	Value Education	2	2	3	25	75	100
IV	AEC	UGCES	Environmental Studies	2	2	3	25	75	100
TOTAL				30	26				800

SEMESTER-III

Part	Course Type	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	CIA	ESE	Total
I	**LC**	17GT3	Tamil-III	6	3	3	25	75	100
II	ELC	17GE3	English-III	6	3	3	25	75	100
III	CC-IV	17MC304	Sequences and Series	6	5	3	25	75	100
III	CC-V	17MC405	Mathematical Statistics	3	*	-	-	-	-
III	AC-I	CAPH1	Allied Physics I	5	4	3	25	75	100
III	AC-II	DAPH2P	Allied Physics Practical	2	*	-	-	-	-
IV	NMEC-1	MCNMEC1:1	Mathematics for Competitive Examinations – I	2	2	3	25	75	100
		MCNMEC1:2	Commercial Mathematics						
TOTAL				30	17				500

SEMESTER - IV

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	CIA	ESE	Total
I	**LC**	17GT3	Tamil-IV	6	3	3	25	75	100
II	ELC	17GE3	English-IV	6	3	3	25	75	100
III	CC-V	17MC405	Mathematical Statistics	2	4	3	25	75	100
III	CC- VI	17MC406P1	Mathematical Statistics Practical (Using SPSS)	5	4	3	40	60	100
III	AC-II	DAPH2P	Allied Physics Practical	3	3	3	40	60	100
III	AC-III	DAPH3	Allied Physics II	4	3	3	25	75	100
IV	Skill Based Elective Course-I	SBEC1	Inter Personal Skills	2	4	3	25	75	100
IV	NMEC2	MDNMEC2:1	Mathematics for Competitive Examinations – II	2	2	3	25	75	100
		MDNMEC2:2	Bio Statistics						
	TOTAL			30	26				800

SEMESTER –V

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	CIA	ESE	Total
III	CC-VII	Part-III (CCVII) 17MC507	Abstract Algebra	6	5	3	25	75	100

Part	Course Type	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	CIA	ESE	Total
III	CC-VIII	17MC508	Real Analysis	5	4	3	25	75	100
III	CC-IX	17MC509	Statics	5	4	3	25	75	100
III	CC-X	17MC510	Differential Equations, Laplace Transforms and Fourier series	5	4	3	25	75	100
III	EC-1	17M5EC3:1	Operations Research	5	5	3	25	75	100
		17M5EC3:2	Mathematical Modelling						
IV	Skill Based Course-II	SBEC2	Office Management	2	4	3	25	75	100
IV	Skill Based Course-III	SBEC3	Office Communication	2	4	3	25	75	100
	TOTAL			30	30				700

SEMESTER - VI

Part	Course Type	Course Code	Title of the Course	Hrs / Week	Credits	Exam Hrs	CIA	ESE	Total
III	CC- XI	17MC611	Complex Analysis	6	5	3	25	75	100
III	CC-XII	17MC612	Graph theory	6	5	3	25	75	100
III	CC-XIII	17MC613	Dynamics	6	5	3	25	75	100
III	EC- II	17M6EC4:1	Numerical Analysis	5	4	5	25	75	100
		17M6EC4:2	Astronomy						
III	EC-III	17M6EC5	Discrete	4	3	3	25	75	100

Part	Course Code		Title of the Course	Hrs/Week	Credits	Exam Hrs	CIA	ESE	Total
			Mathematics						
IV	Skill Based Course-II	GS	Gender Studies	1	1	3	25	75	100
III	Naan Mudhalvan	U23NM6DA	Data analysis with advanced tools	2	2		25	75	100
TOTAL				30	25				700
	Self Study Course	USSC1	Mathematics Aptitude for Recruitment Board Examinations	-	2	2	-	-	100

Total No. of Papers   : 39
Total Hours   : 180
Total Credits   : 139
Extension Activities : 01
Total Marks   : 3900

Papers offered by the Department of Mathematics for Other Major Students

Part	Course Code	Title of the Course	Hrs/Week	Credits	Exam Hrs	Marks		
						CIA	ESE	Total
III	171AM1	Calculus and Fourier Series	6	4	3	25	75	100
III	171AM1:CS	Algebra, ODE and Trigonometry	6	4	3	25	75	100
III	172AM2	Laplace Transforms, Calculus and Vector Calculus	6	4	3	25	75	100
III	172AM2:CS	Numerical Methods	4	3	3	25	75	100
III	172AM3	Operations Research	4	3	3	25	75	100
III	172AM3:CS	Probability and Statistics	4	3	3	25	75	100

CC-I DIFFERENTIAL AND INTEGRAL CALCULUS

Objectives:
1. To expose the students to various techniques of integration.
2. To study concepts of definite integrals.

UNIT I :

Methods of Successive Differentiation – Leibnitz's Theorem and its applications – Increasing and Decreasing functions.

UNIT II :

Curvature –Radius of Curvature in Cartesian and in polar coordinates – Centre of curvature – Evolutes and Involutes.

UNIT III :

Integration by parts – Definite Integrals and reduction formulae.

UNIT IV :

Double Integrals – Changing the order of Integration – Triple Integrals.

UNIT V :

Beta and Gamma functions and relation between them – Integration using Beta and Gamma functions.

TEXT BOOKS:

[1] T.K. Manickavasagam Pillai and others Differential Calculus, volume– I
S.V. Publications, Chennai- Reprint 2002.

[2] T.K. Manickavasagam Pillai and others, Integral Calculus, volume –II
S.V.Publications, Reprint 2002.

UNIT   I   : Chapter 3 (sections 1.1 to 2.2) and
Chapter 4   (sections 2.1 , 2.2) of [1]

UNIT   II   : Chapter 10 (sections 2.1 to 2.6) of [1]

UNIT   III   : Chapter 1 (sections 11, 12 and 13) of [2]

UNIT   IV   : Chapter 5 (sections 2.1, 2.2) and   (section 4) of [2]

UNIT   V   : Chapter 7 (sections 2.1 to 2.5) of [2]

REFERENCE(S):

[1] Duraipandian and Chatterjee, Analytical Geometry.

[2] Shanti Narayanan , Differential and Integral Calculus.

CC-II ANALYTICAL GEOMETRY (3D) AND TRIGONOMETRY

Objectives
1. To study three dimensional Cartesian Co-ordinates system.
2. To introduce the basic concepts of Vector Calculus.

UNIT   I:

Coplaner lines – Shortest distance between two skew lines – Equation of the Line of shortest distance.

UNIT   II:

Sphere – Standard equation – Length of a tangent from any point – Sphere passing through a given circle – Intersection of two Spheres.

UNIT   III:

Expansions of $\sin(nx)$, $\cos(nx)$, $\tan(nx)$ – Expansions of $\sin^n x$, $\cos^n x$ – Expansions of $\sin(x)$, $\cos(x)$, $\tan(x)$ in powers of x.

UNIT   IV:

Hyperbolic functions – Relation between hyperbolic and circular functions –Inverse hyperbolic functions.

UNIT   V:

Logarithm of a complex number – Summation of Trigonometric series – Difference method – Angles in arithmetic progression method – Gregory's Series.

TEXT BOOKS

[1]   T.K. Manickavasagam Pillai and T.Natarajan Analytical Geometry,part–II
        [Three Dimensions] S.V. publications,Chennai – Reprint – 2002
[2]   S.Arumugam and others , Trigonometry And Fourier series New Gamma
        publications –1999.

UNIT	I	: Chapter 3 (sections 7 and 8) of [1]
UNIT	II	: Chapter 4 (sections 1 to 8) of [1]
UNIT	III	: Chapter 1 (sections 1.2 to 1.4) of [2]
UNIT	IV	: Chapter 2 (sections 2.1 and 2.2) of [2]
UNIT	V	: Chapter 3 and Chapter 4 (sections 4.1, 4.2 and 4.4) of [2]

REFERENCE(S)

[1]   S.Arumugam and Isacc , Calculus, volume I, New Gamma Publishing House, 1991
[2]   S.Narayanan, T.K Manickavasagam Pillai,Trigonometry, S.Viswanathan   Pvt Limited and
        Vijay Nicole Imprints Pvt Ltd, 2004.

CC – III   THEORY OF EQUATIONS AND VECTOR CALCULUS

Objectives:

1. To study the relation between the roots and coefficients and nature of the roots.
2. To study the concepts of Weirstrass inequalities, Cauchy's inequality and application of Maxima and Minima functions.

UNIT I :

Relation between the roots and coefficients of polynomial Equations – Symmetric functions – Sum of the rth powers of the   roots – Two methods [Horner's method and Newton's Method].

UNIT II:

Transformations of Equations – (Roots with sign changed – Roots multiplied by a given number– Reciprocal roots) – Reciprocal equations – To increase or decrease the roots of given equation by a given quantity – Form the quotient and Remainder when a polynomial is divided by a binomial – Removal of terms – To form an equation whose roots are any power of the roots of a given equation.

UNIT III:

Vector differentiation – Velocity and acceleration vectors – Vector and scalar fields – Gradient of a vector – Unit normal – Directional derivative – Divergence and curl of a vector – Solenoidal and Irrotational vectors – Laplacian double operators – Simple problems.

UNIT IV:

Vector Integration – Tangential line integral – Conservative   force field – Scalar potential – Work done by a force – Normal surface integral – Volume integral – Simple problems.

UNIT V:

Gauss Divergence theorem – Stoke's theorem – Green's theorem – Simple problems and verification of the theorems for simple problems (statement only).

TEXT BOOK(S)

[1]   T.K. Manickavasagam Pillai and others, Algebra volume I, S.V. Publications – Reprint –1999 .

[2]   K.Viswanathan and S.Selvaraj, Vector Analysis, Emerald Publishers Reprint 1999.

UNIT   I: Chapter 6 (sections 11 to 14) of [1]

UNIT II   :   Chapter 6 (sections 15, 16, 17, 18, 19, 20) of [1]

UNIT III   :   Chapter1 (section1)andChapter2(sections2.1to2.2.5,2.3to2.5.1)of [2]

UNIT IV   :   Chapter 3   (sections 3.1 to 3.7) of [2]

UNIT V   :   Chapter 4   (sections 4.1 to 4.5.1) of [2]

REFERENCE:

[1]   H.S Hall and S.R Knight ,Higher Algebra, prentice Hall of India, New Delhi.

CC – IV   SEQUENCES AND SERIES

Objectives:

1. To study the algebra of sequences.

2. To study the convergence and divergence of series and the methods of testing the convergence.

3. To study the binomial, exponential and logarithmic series.

UNIT I :

Sequence, limit, convergence of a sequence – Cauchy's general principle of convergence – Cauchy's first theorem on Limits – Bounded sequence – Monotonic sequence always tends to a limit, finite or infinite.

UNIT II :

Infinite series – Definitions of Convergence, Divergence and Oscillation – Necessary condition for Convergence – Convergence of $\sum \dfrac{1}{n^p}$ and Geometric series. **UNIT III :**

Comparison test, D' Alembert's Ratio test and Raabe's test. Simple problems based on above tests.

UNIT IV :

Cauchy's condensation test, Cauchy's Root test and their simple problems – Alternative series with simple problems.

UNIT V:

Binomial theorem for rational index – Exponential and Logarithmic series – Summation of series and approximations using these theorems.

TEXT BOOK :

 [1]   T.K Manicavachagam pillai, T. Natarajan, K.S Ganapathy, Algebra, Volume – I, S.Viswanathan Pvt Limited, Chennai, 2004.

UNIT   I   : Chapter 2 (sections 1 to 7)
UNIT II   : Chapter 2 (sections 8, 9, 10, 11, 12 and 14)
UNIT III   : Chapter 2 (Sections13, 16, 18 and 19)
UNIT IV   : Chapter 2 (sections 15, 17, 21 to 24)
UNIT V   : Chapter 3 (sections 5 to 11, 14) and Chapter 4 (Sections 2, 3, 5 to 9)

REFERENCE (S) :

[1]   M.K Singal and Asha Rani Singal, A first course in Real Analysis, R. Chand and Co., 1999.

[2]   Dr. S.Arumugam, Sequences and Series, New Gamma Publishers, 1999.

[3]   Richard, R. Goldberg, Methods of Real Analysis [Oxford and IBH Publishing Co.Pvt ltd]

Objectives:
1. To make the students gain wide knowledge in probability which plays a main
   role in solving real life problems.
2. To frame distribution functions and its types.
3. To study the applications of Binomial and Poisson distributions.

UNIT I:

Diagrammatic representation: Types of Diagram – Bar and Pie diagram- Pictographs- graphs- Rang charts and ratio charts- Histogram – Frequency Polygon- Problems- Limitation of diagrams and graphs. Measures of general value: Arithmetic mean - Median-Mode - Geometric mean - Harmonic mean - Quartile deviations (Simple problems only).

UNIT II:

Correlation   (two variables only) – Karl Pearson's Correlation Coefficient and its properties.Limits for Correlation Coefficient and Rank Correlation- Spearman's rank correlation coefficient (repeated and non-repeated). Lines of regression – Definition – Properties of regression coefficients – Simple problems.

UNIT III:.

Theoretical discrete distribution: Binomial and Poisson distribution – Moment generating functions of these distributions – Additive Property of Binomial and Poisson distribution.
Continuous distribution: Normal distribution – Chief characteristics of normal
distributions.

UNIT IV:

Sampling distribution   – Chi square Variates –   Definition – Derivation – Mean and variance. Student's t- Distributions – Definition – Derivation – Constant (mean and variance only) F-distribution – Definition – Derivation – Constants (mean and variance only). Relationship among t,F, chi-square distribution.

UNIT V:

Small sample tests – t-test for single mean, difference of means and paired t-test, F-test for equality of variances. Chi-square test of goodness of fit and independence of attributes – Simple problems.

TEXT BOOK :

[1] S.C, Gupta and V.K.Kapoor . Fundamentals of Mathematical Statistics–Sultan chand   and sons, Educational Publishers, New Delhi,2002.

[2] P.R.Vittal, Mathematical Statistics, Margham Publications,Chennai,Reprint-2013.

UNIT I :   Part-II(Chapter 4 and Chapter 5) [2].

UNIT II   :   Chapter 10 (sections 10.4, 10.4.1,10.4.2, 10.7 to 10.7.4)
                         Chapter 11 (sections 11.2 to 11.2.2) [1]

UNIT III   :   Chapter 8 (Sections 8.4, 8.4.6, 8.4.7, 8.5, 8.5.1, 8.5.5, 8.5.8) and
                         Chapter 9 (Sections 9.2, 9.2.2) [1]

UNIT   IV   :   Chapter 14 (sections 14.4.1 , 14.4.3 , 14.4.4 , 14.5 , 14.6 , 14.7.1 ,
                         14.7.2, 14.8.3 , 14.8.4) [1]

UNIT   V   :   Chapter 15 (sections 15.6.2, 15.6.3)
                         Chapter 16 (sections 16.3.1 to 16.3.3, 16.6.1) [1]

Objective:

To give practice on different statistical techniques using SPSS.
.
List of Experiments:

1. Graphical display of data

2. Calculation of measure of central tendency.

3. Correlation.

4. Regression.

5. Fitting of Binomial and Poisson distribution.

6. Fitting of Normal distribution.

7. Chi-square distribution.

8. Students t-distribution.

9. Paired t- test for Mean.

10. Chi-square test for Goodness of fit.

(Five questions have to be answered out of six questions. At least one question from each unit must be asked. Each question carries ten marks).

(Internal Marks – 40 ; External Marks – 60)

TEXT BOOK :

[1] S.C Gupta and V.K. Kapoor . Fundamentals of Mathematical Statistics–Sultan Chand and Sons, Educational publishers, New Delhi,2002.

CC – VII   ABSTRACT ALGEBRA

Objective:

To provide concrete knowledge about the abstract concepts like sets, groups, Rings and vector Spaces and their properties.

UNIT I : Groups

Groups – Introduction – Definition and Examples – Elementary Properties of a Group – Equivalent Definitions of group – Permutation Group -Subgroups – Cyclic groups – Order of an element – Cosets and Lagrange's theorem.

UNIT II :

Normal subgroups and Quotient groups – Isomorphisms – Homomorphisms .

UNIT III : Rings

Definition and Examples – Elementary Properties of rings – Types of rings – Characteristics of a ring – Subrings   – Ideals – Quotient rings – Maximal and prime ideals – Homomorphism of rings – Isomorphism of rings

UNIT IV : Vector spaces

Definition and Examples – Subspaces – Linear Transformations – Span of a set – Linear independence.

UNIT V :

Basis and Dimension – Rank and Nullity – Matrix of a Linear Transformation .

TEXT BOOK :

[1]   S. Arumugam and A. Thangapandi Isaac, Modern Algebra , Scitech publications
(India) PVT, Ltd – 2004 1st print .

UNIT I	: Chapter 3 (sections 3.1 to 3.8)
UNIT II	: Chapter 3 (sections 3.9 to 3.11)
UNIT III	: Chapter 4 (sections 4.1 to 4.10)
UNIT IV	: Chapter 5 (sections 5.1 to 5.5)
UNIT V	: Chapter 5 (sections 5.6 to 5.8)

REFERENCE (S)

[1]   M.L.SANTIAGO, Modern Algebra, Tata,MCGraw–Hill publishing Company
Limited, New Delhi.

[2]   Surjeet singh and Qazi Zameeruddin, Modern Algebra, Vikas publishing House
PVT,Limited.

CC – VIII   REAL ANALYSIS

Objective:

   1.   To study the real number system & properties the properties of various functions

              defined on the real line.

UNIT I :

       Sets and functions : sets and elements – Operations on sets – Functions – Real valued functions – Equivalence, countability – Real numbers – Least upper bounds.

UNIT II :

       Limits and metric spaces : Limit of a function on the real line – Metric spaces – Limits in metric spaces.

UNIT III :

       Continuous functions on metric spaces : Functions continuous at a point on the real line – Reformulation – Functions continuous on metric space – Open sets – Closed sets.

UNIT IV :

       Calculus: sets of measure zero – Definition of the Riemann integral – Existence of the Riemann integral – Properties of the Riemann integral – Derivatives – Rolle's theorem – The law of the mean – Fundamental theorem of calculus.

UNIT V :

       Taylor series : Taylor's theorem – The binomial theorem – L'Hospital's rule

TEXT BOOK :

[1]   RICHARD R.GOLDBERG ,Methods of Real Analysis,
        Oxford and IBHP Publishing co, New Delhi ,1970.

UNIT I	:	Chapter 1 (sections 1.1 to 1.7)
UNIT II	:	Chapter 4 (sections 4.1 to 4.3)
UNIT III	:	Chapter 5 (sections 5.1 to 5.5)
UNIT IV	:	Chapter 7 (sections 7.1 to 7.8)
UNIT V	:	Chapter 8 (sections 8.5 to 8.7)

REFERENCE(S) :

[1]   M.K. Singal and Asha Rani Singal , A First course in Real Analysis,
        R. Chand and Co, publishers, New Delhi, 2003.

[2]   Shanthi Narayananan, A Couse of Mathematical Analysis,
        S.Chand and Co, 1995.

CC – IX   STATICS

Objectives

1. To provide a basic knowledge of the behavior of various types of forces.

2. To give enough working knowledge to handle practical problems.

UNIT I :

Force – Resultant of two forces – Three forces related to a triangle – Resultant of several forces – Equilibrium of a particle under three or more forces .

UNIT II :

Force on a rigid body – Moment of a force – Equivalent system of forces –parallel forces – Varignon's Theorem – Forces along a triangle – Couples – Equilibrium of a rigid body under three coplanar forces – Reduction of a coplanar forces into a force and a couple.

UNIT III :

Types of forces – Friction – Laws of Friction – Coefficient of Friction, Angle and Cone of Friction – Limiting equilibrium of a particle on a rough inclined plane – Tilting of a body – Simple Problems.

UNIT IV :

Virtual Work – Principle of Virtual Work – Applied to a body or a system of bodies in equilibrium – Equation of Virtual Work – Simple Problems.

UNIT V :

String – Equilibrium of Strings under gravity – Common Catenary – Suspension bridge.

TEXT BOOK :

[1]   P. Duraipandiyan, Mechanics (Vector Treatment), S.Chand and Co.,June 1997

UNIT I : Chapter 2 and Chapter 3 (section 3.1)

UNIT II   : Chapter 4 (sections 4.1 , 4.3 to 4.9) and Chapter 5 (section 5.1)

UNIT III   : Chapter 2 (section 2.1.2) and Chapter 3 (section 3.2) and

Chapter 5 (section 5.2)

UNIT IV   : Chapter 8

UNIT V   : Chapter 9

REFERENCE (S):

[1]   M.K.Venkataraman, Statics, Agasthiyar Publications, 2002.

[2]   A.V . Dharmapadham, Statics, S.Viswanathan Publishers Pvt., Ltd.,

[3]   S.L .Lony ,Elements of Statics and Dynamics, Part – I,. A.I.T. Publishers, 1991.

CC – X DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORMS AND FOURIER SERIES

Objectives :

1. To study differential equations and partial differential equations of first and second order.

2. To study the techniques of finding Laplace transforms and inverse Laplace transforms and real functions and their application in solving ordinary differential equations.

3. To express periodic functions as a Fourier series.

UNIT I :

Differential Equations – Linear differential equations with Constant coefficients – The operators D and D^{-1} – Particular Integral – Special methods of finding Particular integral – Linear equations with variable coefficients – To find the particular integral – Special method of evaluating the particular integral when x is of the form x ^{m}

UNIT II :

Exact Differential Equations – Conditions of integrability of Mdx + Ndy = 0 – particular rule for solving an Exact Differential Equation – Rules for finding integrating factors – Equations of the first order but of higher degree – Solvable for x, y, dy/dx – Clairaut's form – Equations that do not contain x explicitly – Equations that do not   contain y explicitly –   Equations Homogeneous in x and y.

UNIT III :

Partial Differential Equations – Derivation of partial Differential Equations by elimination of constants, arbitrary functions – Different Integrals of P.D.E – Solutions of P.D.E. in some simple cases – Standard types of first order equations – Standard I,II,III,IV – Equations reducible to the standard forms – Lagrange's equation.

UNIT IV :

The Laplace Transforms – Sufficient conditions for the existence of the Laplace Transforms – Laplace Transforms of periodic functions – General Theorems – Evaluation of certain integrals using   Laplace Transforms.The Inverse transforms – Inverse transforms of functions – Method of partial fractions – Application of Laplace Transforms to solve ordinary differential equations with constants coefficients.

UNIT V :

Fourier series – Definition – Fourier series expansion of periodic functions with period 2π and period 2a – Use of Odd and even functions in Fourier Series.

TEST BOOK :

[1]   S. Narayanan and T.K. Manickavasagam Pillay, Calculus volume –III,
         S.Viswanathan Pvt., Ltd., 1999.

[2]   S.Narayanan, T.K. Manickavasagam pillai, Calculus Volume –III,
         S.Viswanathan Pvt. Limited and Vijay Nicole Imprints Pvt Ltd, 2004.

UNIT I : Chapter 2 (sections 1 , 1.2 , 2 , 3 , 4 , 8 , 8.1 , 8.2 , 8.3) of[1]

UNIT II   : Chapter 1 (sections 3.1 to 3.3 , 4,5 , 5.1 to 5.5 , 6.1, 7.1 to 7.3) of[1]

UNIT III   : Chapter 4 (sections 1 , 2 , 2.1 , 2.2 , 3 , 4 , 5 , 5.1 to 5.5 , 6) of[1]

UNIT IV   : Chapter 5 (sections 1, 1.1, 1.2 , 2 , 3 , 4 , 5 ,6 , 7 , 8) of[1]

UNIT V   : Chapter 6 (sections 1 to 3) of [2]

REFERENCE (S):

[1]   M.K.Venkataraman, Engineering Mathematics, S.V. Publications, 1985, Revised Edition.

[2]   Arumugam and Isaac, Differential Equations and Applications, New Gamma Publishing House, 2003.

CC – XI   COMPLEX ANALYSIS

Objectives:

1. To introduce the theory of complex variable which is different from analysis of real variable.
2. To learn the properties of complex valued function defined on the set of Complex numbers.
3. To introduce the concept of complex integration and its properties.

UNIT I :

Functions of a complex variable – Limits – Theorems on Limits – Continuous functions – Differentiability – Cauchy – Riemann equations – Analytic functions – Harmonic functions.

UNIT II :

Elementary transformations – Bilinear transformations – Cross radio – Fixed points of Bilinear transformations – Some special bilinear transformations.

UNIT III :

Complex integration – Definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives.

UNIT IV :

Series expansions – Taylor's series – Laurent's series – Zeros of analytical functions – Singularities.

UNIT V :

Residues – Cauchy's Residue theorem – Evaluation of definite integrals.

TEXT BOOK:

[1]   S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, Complex Analysis, New Scitech publications (India) Pvt.Ltd. November 2003.

UNIT I	:	Chapter 2 (sections 2.1 to 2.8)
UNIT II	:	Chapter 3 (sections 3.1 to 3.5)
UNIT III	:	Chapter 6 (sections 6.1 to 6.4)
UNIT IV	:	Chapter 7 (sections 7.1 to 7.4)
UNIT V	:	Chapter 8 (sections 8.1 to 8.3)

REFERENCE(S)

[1]   P.P.Gupta – Kedarnath and Ramnath, Complex Variables, Meerut- Delhi.

[2]   J.N.Sharma, Functions of a Complex Variable, Krishna Prakasan Media(p) Ltd. 13th Edition, 1996-97.

[3]   T.k. Manickavachagam Pillai, Complex Analysis, S.Viswanathan Publishers pvt. Ltd.1994.

CC - XII GRAPH THEORY

Objective:

      1.   To introduce the notion of graph theory and its applications.

UNIT I :

      Definition of a graph, application of a graph – Finite and infinite graphs   –
Incidence and degree – Isolated, pendant vertices and Null graph – Isomorphism – Subgraphs –
walks, Paths and circuits – connected and disconnected graphs   –
components – Euler graphs – Operations on Graphs – More on Euler graphs – Hamiltonian paths
and Circuits.

UNIT II :

      Trees – Properties of trees – Pendant vertices in a Tree – Distance and centres in a Tree
– Rooted and Binary Trees – Spanning Trees – Fundamental Circuits.

UNIT   III :

      Cut -sets – Properties of a Cut-set – All cut -sets in a graph Fundamental circuits and
Cut sets – Connectivity and separability.

UNIT IV :

      Vector Spaces of a Graph – Sets with one, two operations – Modular arithmetic –Galois
Fields – Vectors and Vectors Spaces – Vector Space Associated with a Graph –Basis vectors of a
graph – circuit and cut-set subspaces – Orthogonal vectors and Spaces.

UNIT V:

      Matrix representation of graphs – Incidence matrix – Circuit Matrix – Fundamental
Circuit Matrix and rank of B – Cut-set matrix. Chromatic Number – Chromatic partitioning –
Chromatic polynomial.

TEXT BOOK:

[1]   Narsingh Deo, Graph Theory with applications to Engineering and Computer
        Science,Prentice Hall of India Pvt Ltd., New Delhi, Reprint 2004.

UNIT I : Chapter 1 (sections 1.1 to 1.5) and
                Chapter 2 (sections 2.1 , 2.2 , 2.4 to 2.9)

UNIT II   **:** Chapter 3 (sections 3.1 to 3.5, 3.7 , 3.8)

UNIT III   **:** Chapter 4 (sections 4.1 to 4.5)

UNIT IV   **:** Chapter 6 (sections 6.1 to 6.8)

UNIT V   **:** Chapter 7 (sections 7.1 , 7.3 , 7.4 , 7.6) and
                Chapter 8 (sections 8.1 to 8.3)

REFERENCE(S):

[1]   Dr.S.Arumugam and Dr.S.Ramachandran , Invitation to Graph Theory ,
        Scitech   Publications India Pvt Limited, Chennai 2001.

[2]   K.R Parthasarathy ,Basic Graph Theory , Tata Mcgraw Hill Publishing Company, New
        Delhi,1994.

[3]   G.T John Clark, Derek   Allan Holten, A First Look at Graph Theory ,World Scientific
        Publishing company,1995.

CC – XIII   DYNAMICS

Objectives:

1. To expose a basic knowledge about the Coplanar Motion, Newton's Laws of Motion.
2. To provide a knowledge about projectiles, simple Harmonic motion and Conservation of linear momentum.

UNIT I :

Kinematics : Velocity – Relative Velocity – Acceleration – Coplanar Motion – Components of Velocity and Acceleration – Newton's Laws of Motion.

UNIT II :

Simple Harmonic motion – Simple Pendulum – Load suspended by an elastic string – Projectile – Maximum height reached, ranges, time of flight – Projectile up/down an inclined plane.

UNIT III :

Impulsive force – Conservation of linear momentum – Impact of a sphere and a plane – Direct and Oblique Impact of two smooth spheres – Kinetic energy and impulse.

UNIT IV :

Central Orbit – Central force – Differential equation to a central orbit in polar and p-r coordinates – Given the central orbit to find the law of force – Kepler's Laws of Planetary motion

UNIT V :

Moment of Inertia of simple bodies – Theorem of Parallel and Perpendicular axes – Motion in two dimension – Equation of motion for two dimensional motion.

TEXT BOOK :

[1]   P. Duraipandiyan, Mechanics, (Vector Treatment), S.Chand and Co.,
          June 1997 Edition.

UNIT I :Chapter 1 and Chapter 2 (section 2.1.1)
UNIT II   :Chapter 12 (sections12.1 to12.3),Chapter15(section 15.6)and Chapter 13
UNIT III   :Chapter 14
UNIT IV   :Chapter 16
UNIT   V   :Chapter 17 and Chapter 18

REFERENCES

[1]   M.K. Venkataraman, Dynamics, Agasthiar Book Depot, 1990.
[2]   A.V Dharmapadam, Dynamics, S. Viswanathan Publishers, 1981.

OPERATIONS RESEARCH (EC – I)

Objectives :

1. To introduce the field of operations research which has many applications in management techniques.

2. To help students to find optimum solutions in business and management problems.

UNIT I :

Introduction to Operations Research – Mathematical Formulation of the problem – Graphical Solution Method – Simplex method – Big (M) Method.

UNIT II :

Transportation problem – North west corner rule – Least cost method – Vogel's approximation Method – MODI Method – Assignment problems.

UNIT III :

Sequencing Problems : Introduction – Problem of sequencing – Basic term used in sequencing – Processing n Jobs through 2 machines – Processing n Jobs through k machines – Processing 2 Jobs through k machines.

UNIT IV :

Replacement Problems –   Introduction – Replacement of Equipment / asset that Deteriorates Gradually – Replacement of Equipment that fails suddenly.

UNIT V :

Network scheduling by PERT/CPM – Introduction – Network and basic components – Rules of network construction – Critical path analysis – Probability consideration in PERT – Distinction between PERT and CPM.

TEXT BOOK :

[1] Operations Research – Kanti Swarub, P.K.Gupta, Man Mohan. Sultan Chan & Sons Educational Publishers New Delhi, Ninth thoroughly Revised Edition.

UNIT I : Chapter 2 (sections 2.1, 2.2)

Chapter 3 (sections 3.1, 3.2)

Chapter 4 (sections 4.1, 4.4)

UNIT II   : Chapter 10 (sections 10.1, 10.2, 10.7, 10.8, 10.11)

Chapter 11 (sections 11.1, 11.2, 11.3, 11.4)

UNIT III   : Chapter 12 (sections 12.1 to 12.6)

UNIT IV   : Chapter 18 (sections 18.1 to 18.3)

UNIT V   : Chapter 21 (sections 21.1, 21.2 , 21.4 to 21.7)

REFERENCE(S)

[1].   Hamdy A. Taha, Operations Reseach (7th Edn.), Prentice Hall of India, 2002

[2].   Richard Bronson, Theory and Problems of Operations Research,
          Tata McGraw Hill Publishing Company Ltd., New Delhi, 1982.

NUMERICAL ANALYSIS (EC – II)

Objectives :

1. To introduce different numerical techniques to solve Algebraic and differential equations
2. To develop skills in solving problems using numerical techniques.

UNIT I :

Algebraic and Transcendental equations – Finding the solution of the given equation using bisection method, Method of false position ,Newton-Raphson method, Iteration method.

UNIT II :

Finite differences – Forward, Backward and central differences – Newton's Forward and backward difference interpolation formulae – Interpolation with unevenly spaced intervals – Lagrange's interpolating polynomial.

UNIT   III :

Numerical – Integration using Trapezoidal rule and simpson's1/3 and 3/8- rules.

UNIT IV :

Solution to Linear systems – Gauss Elimination method – Jacobi and Gauss Siedal iterative methods.

UNIT V :

Numerical solution of ODE – Solution by Taylor's series method, Picard's method, Euler's method, Runge-kutta second and fourth order methods.

TEXTBOOK :

[1]   S.S Sastry, Introductory methods of Numerical Analysis, Prentices Hall of India Pvt.Limited,2001,Third Edition.

UNIT   I   : Chapter 2 (sections 2.2, 2.3, 2,4, 2,5)
UNIT   II   : Chapter 3 (sections 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.6, 3.9, 3.9.1)
UNIT III   : Chapter 5 (sections 5.4, 5.4.1, 5.4.2, 5.4.3)
UNIT IV   : Chapter 6 (sections 6.3, 6.3.2) and
                 : Chapter 8 (sections 8.3.1 , 8.3.2)
UNIT V   : Chapter 7 (sections 7.1, 7.2, 7.3, 7.4, 7.4.2 , 7.5)

REFERENCE(S):

[1]   S.Narayanan and others, Numerical Analysis, S.Viswanathan Publishers, 1994,
[2]   A.Singaravelu, Numerical methods, Meenachi Agency, June 2000.

DISCRETE MATHEMATICS (EC – III)

Objectives :

1. To study various finite(discrete) structures of Mathematics.
2. To study recurrence relations and generating functions, analyses recurrence relations and provides methods for solving recurrence relations
3. To introduce group codes, procedure for generating group codes and Inference theory of predicate calculus

UNIT I :

Recurrence relations – Solution of finite order homogeneous Linear relations – Solution of Non-Homogeneous relations – Generating functions- Some common recurrence relations – Primitive recursive functions – Recursive and Partial Recursive Functions.

UNIT II :

Coding Theory – Introduction – Hamming Distance – Encoding a message – group codes – Procedure for Generating Group codes – Decoding and Error correction – An example of simple Error correcting code.

UNIT III :

Connectives –Atomic and Compound statements – Well formed formulae – Truth table of a Formula – Tautology - Tautological Implications and Equivalence of Formulae - Normal Forms – Principal Normal Forms.

UNIT IV :

Theory of inference-Open Statements-Quantifiers – Inference theory of Predicate Calculus-statements involving more than one quantifier.

UNIT V :

Rank of a matrix – Consistency – Eigen values, Eigen vectors – Cayley Hamilton's theorem (statement only) – Symmetric, skew symmetric , Orthogonal, Hermitian, skew Hermitian and Unitary Matrices – Simple problems only.

TEXT BOOK[S]:

[1] Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2011.

[2] S.Arumugam and A. Thangapandi Isaac, Modern Algebra, New Gamma publishing House, 2000.

UNIT I : Chapter 5 (sections 5.5 to 5.33) of [1]

UNIT II : Chapter 8 (section 8.1 to 8.11) of [1]

UNIT III : Chapter 9 (sections 9.4 to 9.49) of [1]

UNIT IV: Chapter 9 (sections 9.56 to 9.86) of [1]

UNIT V : Chapter 7 (sections 7.2 , 7.5 , 7.6 , 7.7) of [2]

REFERENCE:

[1] J.P. Trembly and R.Manohar; Discrete Mathematical Structures with Applications to Computer Science ,TMH Edition 1997.

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ASTRONOMY (EC - IV)

Objectives

1.To introduce the exciting world of astronomy to the students.

2.To help the students to study about the celestial objects.

UNIT I :

Relevant Properties of a sphere and relevant formulae for spherical trigonometry (All without proof) – Diurnal motion

UNIT II :

Earth – Dip of horizon – Twilight – Refraction – Tangent and Cassini's Formula.

UNIT III :

Kepler's Laws of Planetary motion (statement only) – Newton's deduction from them – Three anomalies of the Earth and relation between them.

UNIT IV :

Equation of time, Calendar – Geocentric Parallax – Aberration of light.

UNIT V :

Moon (except Moon's liberations) – Motions of Planet (assuming that orbits are circular) – Eclipses.

TEXT BOOK:

[1]   S.Kumaravelu and Prof. Susheela Kumaravelu , Astronomy ,

SKV Publications,2004.

UNIT I :   Chapter 1 and Chapter 2

UNIT II   :   Chapter 3 (sections 1,2, 5,6)

Chapter 4 (sections 117 to 122 , 129, 130)

UNIT III   :   Chapter 6

UNIT IV   :   Chapter 7 (section 1, 3, 4) and Chapter 9.

UNIT V   :   Chapter 12.

REFERENCE:

[1]   V.Thiruvenkatacharya, A text book of Astronomy,

S.Chand and Co., Pvt Ltd.,1972.

MATHEMATICAL MODELLING (EC - V)

Objectives

      1. To introduce the basic concepts of modeling.

      2. To study the different mathematical models involving differential equations,

      graph theory etc.

UNIT I :

      Mathematical Modelling through Ordinary Differential Equations of First Order: Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamics problems – Geometrical problems.

UNIT II :

      Mathematical Modelling through system of Ordinary Differential Equations of First Order: Population Dynamics-Epidemics – Compartment Models – Economics –Medicine, Arms Race, Battles and International Trade – Dynamics.

UNIT III :

      Mathematical Modelling through Ordinary Differential Equations of Second Order: Planetary Motions – Circular Motion and Motion of Satellites – Mathematical   Modelling through Linear Differential Equations of Second order – Miscellaneous Mathematical Models.

UNIT IV :

      Mathematical Modelling through Difference Equations: Simple Models – Basic theory of Linear Difference Equations with Constant Coefficients – Economics   and   Finance – Population Dynamics and Genetics – Probability Theory.

UNIT V :

      Mathematical Modelling through Graphs: Solutions that can be Modelled through Graphs – Mathematical Modelling in terms of Directed Graphs, Signed Graphs, Weighted Digrap

TEXT BOOK:

      J.N. Kapur, Mathematical Modelling , Wiley Eastern Limited , New Delhi,1988.

REFERENCE:

      J.N. Kapur, Mathematical Models in Biology and Medicine, Affiliated East-West Press te Limited, New Delhi,1981.

B.SC., COMPUTER SCIENCE
ALLIED MATHEMATICS
ALLIED COURSE – I (AC) – NUMERICAL METHODS

Objectives :

1. To introduce different numerical techniques to solve Algebraic and differential equations
2. To develop skills in solving problems using numerical techniques.

UNIT I :

Algebraic and Transcendental Equations – Finding the roots of the given equation using Bisection Method – Newton Raphson Method, Iteration Method.

UNIT II :

Finite differences – Forward, Central and Backward differences – Newton's forward & backward interpolation formulae – Lagrange's interpolation polynomial.

UNIT III :

Numerical Integration – Trapezoidal and Simpson's 1/3 and 3/8 rules.

UNIT IV :

Solutions to linear systems – Gaussian Elimination Method – Jacobi and Guass siedal Iterative methods.

UNIT V :

Numerical solution of ordinary differential Equations : Solution by Taylor series method – Euler's Method – Euler's modified method – Runge - Kutta second and fourth order methods,(Proof need not necessary, simple problems only for all units).

TEXT BOOK

1. S.S. Sastry, Introductory Methods of Numerical Analysis, prentice Hall of India, private limited fourth edition, 2005

REFERENCE (S)

1.   A. Singaravelu Numerical Methods , 2002.
2.   Dr. M.K.Venketaraman, M.A., M.Tech., Ph.D. Numerical Methods in Science and Engineering , National publishing Co., Chennai, 2000.

ALLIED MATHEMATICS
ALLIED COURSE – II (AC) – **OPERATIONS RESEARCH**

Objectives
      1.To introduce the various techniques of Operations Research.
      2.To make students solve real life problems in Business and Management.
UNIT I :
      Introduction to operations Research – Linear programming problem – Mathematical formulation of LPP – Graphical Solution methods – Simplex methods with <=, >=, = constraints
UNIT II :
      Transportation problems (Definition) – Matrix form of T.P – Initial Basic feasible solution – The North West corner Rule – The Row minima method – The column minima Method – The matrix minima Method – Vogel's Approximation method – Unbalanced T.P.
UNIT III :
      Assignment problem – Hungarian Algorithm – Maximization method – Minimization method–Special cases in Assignment problems.
UNIT IV :
      Net work scheduling by PERT/CPM – Introduction – Network and basic components – Rules of Network construction – critical path analysis**.**
UNIT V :
      Probability considerations in PERT– Distinction between PERT and CPM (Simple problem only)
TEXT BOOK :
    1.   Kanti swarup, P.K. Gupta and Manmohan, Operations Research –9th Edition   2001, published by sultan Chand & Sons, New Delhi.

UNIT   I   : Chapter 2 (sections 2.1, 2.3)
                  Chapter 3 (sections 3.2, 3.3)
                  Chapter 4 (sections 4.3, 4.4)
UNIT II   : Chapter 10 (sections 10.1, 10.5, 10.8, 10.9)
UNIT III   : Chapter 11 (sections 11.1, 11.2, 11.3,11.4)
UNIT IV   : Chapter 21 (sections 21.1, 21.2, 21.4, 21.5)
UNIT   V   : Chapter 21 (sections 21.6, 21.7)

B.SC., COMPUTER SCIENCE
ALLIED MATHEMATICS
ALLIED COURSE – III (AC) – PROBABILITY AND STATISTICS

Objective:

1. To make the students gain wide knowledge in probability which plays a main role in solving real life problems.

UNIT I:

Theory of Probability: Basic Terminology – Axiomatic approach to probability – Some theorems on probability – Conditional probability – Multiplication theorem of Probability – Independent events.

UNIT II:

Random variables – Distribution function – Discrete and Continuous random variable – Two- dimensional random variables.

UNIT III:

Mathematical Expectation: Expected value of a Random variable – Properties of Expectation and properties of variance – Covariance – Moment generating function.

UNIT IV:

Correlation – Definition – Scatter diagram – Kerl pearson's coefficient of correlation – Rank correlation – Simple problems. Linear Regression – Regression lines x on y and y on x – Simple problems.

UNIT V:

Theoretical discrete distribution: Binomial and Poisson distribution – Moment generating functions of these distributions – Additive Property of Binomial and Poisson distribution.

Continuous distribution: Normal distribution – Chief characteristics of normal distributions.

TEXT BOOK:

S.C. GUPTA and V.K. KAPOOR, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, Educational publishers New Delhi. Reprint 2003.

UNIT I   :   Chapter 3 (Sections 3.3, 3.8, 3.8.5, 3.9, 3.9.1, 3.9.3, 3.10, 3.11, 3.12)

UNIT II   :   Chapter 5 (Sections 5.2, 5.2.1, 5.3, 5.3.1, 5.4, 5.4.1, 5.5, 5.5.1)

UNIT III :   Chapter 6 (Sections 6.2, 6.4, 6.5, 6.6) and   Chapter 7 (Sections 7.1, 7.1.2)

UNIT IV :   Chapter 10 (Sections 10.2, 10.3, 10.4 to 10.4.2, 10.7 to 10.7.3) and
                   Chapter 11 (Sections 11.2, 11.2.1)

UNIT V   :   Chapter 8 (Sections 8.4, 8.4.6, 8.4.7, 8.5, 8.5.1, 8.5.5, 8.5.8) and
                   Chapter 9 (Sections 9.2, 9.2.2)

REFERENCES

[1]   A.Singaravelu, Prabablity and statistics (paperIII), March 2002.

[2]   P.Thambidurai, Practical Statistics, Rainbow Publishers – CBI(1991).

B.SC., PHYSICS / CHEMISTRY

ALLIED MATHEMATICS
ALLIED COURSE – I (AC) – CALCULUS AND FOURIER SERIES

Objectives:

1. To provide the knowledge about the differentiation and various methods for evaluation of integrals.
2. To study the properties of definite integrals and methods for solving the double integrals and simple integrals.
3. To study methods for solving Fourier series

UNIT I :

Successive Differentiation – n^{th} derivative of standard functions (Derivation not needed) – simple problems only – Leibnitz theorem (proof not needed) and its applications.

UNIT II :

Evaluation of integrals of types

$$[1] \int \frac{px+q}{ax^2+bx+c}dx \quad [2] \int \frac{px+q}{\sqrt{ax^2+bx+c}}dx \quad [3] \int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$$

$$[4] \int \frac{dx}{a+b\cos x} \quad [5] \int \frac{dx}{a+b\sin x} \quad [6] \int \frac{a\cos x+b\sin x+c}{p\cos x+q\sin x+r}dx$$

UNIT III :

General properties of definite integrals – Evaluation of definite integrals of types – Reducation formula (when n is a positive integer)

$$[1] \int e^{ax}x^n dx \quad [2] \int \sin^n x dx \quad [3] \int \cos^n x dx \quad [4] \int_0^x e^{ax}x^n dx$$

$$[5] \int_0^{\frac{\pi}{2}} \sin^n x dx \quad [6] \text{ without proof } \int_0^{\frac{\pi}{2}} \sin^n x\cos^n x dx \text{ –and illustrations}$$

UNIT IV :

Evaluation of Double and Triple integrals in simple cases.

UNIT V :

Definition of Fourier series – Finding Fourier coefficients for a given periodic function with period 2π.Odd & Even functions Half range Fourier coefficients.

TEXT BOOK(S)

1. A. Singaravelu,   Allied Mathematics – I– 2002
2. A. Singaravelu,   Allied Mathematics – II

ALGEBRA , ODE AND TRIGONOMETRY

Objectives:

1. To study the various methods for solving ordinary differential equations
2. To Provide Hyperbolic functions and the relation between hyperbolic function and circular function.

UNIT I:

Binomial, Exponential and Logarithmic Series (Formulae only) – Problems in Summation only.

UNIT II :

Ordinary Differential Equation of first order but of higher degree – Equations solvable for x, solvable for y, Solvabel for $\frac{dy}{dx}$,Clairaut's form (simple cases only)

UNIT III :

Linear equations with constant coefficients – Finding particular integrals in the cases of e^{kx}, sin(kx), cos(kx) (where k is a constant), x^k where k is a positive integer and e^{kx} f(x) where f(x) is any function of x – (only problems in all the above – No proof needed for any formula).

UNIT IV :

Expansion of sin nθ, cos nθ, tan nθ (n being a positive integer) – Expansion of $\sin^n θ$, $\cos^n θ$, $\sin^n θ \cos^m θ$, in a series of sines & cosines of multiples of θ (θ – given in radians) – Expansion of sin θ, cos θ and tan θ in terms of powers of θ (only problems).

UNIT V :

Euler's formula for $e^{iθ}$ – Definition of Hyperbolic functions – Formulae involving Hyperbolic functions – Relation between Hyperbolic and circular functions – Expansion of sin hx, cos hx, tan hx, in powers of x – Expansion of Inverse hyperbolic functions $\sin h^{-1}x$, $\cos h^{-1}x$ and $\tan h^{-1}x$ – separation of real & imaginary parts of sin (x+iy), cos (x+iy), tan (x+iy), sin h (x+iy), cos h (x+iy), tan h (x+iy),

TEXT BOOK (S) :

1. Arumugam, Issac and Somasundaram, Trigonometry and Fourier series.
2. A.Singaravelu, Allied Mathematics (Paper-II) —1998.

ALLIED COURSE – III (AC)
LAPLACE TRANSFORMS AND VECTOR CALCULUS

Objectives:
1. To study the techniques of finding Laplace transforms and inverse Laplace transforms and their application in solving ordinary differential equations.
2. To study the derivation of vectors and application vector integration.

UNIT I :

Laplace Transform – Definition – $L(e^{at})$, $L(\cos(at))$, $L(\sin(at))$, $L(t^n)$, where n is a positive integer. Baisc theorems in Laplace Transforms (formula only) – $L[e^{-st}\cos bt]$, $L[e^{-st}\sin bt]$, $L[e^{-st}f(t)]$ - $L[f(t)]$, $L[f'(t)]$, $L[f''(t)]$.

UNIT II :

Inverse Laplace Transforms related to the above standard forms – Solving second order ODE with constant coefficients using Laplace Transforms.

UNIT III :

Vector differentiation – Velocity and acceleration vectors – Gradient of a vector – directional derivative – Unit normal vector – Tangent plane – Divergence – Curl – Solenoidal and irrotational vectors – Double operators – Properties connecting grad, div and curl of a vector.

UNIT IV :

Vector integration – Line integrals – Surface integrals – Volume integrals.

UNIT V :

Gauss Divergence Theorem (Statement only), Verification and application – Stoke's Theorem (statement only), Verification and application.

TEXT BOOK(S)

1.   A.Singaravelu,   Allied Mathematics – II – 2002
2.   A.Singaravelu,   Allied Mathematics – III – 1998

NON MAJOR ELECTIVE COURSE–I
MATHEMATICS FOR COMPETITIVE EXAMINATIONS - I
(OFFERED BY THE DEPARTMENT OF MATHEMATICS)

Lect hrs:2 hours   **Credit : 2**

Objective:
1. To study the simple methods for solving Time and Distance, Area , Time and work problems.

UNIT I :
   Numbers – HCF and LCM – Decimal Fractions.

UNIT II :
   Square Roots and Cube Roots – Percentage – Average – Ratio and Proportion – Partnership – Profit and Loss.

UNIT III :
   Time and Work – Time and Distance.

UNIT IV :
   Problems on Trains – Problems on Numbers – Problems of Ages.

UNIT V :
   Area – Volume and Surface area.

TEXT BOOK:

   R.S Aggarwal, Quantitative Aptitude , S.Chand and company Ltd., New Delhi,2008

QUESTION PATTERN
SECTION - A

50 Questions one Mark   50X1=50
Each Unit two questions for all topics:

   One word   10 x 1=10
   Fill in the blanks   10 x 1=10
   Choose the Correct answer   10 x 1 =10
   True or False   10 x 1 =10
   Match the following   10 x 1 =10

SECTION - B

Either or Type   5 x 5=25

                                                                      Total =75

NON-MAJOR-ELECTIVE COURSE
COMMERCIAL METHAMATICS
(OPEN ELECTIVE FOR UG OFFERED BY MATHEMATICS DEPARTMENT)

Objectives

1.To learn the simple techniques for solving aptitude problems.

2.To enable the students prepare themselves for various competitive examinations.

UNIT I

Percentage, Profit and Loss.

UNIT II

Simple Interest, Compound Interest.

UNIT III

Recurring Deposit.

UNIT IV

Time and Distance.

UNIT V

Time and Work.

TEXT BOOK:

R.S. Aggarwal, Quantitative Aptitude, S.Chand and company Ltd, New Delhi 2008.

NON MAJOR ELECTIVE COURSE - II
MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II
(OFFERED BY THE DEPARTMENT OF MATHEMATICS)

Lect hrs:2 hours   **Credit : 2**

Objective:

To develop skills in aptitude and arithmetic for facing the competitive examinations

UNIT I :

Simple Interest – Compound Interest.

UNIT II :

Permutation and Combination – Probability.

UNIT III :

Heights and Distances – Odd Man Out and Series.

UNIT IV :

Tabulation – Bar Graphs.

UNIT V :

Pie Charts – Line Graphs.

TEXT BOOK:

R.S Aggarwal, Quantitative aptitude, S. Chand and company Ltd., New Delhi,2008

QUESTION PATTERN
SECTION - A

50 Questions one Mark   50 x 1=50

Each Unit two questions for all topics:

One word	10 x 1 = 10
Fill in the blanks	10 x 1 = 10
Choose the Correct answer	10 x 1 = 10
True or False	10 x 1 = 10
Match the following	10 x 1 = 10

SECTION - B

Either or Type   5 x 5=25

Total =75

BIOSTATISTICS

Objective:

To develop the skills in the area of problem solving in Biostatistics.

UNIT I :

Biostatistics Introduction Definition and Scope – Collection of data – Primary and Secondary data,types of sampling random and stratified.

UNIT II :

Processing of data: Classification and tabulation of data.

UNIT III :

Organization of data, presentation of data – Diagramatic and graphical.

UNIT IV :

Measures of Central tendency – Mean, Median,Mode.Measures of dispersion SD,SE variance &Cumulate variance

UNIT V :

Common Statistical tools: Chi Square test,test of significance-ANOVA – One way Correlation and Regression, SPSS in brief.

REFERENCE BOOKS:

1.   Arora, P.N.1998 Biostatistics. Himalaya publishing House.
2.   Ramakrishnan,p., 1996 Biostatistics saras publications,Nagercoil.
3.   Sokal R.J.and Rohlf S. J 1981 Introduction to Biostatistics,
        W. H Freeman, London.
4.   Zar,J.H Biostatistical analysis. 1983 McGraw Hill, London.

SELF STUDY COURSE

(OFFERED FOR ALL III YEAR UNDERGRADUATE STUDENTS FROM 2017-18 ONWARDS)

MATHEMATICS APTITUDE FOR RECRUITMENT BOARD EXAMINATIONS

Credits:2

UNIT I :

     H.C.F and L.C.M of Numbers– Problems on Factors and Multiples – Factorization method – Division method – Finding H.C.F of more than two numbers – Factorization method of finding L.C.M – Common division method (L.C.M) – Co- prime –Comparison of Fractions.

UNIT II :

     Profit and Loss – Problems under cost price, selling price and gain or loss. Ratio – Comparison of ratio and compounded ratio – Proportion – Fourth proportional, Third proportional and mean proportional - Variation.

UNIT III :

     Problems on Time and Work – Problems on Time and Distance.

UNIT IV :

     True Discount –Problems under sum due , present worth , true discount –Problems on Banker's Discount , Banker's gain.

UNIT V :

     Heights and Distances – Problems under Trigonometrical identities, Values of T-ratios angle elevation and angle of depression- Problems on Odd man out and Series.

TEXT BOOK:

[1]   Dr. R.S. Aggarwal Quantitive apptitude for Competitative Examinations, S. Chand & Company LTD, Ram Nagar, New Delhi-110 055.

 UNIT I : Chapter 2

 UNIT II : Chapters 11 and 12

UNIT III : Chapters 15 and 17

UNIT IV : Chapters 32 and 33

UNIT V : Chapters 34 and 35

References:
1. Arihant 'Expert team', Clerical cadre assistants and stenographers recruitment exam, Arihant publications India limited.
2. R.Gopal,J.V.Subramanyam,M.Uma Bala 'Arithmetic and Quantitative Aptitude for Competitive Exams'. Sura Books (PVT) Ltd.Chennai.