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 – 2021 – 2022 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	Ability Enhancement	U211T1	Tamil	6	3	3	25	75	100
II	Ability Enhancement	U211E1	English	6	3	3	25	75	100
III	Core - I	U21MC101	Differential and Integral Calculus	6	5	3	25	75	100
III	Core - II	U21MC102	Programming in C	3	3	3	25	75	100
III	Allied – I	U211ACH1	Chemistry - I	5	4	3	25	75	100
III	Allied - II	U212ACH2P	Chemistry-II	2	--	--	--	--	---
IV	Ability Enhancement	U211VE	Value Education	2	2	3	25	75	100
Total				**30**	**20**				**600**

SEMESTER - II

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	Ability Enhancement	U212T2	Tamil	6	3	3	25	75	100
II	Ability Enhancement	U212E2	English	4	1	3	25	75	100
III	Core - III	U21MC203	Analytical Geometry 3D and Trigonometry	6	5	3	25	75	100
III	Core - IV	U21MC204P	Programming in C - Lab	3	3	3	40	60	100
III	Allied –II	U212ACH2P	Chemistry - II	2	4	3	40	60	100
III	Allied – III	U212ACH3	Chemistry - III	5	4	3	25	75	100
IV	Ability Enhancement	U212ES	Environmental Studies	2	2	3	25	75	100
IV	Naan Muthalvan Course	U23NM2LP	Language proficiency for employability	2	2	-	25	75	100
Total				**30**	**24**				**800**

SEMESTER - III

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	Ability Enhancement	U213T3	Tamil	6	3	3	25	75	100
II	Ability Enhancement	U213E3	English	6	3	3	25	75	100
III	Core V	U21MC305	Theory of Equations and vector calculus	6	5	3	25	75	100
III	Core VI	U21MC306	Mathematical Statistics	3	3	3	25	75	100
III	Allied - IV	U213APH4	Physics - I	5	4	3	25	75	100
III	Allied - V	U214APH5P	Physics-II	2	--	--	--	--	--
IV	Non Major Elective - I	U21M3NME1:1	. Commercial Mathematics	2	2	3	25	75	100
		U21M3NME1:2	Mathematics for Competitive Examinations – I						
Total				**30**	**20**				**600**
	Self Study Course – I	U213SSC1		-	2	2	-	100	100

SEMESTER - IV

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
I	Ability Enhancement	U214T4	Tamil	6	3	3	25	75	100
II	Ability Enhancement	U214E4	English	6	3	3	25	75	100
III	Core –VII	U21MC407	Sequences and Series	4	4	3	25	75	100
III	Core - VIII	U21MC408P	Mathematical Statistics Practical (Using SPSS)	3	3	3	40	60	100
III	Allied – V	U214APH5P	Physics - II	2	4	3	40	60	100
III	Allied – VI	U214APH6	Physics - III	3	3	3	25	75	100
IV	Non Major Elective- II	U21M4NME2: 1	Mathematics for Competitive Examinations – II	2	2	3	25	75	100
		U21M4NME2: 2	Biostatistics						
IV	Skill Enhancement - I Theory	U214SE1	Interpersonal skill	2	2	3	25	75	100
IV	Naan Muthalvan Course	U23NM4DS	Digital skills for employability	2	2	-	25	75	100
Total				**30**	**26**				**900**

	Self Study Course - II	U214SS2	--	-	**2**	2	-	100	100

SEMESTER - V

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
III	Core - IX	U21MC509	Abstract Algebra	6	5	3	25	75	100
III	Core - X	U21MC510	Real Analysis	5	5	3	25	75	100
III	Core - XI	U21MC511	Mechanics	5	5	3	25	75	100
III	Core - XII	U21MC512	Differential Equations	5	4	3	25	75	100
III	Major Based Elective - I	U21M5MPE1:1	Operations Research	5	5	3	25	75	100
		U21M5MPE1:2	.Mathematical Modeling						
		U21M5MPE1:3	Special functions						
IV	Skill Enhancement - II Theory	U215MASE2	Office Management – Theory	2	2	3	25	75	100
IV	Skill Enhancement - III Theory	U215MASE3	**1.**Office Communication **2.**Mathematical Reasoning	2	2	3	25	75	100
Total				**30**	**28**				**700**

SEMESTER - VI

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
III	Core - XIII	U21MC613	Complex Analysis	6	5	3	25	75	100
III	Core - XIV	U21MC614	Graph Theory	6	5	3	25	75	100
III	Core - XV	U21MC615	Linear Algebra	6	5	3	25	75	100
III	Major Based Elective - II	U21M6MBE2:1	Numerical Analysis	6	5	3	25	75	100
		U21M6MBE2:2	Object oriented programming in C^{++}						
		U21M6MBE2:3	Number theory						
III	Major Based Elective - III	U21M6MBE3:1	Laplace and Fourier Transforms	5	4	3	25	75	100
		U21M6MBE3:2	Discrete Mathematics						
		U21M6MBE3:3	Astronomy						

V	Ability Enhancement	U21GS	Gender Studies	1	1	3	25	75	100
V		U21EA	Extension Activities	-	1	-	-	-	-
Total				**30**	**26**				**600**

Courses offered by the Department of Mathematics

Part	Course Type	Course Code	Title of the Course	Hrs/ Week	Credits	Exam Hrs	Marks		
							CIA	ESE	Total
III	AC-I	U211AM1	Calculus and FourierSeries	5	4	3	25	75	100
III	AC-II	U212AM2	Algebra, ODE and Trigonometry	4	4	3	25	75	100
III	AC-III	U212AM3	Laplace Transforms, Calculus and VectorCalculus	5	4	3	25	75	100
III	AC-I	U211AM1:CS	Numerical Methods	5	4	3	25	75	100
III	AC-II	U212AM2:CS	Operations Research	4	4	3	25	75	100
IV	AC-III	U213AM3:CS	1. Probability andStatistics 2. Discrete Mathematics	5	4	3	25	75	100

Course Structure Abstract for
B.Sc., Programme 2021-2022 onwards

Part	Course		Total No. of Papers	Hours	Credit	Mark
I	Language course (LC)		4	24	12	400
II	English Language course (ELC)		4	24	12	400
III	Core Course (CC)		15	74	62	1500
III	Allied Course (AC)		6	27	24	600
III	Major Based Elective Course (MBEC)		3	16	14	300
IV	Non Major Elective Course (NMEC)		2	4	4	200
IV	Skill Enhancement (SEC)		3	6	6	300
IV	Ability Enhancement Course (AEC)	Value Education	1	2	2	100
IV		Environmental Studies	1	2	2	100
IV		Gender Studies	1	1	1	100
IV	Naan Muthalvan Course		2	2	2	200
V	Extension Activities		--	-	1	---
Total			**42**	**182**	**142**	**4200**
Extra Credit Courses						
Self Study Course (SSC)			2	-	4	200
Total			44	-	**146**	**4400**

CC-I DIFFERENTIAL AND INTEGRAL CALCULUS

Theory Hours	**: 6**	**Course Code**	**: U21MC101**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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 :

Properties of definite Integrals - Integration by parts – 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 2013.

[2] T.K. Manickavasagam Pillai and others, Integral Calculus, volume –II S.V.Publications, Reprint 2013.

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 2.3) and (section 3, 4, 5) of [2]

REFERENCE(S):

[1] Duraipandian and Chatterjee, Analytical Geometry.

[2] Shanti Narayanan , Differential and Integral Calculus, S.Chand and Co., 1996.

[3] S. Narayanan, T.K. Manikavachagom pillai, Differential Equations and its Applications viswanathan printers, 2007.

[4] Arumugam Issac, Allied Mathematics, New Gamma Publishing house, 2007.

COURSE OUTCOMES:

The students will be able to

CO1: Find higher derivatives of given function by using Leibnitz's theorem.

CO2: Study the knowledge on curvature with its properties in both Cartesian and polar form.

CO3: Evaluate indefinite integrals and reduction formulae.

CO4: Classify and solve the change of order of integration.

CO5: Use Beta and Gama functions to solve their properties.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B : $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C: $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC- II PROGRAMMING IN C

Theory Hours	**: 3**	**Course Code**	**: U21MC102**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. The course is oriented to those who want to advanced structured procedural programming understanding and to improve C programming skills.
2. The objects is to provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.

UNIT I :

Introduction to C – History – Identifiers – Keywords – Variables – Data types – Operators and Expressions – Input and Output statements.

UNIT II :

Conditional statements: simple if, if-else, nested if else, else if ladder, switch and go to statement – Looping statements: while, do-while and for statements – Nesting of loops.

UNIT III :

Introduction to Arrays – One dimensional – Two dimensional.

UNIT IV :

Introduction to Modular Programming: Functions – Call by Value – Call by reference Category of functions – Nesting of functions.

UNIT V :

Introduction to structures and unions – Array of structures – Array within structures, Structures within Structures.

TEXT BOOK :

[1] Balagurusamy. E, Programming in ANSI C, Tata McGraw – Hill, Third Edition, 2013.

UNIT I : Sections 1.1 - 1.10, 2.2 – 2.14, 3.2, 3.16, 4.1 - 4.5.
UNIT II : Sections 5.1-5.9, 6.1- 6.5.
UNIT III : Sections 7.1-7.4.
UNIT IV : Sections 9.1-9.12.
UNIT V : Sections 10.1- 10.8.

REFERENCE (S):

[1]D.M. Ritchie, The C Programming Language, Prentice Hall of India, 1977.

[2]Y. Kanetkar, Understanding Pointers in C, 4th Edition, BPB publications, New Delhi.

[3]C. Gottfried, Programming in C, Schaum outline series, 1996.

[4]P. Pandiyaraja, Programming in C, Vijay Nicole Imprint Private Limited, 2005.

COURSE OUTCOMES:

The students will be able to

CO1: Describe the concept of structure oriented programming and understand various C-tokens.

CO2: Illustrate with examples the idea of conditional statements and looping statements.

CO3: Categorize one dimensional, two dimensional arrays.

CO4: Differentiate various 'function prototypes' and demonstrate nesting of functions.

CO5: Distinguishes the idea of structures and unions, structure and arrays.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)

SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))

SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75

CC-III ANALYTICAL GEOMETRY - 3D AND TRIGONOMETRY

Theory Hours	**: 6**	**Course Code**	**: U21MC203**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. Expose various concept of Analytical geometry of 3D.
2. Be able to understand properties of straight lines and spheres.
3. Solve trigonometry equation and applications.

UNIT I:

Coplanar 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 $\sin(n\theta)$, $\cos(n\theta)$, $\tan(n\theta)$ – Expansions of $\sin^n\theta$, $\cos^n\theta$ - Expansions of $\sin(\theta)$, $\cos(\theta)$, $\tan(\theta)$ in powers of θ.

UNIT IV:

Hyperbolic functions – Relation between hyperbolic and circular trigonometric 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 New Gamma publishing – Nov - 2012.

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 1.1 to 1.3) of [2]

UNIT IV : Chapter 2 (sections 2.1 and 2.2) of [2]

UNIT V : Chapter 3 and Chapter 4 (sections 4.1 to 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.

[3] P.Duraipandian, Laxmi Duraipandian and D.Muhalal, Analytical Geometry 3 Dimensional Emerald publishers, 2004.

[4] Arumugam Issac, Ancillary mathematics, New Gamma Publishing House, 2007.

COURSE OUTCOMES :

The students will be able to

CO1: Gain through knowledge about angle between two skew lines.

CO2: Find equation of Spheres satisfying given conditions.

CO3: Gain knowledge in the expansion of trigonometry functions.

CO4: Expose various concepts of inverse trigonometry.

CO5: Accurately identify and apply properties of logarithmic and exponential functions, Gregory's series.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC-IV PROGRAMMING IN C-LAB

Theory Hours	**: -**	**Course Code**	**: U21MC204P**
Practical Hours	**: 3**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 40**
		External	**: 60**

This course is mainly concentrates on programming of C and its implementation. It makes the students to be familiar with the structure of programming language and it enables them to write programs to solve real world problems using C concepts.

1. Programs on formatted input/output.

2. Programs using conditional statements.

3. Programs using looping statements.

4. Programs using one-dimensional array and two-dimensional array.

6. Programs using functions (Nesting of functions).

7. Programs on structures and unions.

COURSE OUTCOMES:

The students will be able to

CO1: Execute simple programs using input/output and conditional statements.

CO2: Execute simple programs using looping statements.

CO3: Execute simple programs using one-dimensional and two dimensional arrays.

CO4: Execute simple programs using strings.

CO5: Execute simple programs using structures.

Question Paper Pattern

ANSWER ALL THE QUESTIONS
1 X 15 = 15 Marks
2 x 20 = 40 Marks
Record = 5 Marks

Total = 60 Marks

CC – V THEORY OF EQUATIONS AND VECTOR CALCULUS

Theory Hours	**: 6**	**Course Code**	**: U21MC305**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To study the relation between the roots and coefficients and nature of the roots.
2. To study calculate the curl and divergence of vector field.
3. To develop the knowledge of the line integral, surface integral and volume integral in vector calculus.

UNIT I :

Relation between the roots and coefficients of polynomial Equations – Symmetric functions – Sum of the r^{th} powers of the roots – Newton's Theorem on the sum of the powers of the roots.

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– 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 – 2013.

[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 of [2].

UNIT IV : Chapter 3 of [2].
UNIT V : Chapter 4 of [2].

REFERENCE(S):

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

[2] J.N. Sharma, A.R. Vasistha, Vector calculus, Krishna Prakashan Media (P) Ltd., 2004.

[3] Duraipandian, Laxmi Duraipandian, Vector Analysis, Emerald Publishers,Chennai-2 1986.

[4] Advanced Calculus, Robert C. Wrede Murray Spiegel, Tata Mc. Grew Hill, 2002.

COURSE OUTCOMES:

The students will be able to

CO1: Get the knowledge to find the relation between roots and coefficients of equations in Horner's method and Newton's method.
CO2: Understand the reciprocal equation and quotient, remainder of equation and removal terms in equation.
CO3: Understand the important definitions and basic concepts in vector and scalar function.
CO4: Solve the integration of vector using methods of line, surface and volume of integral.
CO5: Understand the concept of Gauss divergence theorem,Green's theorem, Stokes's theorem

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC – VI MATHEMATICAL STATISTICS

Theory Hours	**: 3**	**Course Code**	**: U21MC306**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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.

UNIT II:

Measures of general value: Arithmetic mean - Median-Mode - Geometric mean - Harmonic mean - Quartile deviations (Simple problems only).

UNIT III:

Correlation (two variables only) – Karl Pearson's Correlation Coefficient - Rank Correlation- Spearman's rank correlation coefficient (repeated and non-repeated). Linear regression –Simple problems

.

UNIT IV:.

Binomial and Poisson distribution – Recurrence relations for Binomial and poisson distribution - Continuous distribution: Normal distribution – Chief characteristics of normal distributions.

UNIT V:

Sampling distribution: Chi square Variates – Definition – Derivation –Student's t-Distributions – Definition – Derivation – Constant (mean and variance only). Small sample tests – paired t-test, Chi-square test of goodness of fit - Simple problems.

TEXT BOOKS :

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

[2]. S.C, Gupta and V.K.Kapoor . Fundamentals of Mathematical Statistics–Sultan chand and sons, Educational Publishers, New Delhi, Reprint – 2003.

UNIT I : Chapter 4 of [1]
UNIT II : Chapter 5 of [1]
UNIT III : Chapter 10 (sections 10.2, 10.4,10.4.2, 10.7, 10.7.1 to 10.7.3)
Chapter 11 (sections 11.2, 11.2.1) of [2].
UNIT IV : Chapter 8 (Sections 8.4, 8.4.2, 8.5, 8.5.4) and
Chapter 9 (Sections 9.2, 9.2.2) of [2].
UNIT V : Chapter 15 (sections 15.1, 15.2, 15.6.2)
Chapter 16 (sections 16.2,16.2.1, 16.2.4, 16.3.1 to 16.3.3) of [2].

REFERENCE(S):

[1]. J.N. Kapur and H.C. Saxena, Mathematical Statistics, S. Chand and company Pvt. Ltd., New Delhi, Reprint – 2015.

[2]. R.S.N. Pillai and Bahavathi, Statistics Theory and Pratical, S. Chand and company Pvt. Ltd., New Delhi, Reprint – 2015.

[3]. P.A. Navinithan, Business mathematics and Statistics, Jai publications Trichy, April – 2013.

COURSE OUT COMES:

The students will be able to

CO1 : Collect, Classify and tabulate a given data and study graphical and diagrammatic representation through, Bar diagram, Pie diagrams, Histograms, Frequency polygon.

CO2: Understand measures of central tendency, viz., Mean, Median, Mode and Geometric mean, Harmonic mean. Workout the simple problems in discrete and continuous series.

CO3: Calculate Karl Pearson, Rank correlation and lines of regression

CO4: Compute Binomial, Poisson and Normal Distribution.

CO5: Relationship among t, chi-square distribution and analyze small sample test.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC – VII SEQUENCES AND SERIES

Theory Hours	**: 5**	**Course Code**	**: U21MC407**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objective:

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'sgeneral 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 $\sum \frac{1}{n^p}$and Geometric series.

UNIT – III :

Comparison test - D' Alembert's Ratio test and Raabe's test, Simple problems basedon above tests.

UNIT– IV :

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

UNIT – V:

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

TEXT BOOK :

[1] T.K. Manicavachagampillai, T. Natarajan, K.S. Ganapathy, Algebra, Volume – I, S.Viswanathan Pvt Limited, Chennai,2013.

UNIT -I : Chapter 2 (sections 1 to7)
UNIT -II **:** Chapter 2 (sections 8, 9, 10, 11, 12 and14)
UNIT -III : Chapter 2 (Sections13, 16, 18 and19)
UNIT -IV : Chapter 2 (sections 15, 17, 21 to24)
UNIT -V **:** Chapter 3 (sections 5 to 11, 14) and Chapter 4 (Sections 2, 3, 5 to9).

REFERENCE (S) :

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

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

[3] Richard, R. Goldberg, Methods of RealAnalysis [Oxford and IBH Publishing Co.PvtLTD].

COURSE OUT COMES:

The students will be able to

CO1: An ability to work within an axiomatic framework sequence and limit.
CO2: A detailed understanding of how Cauchy's criterion for the convergence of real and complex sequences and series follows from the completeness axiom and the ability to explain the steps in standard mathematical notation.
CO3: Knowledge of some simple techniques for testing the convergence of sequences and Series and confidence in applying them.
CO4: Familiarity with a variety of well-known sequences and series, with a developing intuition about the behavior of new ones.
CO5: An understanding of how the elementary functions can be defined by power series, with an ability to deduce some of their easier properties.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC – VIII MATHEMATICAL STATISTICS PRACTICAL(USING SPSS)

Theory Hours	**: -**	**Course Code**	**: U21MC408P**
Practical Hours	**: 3**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 40**
		External	**: 60**

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,2003.

COURSE OUT COMES:

The students will be able to

CO1 : Calculate average, Median, Mode, Standard deviation of the given collection data.

CO2 : Find the correlation between the two variables between -1 and +1.

CO3 : Get conclusion (or) result.

CO4 : Fitting of Binomial,Poisson and Normal distribution.

CO5 : Find the Students t-distribution and Chi-square test for Goodness of fit.

Question Paper Pattern

ANSWER ALL THE QUESTIONS
1 X 15 = 15 Marks
2 x 20 = 40 Marks
Record = 5 Marks

Total = 60 Marks

CC- IX ABSTRACT ALGEBRA

Theory Hours	**: 6**	**Course Code**	**: U21MC509**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**:25**
		External	**: 75**

Objectives:

1. To study the various algebraic structures of Mathematics including sets, groups.
2. To develop the Rings, maximal and prime ideals through the concept of groups.

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.

UNIT II :

Cosets and Lagrange's theorem - Normal subgroups and Quotient groups – Isomorphisms – Homomorphisms .

UNIT III : Rings

Definition and Examples – Elementary Properties of rings – Isomorphism – Types of rings –Characteristic of a ring – Subrings.

UNIT IV :

Ideals – Quotient rings – Maximal and prime ideals – Homomorphism of rings – Field of quotients of an integral domain – Ordered integral domain.

UNIT V :

Unique factorization domain(U.F.D) – Euclidean domain – Every P.I.D. is a U.F.D. – Polynomial Rings – Polynomial Rings over U.F.D. – Polynomials over Q.

TEXT BOOK :

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

UNIT I : Chapter 3 (sections 3.0 to 3.7)
UNIT II : Chapter 3 (sections 3.8 to 3.11)
UNIT III : Chapter 4 (sections 4.1 to 4.6)

UNIT IV : Chapter 4 (sections 4.7 to 4.12)
UNIT V : Chapter 4 (sections 4.13 to 4.18)

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.

[3] S.G. Venkatachalapathy, Modern Algebra, Margham Publications, 2008.

[4] I.N. Herstein, Topics in Algebra, John wiley and sons, New York, 2003.

COURSE OUTCOMES:

The students will be able to

CO1: Classify and apply the Groups,Permutation groupsand their properties.

CO2: Identify different algebraic structures, isomorphic and Homomorphism structure.

CO3: Understands the fundamental concepts of the algebraic structures such as Rings and subrings.

CO4: Understand Ideals, quotient rings and Homomorphism of rings.

CO5: Learn about various concepts of Unique factorization domain and Polynomial rings.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC – X REAL ANALYSIS

Theory Hours	**: 5**	**Course Code**	**: U21MC510**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To study the real number system & properties of various functions defined on the real line.
2. To give application of Real analysis.

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,Pvt., Ltd.,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 to8.7)

REFERENCE(S) :

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

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

COURSE OUT COMES:

The students will be able to

CO1: Apply mathematical concepts and principles to perform numerical and symbol computations.

CO2: Use technology appropriately to investigate and solve mathematical problems.

CO3: To recognize mathematics related problems, asses their solvability and solve them with in a specified time frame.

CO4: Analysis Riemann integral derivates and fundamental theorem of calculus.

CO5: Understand Taylor's theorem and Binomial theorem concept.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC –XI MECHANICS

Theory Hours	**: 5**	**Course Code**	**: U21MC511**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To determine the resultant of system of forces.
2. To develop the knowledge and understanding of the fundamental concepts in statics of momentum and angular momentum.
3. To give enough working knowledge to handle practical problems.

UNIT I :

Force: Resultant of two forces on a particle – 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 the side of a triangle – Couples – Resultant of several co-planar forces – Equation of line of action of the resultant - 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 Inclined plane – Tilting of a body – Simple Problems.

UNIT IV :

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

UNIT V :

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

TEXT BOOK :

[1] Mechanics -P.Duraipandiyan, Laxmi Duraipandiyan,(Vector Treatment), S.Chand and Co,Reprint - 2013.

UNIT I : Chapter 2 (section 2.2) 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 1 and Chapter2(section 2.1.1)
UNIT V : Chapter 12(section 12.1 to 12.3) ,Chapter15 (section 15.6) and chapter 13

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.

COURSE OUTCOMES:

The students will be able to

CO1: Get the knowledge about forces help the students in daily life.

CO2: Understand the concepts of force with moment of a force, Reduction of coplanar forces into a force and couple.

CO3: Deep analyzing the laws of Friction.

CO4: Understand kinematics such as relative velocity, components of velocity and acceleration. Learn about Newton's Laws of motion.

CO5: Find out the various properties of simple harmonic motion, simple pendulum & projectile.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)
SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))
SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75

CC-XII DIFFERENTIAL EQUATION

Theory Hours	**: 5**	**Course Code**	**: U21MC512**
Practical Hours	**: -**	**Credits**	**: 4**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To expose the students to various techniques of integration.
2. To study differential equations and partial differential equations of first and second order.
3. To study the techniques of finding Laplace transforms and inverse Laplace transforms and real functions and their application in solving ordinary differential equations.

UNIT I :

Differential Equations of the first order: Definitions – Solutions of Differential Equations– Equations of the first order and the first degree – Variables Separable – Homogeneous Equations – Non-Homogeneous Equations of the first degree in X and Y – Linear Equations – Bernoulli's Equations – Exact Differential Equations – Sufficient Conditions – Rule for Solving an Exact Differential Equations – Rules for Integrating Factors - Equations Solvable of p – Equations Solvable for y – Equations solvable for x – Clairaut's Form.

UNIT II :

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 – Find the particular integral – Equations reducible to the linear homogeneous equation.

UNIT III :

Simultaneous Differential equations: Simultaneous of the first order and first degree – Solution of dx/P = dy/Q = dz/R – Methods for solving dx/P = dy/Q = dz/R- Geometrical interpretation of dx/P = dy/Q = dz/R – Total Differential equations rules for Integrating Pdx + Qdy +Rdz = 0.

UNIT IV :

Partial Differential Equations: Derivation of Partial Differential Equations – Elimination of arbitrary Constants – Elimination of arbitrary Functions – Different integrals of partial differential Equations – Solutions of PDE in some simple cases.

UNIT V :

Standard types of first order Equations – Types I, II, III, IV – Lagrange's Equation – Charpit's Method – Standard I, II, III, IV.

TEXT BOOKS:

[1] S. Narayanan and T.K. Manickavasagam Pillai, Calculus volume– III S.Viswanathan (Printers and Publishers), Pvt. Ltd. 2011.

UNIT I : Chapter 1 (sections 1.1, 1.2, 1.2.0 – 1.2.5,1.3.1- 1.3.3,1.4,1.5.1 - 1.5.5, 1.6.1)
UNIT II: Chapter 2 (sections 2.1, 2.1.2, 2.2-2.4, 2.8, 2.8.1-2.8.3, 2.9)
UNIT III : Chapter 3 (sections 3.1- 3.5, 3.7, 3.7.2 -3.7.4)
UNIT IV : Chapter 4 (sections 4.1, 4.2, 4.2.1-4.2.3, 4.4)
UNIT V : Chapter 4 (sections 4.5, 4.5.1-4.5.5, 4.6, 4.6.1, 4.7, 4.7.1)

REFERENCE(S):

[1] P.R. Vittal, V. Malini, Calculus, Margham, Publications, 2004.

[2] Dr. M.K. Venkataraman, Mrs. Manorama Sridhar, Differential equations and Laplace Transforms, National publishing company, 2004.

[3] S. Narayanan, T.K. Manikavachagom pillai, Differential Equations and its Applications viswanathan printers, 2007.

[4] Arumugam Issac, Allied Mathematics, New Gamma Publishing house, 2007.

COURSE OUTCOMES:

The students will be able to

CO1: Evaluate first order differential equations including separable, homogeneous, exact and linear.
CO2: Identify the type of given differential equations and select and apply the appropriate analytical techniques for finding the solution of first order and second higher order differential equations.
CO3: Solve non homogeneous equations.
CO4: Solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous or Bernoulli cases.
CO5: Solve higher order differential equations using reduction of order, undermine coefficients or variation of parameters.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC – XIII COMPLEX ANALYSIS

Theory Hours	**: 6**	**Course Code**	**: U21MC613**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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.

COURSE OUT COMES:

The students will be able to

CO1 : Understand the significance of differentiability and analytical of complex function leading to the Cauchy-Riemann equations.

CO2 : Solve analytic function as a mapping on the plane, Mobius or bilinear transformation.

CO3: Learn the role on Cauchy theorem and Cauchy's integral formulas in evaluation of closed integrals. Apply Cauchy Inequality, Liouville's theorem, Fundamental theorem of algebra and Morera's theorem.

CO4: Learn Taylor's series and Laurent's series expansion of analytic function.

CO5: Classify the nature of singularity, poles and Residues and application of Cauchy's Residue theorem.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC - XIV GRAPH THEORY

Theory Hours	**: 6**	**Course Code**	**: U21MC614**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. Be familiar with the most fundamental graph theory topics and results.
2. Be exposed to the techniques of proofs and analysis.

UNIT I :

Definition of a graph, application of a graph – Finite and infinite graphs – Incidence and degree – Isolated, pendant vertices and Null graph – Isomorphism – Sub graphs – walks, Paths and circuits – connected and disconnected graphs and 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.

[4] G.Chartrand, Linda Lesniak and Ping zhang, Graphs and Digraphs, Fifth Edition, CRC press, 2011.

COURSE OUTCOMES:

The student will be able to

CO1: Define basic notions in graph theory and account for the theory of paths and the degree of connectedness of a graph.

CO2: Account the basic properties of trees and fundamental circuits.

CO3: After learning the course the students should be able to solve problems involving vertex connectivity, edge connectivity.

CO4: Define the vector spaces of a graph and Galois fields.

CO5: Understand the matrix representation of graphs.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

CC- XV LINEAR ALGEBRA

Theory Hours	**: 6**	**Course Code**	**: U21MC615**
Practical Hours	**: -**	**Credits**	**: 5**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. Know the various algebraic structures of Mathematics including sets, groups.
2. Learn about vector spaces, span of a set and linear independence.
3. Develop an analytic thinking in the concept of linear equations..

UNIT I : Vector Speces:

Introduction – Definition and Examples – Subspaces – Linear Transformation.

UNIT II :

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

UNIT III : Inner Product Speces:

Introduction - Definition and Examples – Orthogonality – Orthogonal Complement.

UNIT IV : Theory of Matrices:

Introduction – Algebra of Matrices – Types of Matrices – The Inverse of a Matrix – Elementary Transformations.

UNIT V :

Rank of a Martix – Simultaneous Linear Equations – Characteristic Equation And Cayley Hamilton Theorem – Eigen Values And Eigen Vectors.

TEXT BOOK :

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

UNIT I : Chapter 5 (sections 5.0 to 5.3)
UNIT II : Chapter 5 (sections 5.4 to 5.8)
UNIT III : Chapter 6 (sections 6.0 to 6.3)
UNIT IV : Chapter 7 (sections 7.0 to 7.4)
UNIT V : Chapter 7 (sections 7.5 to 7.8).

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.

[3] S.G. Venkatachalapathy, Modern Algebra, Margham Publications, 2008.

[4] I.N. Herstein, Topics in Algebra, John wiley and sons, New York, 2003.

[5] A.R. Vasistha, A.K. Vasistha, Modern Algebra, Krishna Prakasam Media(P) Ltd., 2008.

COURSE OUTCOMES:

The students will be able to

CO1: Identify the concepts of vector spaces in linear transformations and their properties.

CO2: Learn about the rank and nullity of linear transformations.

CO3:Understand the basic concepts of orthogonal complement.

CO4: Apply the basic concepts of types of matrices.

CO5: Learn the role on Cayley Hamilton theorem and solve the problems in eigen values and eigen vectors.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

OPERATIONS RESEARCH (EC – I)

Theory Hours	**: 5**	**Course Code**	**: U21M5EC1**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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.

3. To develop scientific ability.

UNIT I :

Linear Programming Problem: Introduction – Mathematical Formulation of the problem – Graphical Solution Method – Simplex method – Big (M) Method.

UNIT II :

Transportation Problem: Introduction – 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, Sixteenth thoroughly Revised Edition Reprint – 2014.

UNIT I : Chapter 2 (sections 2.1, 2.3)
Chapter 3 (sections 3.1, 3.2)
Chapter 4 (sections 4.1, 4.4)

UNIT II : Chapter 10 (sections 10.1, 10.2, 10.8,10.9, 10.13)
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 25 (sections 25.1, 25.2 , 25.4, 25.6, 25.7, 25.8).

REFERENCE(S):

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

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

[3].Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research (Sultan chand and sons).

COURSE OUT COMES:

The students will be able to

CO1: Learn mathematical techniques that will help them to understand and analyze managerial problems in industry so that resources (Capitals, Materials, staffing and machines) may be utilized more effectively.

CO2: Use mathematical software to solve the Transportation Problems.

CO3: Identity and develop operational research models from the verbal description of the real system.

CO4: Solve the replacement problem.

CO5: Understand the Network scheduling of PERT/CPM method.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

NUMERICAL ANALYSIS (EC – II)

Theory Hours	**: 6**	**Course Code**	**: U21M6EC2**
Practical Hours	**: -**	**Credits**	**: 4**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To develop the mathematical skills of the students in the areas of numerical methods.
2. To provide the student with numerical methods of solving the Interpolation, differentiation and integration.
3. This course is an introduction to broad range of numerical methods for solving mathematical problems that arise in science and engineering.

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 points – Lagrange's interpolation formula.

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, 3.6, 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, 7.4,7.5).

REFERENCE(S):

[1] S.Narayanan and others, Numerical Analysis, S.Viswanathan Publishers, 1994,
[2] A.Singaravelu, Numerical methods, Meenachi Agency, June 2000.
[3] E. Kendall, Atkinson, An Introduction to Numerical Analysis, II Edition, John wiley& Sons, 1989.

COURSE OUTCOME:

The students will be able to

CO1: Learn the numerical methods to find our solution of algebraic equations using different methods.
CO2: Understand the various interpolation methods and finite difference concepts.
CO3: Apply numerical methods to obtain approximate solutions to mathematical problems.
CO4: Work numerically on the ordinary differential equations using different methods through the theory of finite differences.
CO5: Apply Taylor series and Runge kutta methods to find the solution of the equations.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)
SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))
SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

DISCRETE MATHEMATICS (EC – III)

Theory Hours	**: 5**	**Course Code**	**: U21M6EC3**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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 single 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 :

Types of matrices - Rank of a matrix– Simultaneous linear equations – Characteristic equation and Cayley Hamilton Theorem - simple problems only.

TEXT BOOK[S]:

[1]. Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001.

[2]. S.Arumugam and A. Thangapandi Isaac, Modern Algebra, New Gamma publishing House, Aug - 2003.

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 9.93) 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(S):

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

[2]. A.R. Vasistha, A.K. Vasistha, M.A> Krishna prakasam media (P) Ltd., 2008.

[3]. Kenneth H. Rosen, Discrete mathematics and its applications, 7^{th} edition, Tata MCGrow Hill Publication.co,Ltd., New Delhi, Special Indian edition 2011.

COURSE OUTCOMES:

The students will be able to

CO1: Solve recurrence relation, linear equations and generating functions.

CO2: Understand the techniques of coding and decoding systems.

CO3: Gain the knowledge of logic and normal forms.

CO4: Have exposure to the inference theory and predicate calculus.

CO5: Have an efficiency in solving problems in matrix theory.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

ASTRONOMY (EC - IV)

Theory Hours	**: 5**	**Course Code**	**: U21M6EC3**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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,2002.

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(S):

[1] V.Thiruvenkatacharya, A text book of Astronomy, S.Chand and Co., Pvt Ltd.,1972.

[2] Bonnet, R. & Keen, G. (1992), Space and Astronomy, 49 Science Fair Projects, TAB Books, Blue Ridge summit, PA.

[3] Sneider, C. (1988), Earth, Moon and Stars, Lawrence Hall of science, Berkeley, CA.

[4] Vogt, G. (1992), The Hubble Space Telescope, The Millbrook Press, Brook field, CT.

COURSE OUTCOMES:

The students will be able to

CO1: Describe and explain the observed daily and long-term motion of objects like sphere(sun, moon, planets, stars).

CO2: Use a earth tangent and Cassini's formula. Explain how astronomical distances are determined using parallax and luminosity techniques.

CO3: Sketch and explain the relationships of three anomalies of the earth.

CO4: Demonstrate a thorough understanding of geocentric parallax.

CO5: Apply scientific reasoning to future astronomical discoveries to understand their validity as well as to everyday situations in moon.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

MATHEMATICAL MODELLING (EC - V)

Theory Hours	**: 5**	**Course Code**	**: U21M5EC1**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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 Digraphs and Unoriented Graphs.

TEXT BOOK:

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

REFERENCE(S):

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

[2]. Bimal K. Mishra and Dipak satpathi, Mathematical modeling, Ane books Pvt,Ltd.,2007.

COURSE OUTCOMES:

The students will be able to

CO1: Understand the concept of a mathematical model and explain the series of steps involved in mathematical modeling.

CO2: Classify different classes of mathematical models.

CO3: Discuss features of a good model and the benefit of using a mathematical model.

CO4: Identify some simple real – life problems that can be solved using mathematical models.

CO5 : Convert the physical problems as differential equations through mathematical modeling.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

MBEC-I SPECIAL FUNCTIONS

Theory Hours	**: 5**	**Course Code**	**: U21M5MBE1:3**
Practical Hours	**: -**	**Credits**	**: 5**
Exam	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To learn different techniques for solving differential equations.
2. To familiarize the students to applications in other branches of Mathematics such as Quantum Mechanics, Electro – Static problems, Stucture of Hydrogen atom, Nuclear Physics, etc,.

UNIT-I

The Integral Test and Euler's constant-Bernoulli functions and Numbers – The Euler – Maclaurin Formulas – The Stirling formulas.

UNIT-II

The Gamma Function: Definition and Basic properties – The Beta Function, Walli's product- The Reflection Formula – Stirling and Weierstrass.

UNIT-III

Elliptic Integrals and Elliptic Functions: Motivational Examples – General Definition of Elliptic Integrals – Evaluation of Elliptic Integrals – The Jacobian Elliptic Function – Addition Theorems.

UNIT-IV

Zeros, Poles and Period Parallelograms – General Elliptic Functions – Weierstrass'P – Function - Elliptic Functions in terms of P and P'.

UNIT-V

Orthogonal Function: Generating Functions – Orthogonality – Series Expansions.

TEXT BOOKS:

1.Special Functions by Leon M.Hall, Professor of Mathematics, University of Missouri-Rolla.

Unit I : chapter 1(Sec 1.1,1.3,1.4,1.5)
Unit II : Chapter 2(Sec 2.1to2.4)

Unit III : Chapter 3(Sec 3.1 to 3.5)

Unit IV : Chapter4(Sec 3.7to3.10)

Unit v : Chapter5(Sec 5.1to 5.3)

REFERENCE(S):

1.Differential equations and calculus of variations by L.Els golts.

2.Differential equations-Diwan and Agashe.

3.Advanced calculus of Applications by F.B. Hilder Brandt.

COURSE OUTCOMES:

The students will be able to

CO1: Understand the concept of the Bernoulli functions and Numbers.

CO2: Solve the basic properties and the beta function, Wallis'product.

CO3: Discuss general definition of elliptic integrals and addition theorem.

CO4: Classify the zeros, poles, and period parallelograms and weierstrass''p-function.

CO5: Explain the generating functions and orthogonality, series expansions.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)

SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))

SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75

LAPLACE AND FOURIER TRANSFORMS (EC – VI)

Theory Hours	**: 6**	**Course Code**	**: U21M6EC2**
Practical Hours	**: -**	**Credits**	**: 3**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

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

2.To express periodic functions as a Fourier series.

UNIT I :

Laplace Transform.

UNITII :

Inverse Laplace Transform.

UNIT III :

Fourier Series.

UNIT IV :

Half – Rang Fourier Series.

UNIT V :

Fourier Integral transform.

TEXT BOOK:

[1] S. Narayanan, T.K. Manicavachagom Pillay. Calculus Volume III – S.Viswanathan (Printers & Publications), Pvt., Ltd., 2011.

UNIT I: Chapter 5 (Sections 5.1,5.1.1, 5.1.2, 5.3 – 5.5)

UNIT II : Chapter 5 (Sections 5.6 to 5.10, 5.10.1)

UNIT III: Chapter 6 (Sections 6.1 to 6.3, 6.3.1, 6.3.2)

UNIT IV : Chapter 6 (Sections 6.4, 6.5.1, 6.5.2, 6.6, 6.6.1)

UNIT V: Chapter 6 (Sections 6.9.2, 6.10, 6.11.1, 6.11.2, 6.12 – 6.14, 6.14.1, 6.15).

REFERENCE(S):

[1]. S. Arumugam & Issac, Differential Equations, New Gamma Publishing House, Palayamkottai, 2003.

[2]. S.Arumugam and others , Trigonometry And Fourier series New Gamma Publications –1999.

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

COURSE OUTCOMES:

The students will be able to

CO1: Learns that serves as a platform for advanced mathematics and for solving many real life problems.

CO2: Use the methods of Laplace transforms and Inverse Laplace transforms to solve

CO3: Derive a Fourier series of a given periodic function by evaluating Fourier coefficients.

CO4 : Know that any periodic function can be expressed as a Fourier series.

CO5 : Be able to expand an Odd or even function as a half – rang cosine or sine Fourier series.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

OBJECT ORIENTED PROGRAMMING using C++(EC – VII)

Theory Hours	**: 5**	**Course Code**	**: U21M6EC3**
Practical Hours	**: -**	**Credits**	**: 4**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. To introduce programming style that is associated with the concepts of class, object and other concepts revolving around these two, like inheritance and polymorphism.
2. To realize object oriented programming is a vast improvement over procedural programs.

UNIT I:

Programming Paradigms – Introduction to OOP – Advantages of OOP- Characteristics of OOP language – Overview of C++ - C++ programming basics – Function: simple Functions – Call by value – Call by reference – Returning values of different type – Function overloading – inline functions – Default arguments – Recursive function.

UNIT II:

Class – Objects – Constructors – Destructors – Objects as function arguments- Returning object from functions – Structures and Classes – Staticdata - Static function – Array of objects.

UNIT III:

Access specifies – Friend function – Friend class – Operator over loading –Type casting –Pointer–Template.

UNIT IV:

Inheritance – Derived class constructors – Class hierarchies – Types of inheritance – Virtual base class – Function overriding – Virtual functions- Pure virtualunctions - Abstract class.

UNIT V:

Files and Streams : I/O manipulators – Streams – Error handling during file operations string I/O - Character I/O - Object I/O – I/O with multiple objects – File pointers - Disk I/O with member functions.

TEXT BOOK:

[1]. Robert Lafore, Object oriented Programming in Microsoft C++, Galgotia Publication New Delhi, 2000.

UNIT I: Chapter 1,2 and 3.

UNIT II: Chapter 4 and 5.

UNIT III: Chapter 6 and 7.

UNIT IV: Chapter 9 and 10.

UNIT V: Chapter 11 and 12.

REFERENCES (S):

[1]. E. Balagurusamy, Object Oriented Programming with C++, Second Edition,2002.

[2]. Bjarne Stroustrup, The C++ Programming Language, Addison – Wesley, NewYork, 1999.

[3]. StephenPrata, C++ Primer Plus, 6 th Edition, Addison – Wesley, Professional,2011.

[4]. Yashavant P. Kanetkar, Let Us C,BPB Publications 4th Revised Edition, Copyright 2002.

COURSE OUTCOMES:

Students will be able to

CO1 : Understand that objects oriented programs are organized around objects, which contain both data and functions that data and a class is a template for of objects.

CO2 : Study how Inheritance allows a class to be derived from an existing class without modifying it.

CO3 : Explain the concepts of operator overloading, type casting pointers and work on templates.

CO4 : Identify classes hierarchies and type of inheritance.

CO5 : Have a Working knowledge of disk I/O operations with member functions.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)

SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))

SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75

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

Theory Hours	**: 2**	**Course Code**	**:U21M3NMEC1**
Practical Hours	**: -**	**Credits**	**: 2**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1. Develop Mathematical Aptitude Skills.
2. The formulae given are useful over many problems.
3. To provide a confidence to appear in competitive examinations.

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 on Ages.

UNIT V :

Area – Volume and Surface Areas.

TEXT BOOK:

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

REFERENCE(S):

[1]. B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.

[2]. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.

[3]. Arora .P.N. and Arora.s. 2009, Quantitative Aptitude Mathematics: Volume-1,S.Chand and company Ltd.

[4]. Kothari. C.R.1989, Quantitative techniques,Vikas Publishing House Pvt Ltd.

[5]. Srinivasan.T.M., Perumalswami.S. and gopala Krishnan.M.D., 1985 , Elements of Quantitative Techniques, Emerald Publishers.

COURSE OUTCOMES:

The students will be able to

CO1: Expose various types of Numbers. Use least common multiple method.

CO2: Crack challenging problems of simplifications based on complex function, square roots, cubic roots, unit digits, Exponents and percentages within a few seconds with the help of short tricks without knowledge.

CO3: Learn and apply tips and logical method on difficult problems of topics like time and work, pipes and cistern, speed and distance, average speed etc.

CO4: Study Problems on Trains, Numbers, Ages.

CO5: Apply easiest technique to solve Volume and Surface area.

Question Paper Pattern

Each units fifteen multiple choice questions for all topics: 75 x 1 = 75

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

Theory Hours	**: 2**	**Course Code**	**:U21M3NMEC1**
Practical Hours	**: -**	**Credits**	**: 2**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

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:

Banker's Discount.

UNIT IV:

Time and Distance.

UNIT V:

Time and Work.

TEXT BOOK:

[1] . R.S. Aggarwal, Quantitative Aptitude, S.Chand and company Ltd, New Delhi 2014.

REFERENCES :

[1]. B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.

[2]. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.

[3]. Arora .P.N. and Arora.s. 2009, Quantitative Aptitude Mathematics: Volume-1,S.Chand and company Ltd

[4]. Kothari. C.R.1989, Quantitative techniques,Vikas Publishing House Pvt Ltd.

COURSE OUTCOMES:
The students will be able to

CO1: Apply proportions to rate, base and percentage problems.

CO2: Apply the principal of simple interest and compound interest relevant problems in financial applications.

CO3: Gain knowledge about to Banker's Discount and calculation of interest.

CO4: Understand the problems to based on Time and Distance.

CO5: Study problem on work are based on application of concept of ratio of time

Question Paper Pattern

Each units fifteen multiple choice questions for all topics: 75 x 1 = 75

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

Theory Hours	**: 2**	**Course Code**	**:U21M4NMEC2**
Practical Hours	**: -**	**Credits**	**: 2**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:

1 . To develop skills in aptitude and arithmetic for facing the competitive examinations
2. To learn and apply short tricks, tips and logical method on many difficult problems.
3. To solve problem in a fraction of minute using shortcut methods.

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:

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

REFERENCE(S):

[1]. B.S.Sijwali, quantitative aptitude Arihant Publications(india) Pvt Ltd 2007.

[2]. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Mc Graw Hill Companies, 2006.

[3]. Arora .P.N. and Arora.s. 2009, Quantitative Aptitude Mathematics: Volume-1,S.Chand and company Ltd

[4]. Kothari. C.R.1989, Quantitative techniques,Vikas Publishing House Pvt Ltd.

[5]. Srinivasan.T.M., Perumalswami.S. and gopala Krishnan.M.D., 1985 , Elements of Quantitative Techniques, Emerald Publishers.

COURSE OUTCOMES:

The students will be able to

CO1: Be apply easiest technique to solve simple interest and compound interest and its various types.
CO2: Explain and apply basic concept of probability.
CO3: To learn and apply short tricks and tips to Odd Man Out and Series.
CO4: To study Tabulation and Bar graphs.
CO5: Expose various types of Pie Charts – Line Graphs.

Question Paper Pattern

Each units fifteen multiple choice questions for all topics: 75 x 1 = 75

NON-MAJOR - ELECTIVE COURSE
BIO STATISTICS

Theory Hours	**: 2**	**Course Code**	**:U21M4NMEC2**
Practical Hours	**: -**	**Credits**	**: 2**
Exam Hours	**: 3**	**Internal**	**: 25**
		External	**: 75**

Objectives:
1.To develop the skills in the area of problem solving in Biostatistics.
2. To solve the problem in mean, median, mode methods.

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(S):
[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.

TEXT BOOK:

[1]. P. Ramakrishnan, Biostatistics, saras publications.

COURSE OUTCOMES:

The students will be able to

CO1: Study principle concepts about biostatistics.

CO2: Study data characteristics and form of distribution of data structure.

CO3: Understand the exact method of data analysis for the problem under investigation.

CO4: Gain knowledge about mean, median, mode, variance and cumulative variance.

CO5: Study chi square test, one way correlation and regression .

Question Paper Pattern

Each units fifteen multiple choice questions for all topics: 75 x 1 = 75

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

[4] $\int \frac{dx}{a+b\cos x}$ [5] $\int \frac{dx}{a+b\sin x}$ [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] $\int e^{ax}x^n dx$ [2] $\int \sin^n x dx$ [3] $\int \cos^n x dx$ [4] $\int_0^x e^{ax}x^n dx$

[5] $\int_0^{\frac{\pi}{2}} \sin^n x dx$ [6] without proof $\int_0^{\frac{\pi}{2}} \sin^n x \cos^n x dx$ –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– Aug 2007(1st Eduction).
2. A. Singaravelu, Allied Mathematics – II – June – 2010(2nd Eduction).

COURSE OUT COMES:

The students will be able to

CO1: Find higher derivatives of given function by using Leibnitz's theorem.

CO2: Evaluate indefinite integrals and reduction formula.

CO3: Develop the concept of definite integrals and reduction formula.

CO4: Solve first order differential equation utilizing the standard techniques for separable, exact , linear homogeneous equation.

CO5: Derive a Fourier series of a given periodic function by evaluating Fourier coefficients.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

ALLIED COURSE – II (AC)
ALGEBRA, ODE AND TRIGONOMETRY

Objectives:

1. To study the various methods for solving Ordinary Differential Equations.
2. To understand the linear system of Ordinary Differential Equations.

UNIT I:

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

UNIT II :

Differential Equation of first order and higher degree – Equations solvable for p, solvable for x, Solvabel for y , Clairaut's equation (simple cases only)

UNIT III :

Linear Differential equations with constant coefficients – Finding particular integrals in the cases of e^{ax}, sin(ax), cos(ax) (where a is a constant), x^a where a is a positive integer and e^{ax} 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 $^n\theta$, cos $^n\theta$, sin $^n\theta$cos $^m\theta$, 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 :

Exponential formula for $e^{i\theta}$ – Definition of Hyperbolic functions – Formulae of 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:

1. Dr. A.Singaravelu, Allied Mathematics , Fourth Revised Edition, Aug – 2013.

REFERENCE(S):

[1]. PR.Vital, Trigonometry, Margham Publications Chennai IT, 3rd Edition-2004.

[2]. S.Narayanan, T.K.Manickavasagam Pillai, Trigonometry S.Viswanathan, Pvt Ltd 2004.

[3]. S.Narayanan, T.K.Manickavasagam Pillai, Differential equations and it's applications Viswanatham Printers, 2007.

[4]. Arumugam Issac,Allied Mathematics, New Gamma Publishing House, 2007.

COURSE OUTCOMES:

The students will be able to

CO1: Study basic problems involving the Exponential and Logarithmic Series.

CO2: Learn about Differential Equation of first orderand higher degrees.

CO3: Learn about Linear equations with constant coefficients.

CO4: Learn about the expansion of trigonometry functions. Expose various concept of trigonometry, inverse trigonometry functions.

CO5: Provide Hyperbolic functions and the Relation between hyperbolic function.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)

SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))

SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75

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 differential equations.
2. To study the Derivation of vectors and line integral, surface integral and volume integral and their applications.

UNIT I :

Laplace Transforms – Definition –L (e^{at}), L (e^{-at}) , L(cos(at)), L(sin(at)), L(t^n), where n is a positive integer - Basic theorems in Laplace Transforms (formula only) – L[e^{-st}cosbt], L[e^{-st}sinbt], 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 of differential equations using Laplace Transforms.

UNIT III :

Vector differentiation – Velocity and Acceleration Vectors – Gradient of a vector – Directional Derivative – Unit Normal Vector– Divergence – Curl – Solenoidal and Irrotational vectors – 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:

1. Dr. A.Singaravelu, Allied Mathematics , Fourth Revised Edition, Aug – 2013.

REFFERENCE(S):

[1]. G. B. Thomas and R. L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson, 2002.

[2]. Jain and Iyengar, Advance Engineering Mathematics, Narosa Publishing House.

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

[4]. J.N. Sharma, A.R. Vasishtha, Vector calculus, Krishna Prakashan Media (P) Ltd., 2004.

COURSE OUTCOMES:

The students will be able to

CO1: Learns that serves as a platform for advanced mathematics and for solving many real life problems.

CO2: Use the methods of laplace transforms and Inverse laplace transforms to solve differential equations with constant coefficients.

CO3: Determine gradient vector fields and find potential functions, derivatives of vector functions.

CO4: Evaluate line, surface and volume integrals. Compute length, area and volume of surface using vector integration.

CO5: Apply the Gauss Divergence Theorem and Stoke's Theorem.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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 –Runge - Kutta second and fourth order methods,(Proof need not necessary, simple problems only for all units).

UNIT I : Chapter 2 (sections 2.1,2.2, 2.3, 2.5)
UNIT II : Chapter 3 (sections 3.3, 3.3.1, 3.3.2, 3.3.3, 3.6, 3.9.1)
UNIT III : Chapter 5 (sections 5.4.1, 5.4.2, 5.4.3)
UNIT IV : Chapter 6(sections 6.3, 6.3.2)
Chapter 8(sections 8.3.1, 8.3.2)
UNIT V : Chapter 7 (sections 7.1, 7.2, 7.4, 7.5).

TEXT BOOK:

1. S.S. Sastry, Introductory Methods of Numerical Analysis, prentice Hall of India, private limited Third edition - 2001.

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.

COURSE OUTCOMES:
The students will be able to

CO1 : Obtain numerical solutions of algebraic and transcendental equations.

CO2 : Learn about various interpolating and extrapolating methods to find numerical solutions

CO3 : Understand the Trapezoidal and Simpson's 1/3 and 3/8 rules.

CO4: Solve initial and boundary value problems in differential equations using numerical methods.

CO5 : Apply taylor's series and runge - kutta methods to find the solution of the equations.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

B.Sc., COMPUTER SCIENCE
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, 2.2)
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).

REFERENCE(S):

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

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

COURSE OUT COMES:

The students will be able to

CO1: Learn mathematical techniques that will help them to understand and analyze managerial problems in industry so that resources (Capitals, Materials, staffing and machines) may be utilized more effectively.

CO2: Use mathematical software to solve the Transportation Problems.

CO3: Apply theSpecial cases in Assignment problems.

CO4: Solve the Network scheduling of CPM method problem.

CO5: Understand the Network scheduling of PERT method.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

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

Objectives:

1. To make the students gain wide knowledge in probability which plays a main role in solving real life problems.
2. To study the applications of Binomial and Poisson distributions.

UNITI:

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:

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

TEXT BOOK:

[1]. 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 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).

REFERENCE(S):

[1]. A.Singaravelu, Prabablity and statistics (paper - III), March 2002.

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

COURSE OUT COMES:

The students will be able to

CO1: Understand the basic concept of probability.

CO2: Appreciate the importance of probability distribution of random variables and to know the notion of central tendency.

CO3: Establish the Mathematical Expectation**.**

CO4: Understand the correlation and regression coefficient.

CO5: Important probability distributions of binomial, poisson and normal.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

B.Sc., COMPUTER SCIENCE
ALLIED MATHEMATICS
ALLIED COURSE – IV (AC) –DISCRETE MATHEMATICS

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 single 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 :

Types of matrices - Rank of a matrix– Simultaneous linear equations – Characteristic equation and Cayley Hamilton Theorem - simple problems only.

TEXT BOOK[S]:

[1]. Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001.

[2]. S.Arumugam and A. Thangapandi Isaac, Modern Algebra, New Gamma publishing House, Aug - 2003.

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 9.93) 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(S):

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

[2]. A.R. Vasistha, A.K. Vasistha, M.A> Krishna prakasam media (P) Ltd., 2008.

[3]. Kenneth H. Rosen, Discrete mathematics and its applications, 7^{th} edition, Tata MCGrow Hill Publication.co,Ltd., New Delhi, Special Indian edition 2011.

COURSE OUTCOMES:

The students will be able to

CO1: Solve recurrence relation, linear equations and generating functions.

CO2: Understand the techniques of coding and decoding systems.

CO3: Gain the knowledge of logic and normal forms.

CO4: Have exposure to the inference theory and predicate calculus.

CO5: Have an efficiency in solving problems in matrix theory.

Question Paper Pattern

SECTION A : $10 \times 2 = 20$ (Each Unit Carries Two Questions)

SECTION B $5 \times 5 = 25$ (Each Unit Carries Two Questions (Either or Type))

SECTION C $3 \times 10 = 30$ (Each Unit Carries One Questions)

Total = 75

MATHEMATICAL REASONING

Objectives:

1. To developing logical thinking and mathematical reasoning.
2. To make a logical deduction of important tool for any sequential programming.

UNIT I:

Blood relation – Deciphering jumbled up descriptions, Relation puzzle and coded relations.

UNIT II:

Coding and Decoding – Letter decoding, Direct letter coding, Number/symbol coding – Matrix coding – Substitution – Deciphering message word codes – Deciphering number and symbol codes for messages – Jumbled coding.

UNIT III:

Puzzle test: Classification type – Seating/ placing arrangements – Comparison type - Sequential order of things - Selection based on given conditions – Family based puzzles.

UNIT IV:

Logical deduction – Arguments – Assumptions – Course of Actions- Conclusions.

UNIT V:

Deriving conclusions from passages – Theme deduction – Cause and effect reasoning.

TEXT BOOK(S):

1. Aggarwal, R. S, A Modern Approach to verbal & non-verbal reasoning,

S. Chand & company Ltd., 2006.

Unit 1 : section 1: 5

Unit 1 : section 1: 4

Unit 1 : section 1: 6

Unit 1 : section 2: 1,2,3,4,5

Unit 1 : section 2: 6,7,8.

REFERENCE(S):

[1]. Aggarwal, R. S. A Modern Approach to verbal reasoning, S. Chand & company Ltd., 2006.

[2]. Aggarwal, R. S. A Modern Approach to non- verbal reasoning, S. chand & company Ltd., 2006.

[3]. Aggarwal, R. S. A Modern Approach to logical reasoning, S. Chand & company Ltd., 2006.

COURSE OUTCOMES:

The students will be able to

CO1: Predict the Relation puzzle and coded relations.

CO2: Understand the relation with Coding and Decoding.

CO3: Analyze the puzzles and family based puzzles .

CO4: Use logical deductions to verify the validity of the conclusion.

CO5: Differentiate cause and effect, derive conclusions from passage.

Question Paper Pattern

SECTION A : 10 × 2 = 20 (Each Unit Carries Two Questions)

SECTION B 5 × 5 = 25 (Each Unit Carries Two Questions (Either or Type))

SECTION C 3 × 10 = 30 (Each Unit Carries One Questions)

Total = 75
