DHANALAKSHMI SRINIVASAN COLLEGE OF ARTS AND SCIENCE FOR WOMEN (AUTONOMOUS)

(AFFILIATED TO BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI)
(NATIONALLY RE-ACCREDITED WITH 'A' GRADE BY NAAC)
PERAMBALUR-621 212,TAMIL NADU
DEPARTMENT OF MATHEMATICS

B.Sc MATHEMATICS – COURSE STRUCTURE UNDER CBCS
(CANDIDATES ADMITTED FROM 2021-2022 ONWARDS)

YEAR/ SEM	PART	COURSE	COURSE TITLE	COURSE CODE	INSTR PERIODS / WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
								INTERNAL	EXTERNAL	
I YEAR I SEM	I	LANGUAGE COURSE - I	CHEYYUL (EKKALA ELAKKIYAM), SIRUKADHAI, ILLAKIYAVARALURU / HINDI/ FRENCH/ SANSKRIT/ ARABIC	21U1LT1 / 21U1LH1 / 21U1LF1 / 21U1LS1 / 21U1LA1	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE - I	ENGLISH FOR COMMUNICATION-I	21U1EL1	6	3	3	25	75	100
	III	CORE COURSE - I	THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS	21UMM1C1	5	5	3	25	75	100
		CORE COURSE - II	ANALYTICAL GEOMETRY 3D	21UMM1C2	5	4	3	25	75	100
		ALLIED COURSE - I	GENERAL PHYSICS –I	21UMM1A1	3	3	3	25	75	100
		ALLIED CORSE - II	GENERAL PHYSICS PRACTICAL - I	21UMM1A2P	3	-	-	-	-	-
	IV	ENVIRONMENTAL STUDIES	ENVIRONMENTAL STUDIES	21U1EVS	2	2	3	25	75	100
	TOTAL				**30**	**20**	**18**	**150**	**450**	**600**
I YEAR II SEM	I	LANGUAGE COURSE - II	CHEYYUL (EDAIKALA ELAKKIYAM), PUTHINAM / HINDI/ FRENCH/ SANSKRIT/ ARABIC	21U2LT2 / 21U2LH2 / 21U2LF2 / 21U2LS2 / 21U2LA2	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE - II	ENGLISH FOR COMMUNICATION-II	21U2EL2	6	3	3	25	75	100
	III	CORE COURSE - III	TRIGONOMETRY & VECTOR CALCULUS	21UMM2C3	5	4	3	25	75	100
		CORE COURSE - IV	INTEGRAL CALCULUS	21UMM2C4	5	5	3	25	75	100
		ALLIED COURSE - II	GENERAL PHYSICS PRACTICAL - I	21UMM1A2P	3	3	3	40	60	100
		ALLIED COURSE - III	GENERAL PHYSICS - II	21UMM2A3	3	3	3	25	75	100
	IV	VALUE EDUCATION	VALUE EDUCATION	21U2VED	2	2	3	25	75	100
	TOTAL				**30**	**23**	**18**	**190**	**510**	**700**

II YEAR III SEM	I	LANGUAGE COURSE-III	CHEYYUL (KAPPIYANGAL), URAINADAI, ALUVAL MURAI MADALGAL, ELAKKIYA VARALARU / HINDI/ FRENCH/ SANSKRIT/ ARABIC	21U3LT3 / 21U3LH3 / 21U3LF3 / 21U3LS3 / 21U3LA3	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE-III	ENGLISH THROUGH LITERATURE	21U3EL3	6	3	3	25	75	100
		CORE COURSE - V	ALGEBRA AND FOURIER SERIES	21UMM3C5	5	5	3	25	75	100
	III	CORE COURSE - VI	THEORY OF NUMBERS	21UMM3C6	5	4	3	25	75	100
		ALLIED COURSE -IV	MATHEMATICAL STATISTICS-I	21UMM3A4	3	3	3	25	75	100
		ALLIED COURSE -V	MATHEMATICAL STATISTICS PRACTICAL	21UMM3A5P	3	-	-	-	-	-
	IV	NON-MAJOR ELECTIVE – I	QUANTITATIVE APTITUDE - I	21UMM3N1A	2	2	3	25	75	100
			OPERATIONS RESEARCH	21UMM3N1B						
			STATISTICS - I	21UMM3N1C						
	TOTAL				**30**	**20**	**18**	**150**	**450**	**600**
II YEAR IV SEM	I	LANGUAGE COURSE-IV	CHEYYUL (SANGA ELAKIYAM, NEETHI ELAKKIYAM), NADAGAM, ELAKKIYA VARALARU, POTHUKATTURAI / HINDI/ FRENCH/ SANSKRIT/ ARABIC	21U4LT4 / 21U4LH4 / 21U4LF4 / 21U4LS4 / 21U4LA4	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE-IV	ENGLISH FOR COMPETITIVE EXAMINATIONS	21U4EL4	6	3	3	25	75	100
	III	CORE COURSE- VII	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM	21UMM4C7	5	5	3	25	75	100
		CORE COURSE- VIII	SEQUENCE AND SERIES	21UMM4C8	5	4	3	25	75	100
		ALLIED COURSE -V	MATHEMATICAL STATISTICS PRACTICAL	21UMM3A5P	3	3	3	40	60	100
		ALLIED COURSE -VI	MATHEMATICAL STATISTICS - II	21UMM4A6	3	3	3	25	75	100
	IV	NON-MAJOR ELECTIVE – II	QUANTITATIVE APTITUDE - II	21UMM4N2A	2	2	3	25	75	100
			NUMERICAL METHODS	21UMM4N2B						
			STATISTICS - II	21UMM4N2C						
	TOTAL				**30**	**23**	**21**	**190**	**510**	**700**

III YEAR V SEM	III	CORE COURSE – IX	NUMERICAL ANALYSIS	21UMM5C9	5	4	3	25	75	100
		CORE COURSE –X	ABSTRACT ALGEBRA	21UMM5C10	5	5	3	25	75	100
		CORE COURSE -XI	REAL ANALYSIS	21UMM5C11	5	5	3	25	75	100
		CORE COURSE –XII	STATICS	21UMM5C12	5	5	3	25	75	100
		MAJOR BASED ELECTIVE – I	OPERATIONS RESEARCH	21UMM5M1A	4	4	3	25	75	100
			STOCHASTIC PROCESSES	21UMM5M1B						
			FUZZY MATHEMATICS	21UMM5M1C						
	IV	SKILL BASED ELECTIVE - I	QUANTITATIVE APTITUDE - I	21UMM5S1A	2	2	3	25	75	100
			ARITHMETIC AND MENTAL ABILITY - I	21UMM5S1B						
			GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS - I	21UMM5S1C						
		SKILL BASED ELECTIVE - II	QUANTITATIVE APTITUDE - II	21UMM5S2A	2	2	3	25	75	100
			ARITHMETIC AND MENTAL ABILITY - II	21UMM5S2B						
			GENERAL APTITUDE FOR COMPETITIVE EXAMINATIONS - II	21UMM5S2C						
		SOFT SKILL DEVELOPMENT	SOFT SKILL DEVELOPMENT	21U5SS	2	2	3	25	75	100
	TOTAL				**30**	**29**	**24**	**200**	**600**	**800**
III YEAR VI SEM	III	CORE COURSE - XIII	LINEAR ALGEBRA	21UMM6C13	6	5	3	25	75	100
		CORE COURSE –XIV	COMPLEX ANALYSIS	21UMM6C14	6	5	3	25	75	100
		CORE COURSE –XV	DYNAMICS	21UMM6C15	6	5	3	25	75	100
		MAJOR BASED ELECTIVE –II	GRAPH THEORY	21UMM6M2A	5	4	3	25	75	100
			MATHEMATICAL MODELLING	21UMM6M2B						
			NON-LINEAR DIFFERENTIAL EQUATIONS	21UMM6M2C						
		MAJOR BASED ELECTIVE –III	ASTRONOMY	21UMM6M3A	6	4	3	25	75	100
			DESIGN & ANALYSIS OF ALGORITHMS	21UMM6M3B						
			FINANCIAL MATHEMATICS	21UMM6M3C						
	IV	GENDER STUDIES	GENDER STUDIES	21U6GS	1	1	3	25	75	100
	V	EXTENSION ACTIVITIES	EXTENSION ACTIVITIES		-	1	-	-	-	-
	TOTAL				**30**	**25**	**18**	**150**	**450**	**600**
	GRAND TOTAL				**180**	**140**	**117**	**1030**	**2970**	**4000**

Dr. V. ANUSUYA, M.Sc., M.Phil., M.C.A., Ph.D., Associate Professor & Research Supervisor

D. PARAMASIVAM

PG & Research Department of Mathematics
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M. ARCHANA
STENO-TYPIST

S. Railway.

Dr. S. [illegible]
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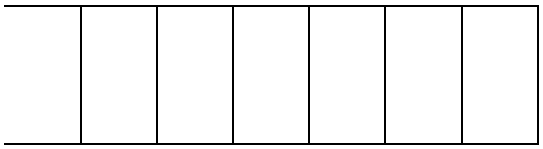
P. Paiya
R. Ramya

P. Mai.

N. Mal.



LIST OF COURSES

SEM	TAMIL	ENGLISH	MAJOR PAPERS	ALLIED PAPERS	ELECTIVE PAPERS	NME	SBE	PRACTICAL	OTHERS	TOTAL
I	1	1	1	1	-	-	-	-	EVS-1	5
II	1	1	2	1	-	-	-	1	VE-1	7
III	1	1	1	1	-	1	-	-	-	5
IV	1	1	2	1	-	1	-	1	-	7
V	-	-	4	-	1	-	2	-	SS-1	8
VI	-	-	3	-	2	-	-	-	GS-1	6

Language part-1	4
English part-II	4
Core paper	13
Allied Paper	4
Allied Practical	2
Non-Major Elective	2
Skill Based Elective	2
Major Based Elective	3
Environmental studies	1
Soft skill development	1
Gender studies	1
Value education	1
Extension activities	1

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DEPARTMENT OF MATHEMATICS

M.Sc MATHEMATICS – COURSE STRUCTURE UNDER CBCS
(CANDIDATES ADMITTED FROM 2020-2021 ONWARDS)

SEM	COURSE	COURSE TITLE	COURSE CODE	INSTR PERIODS/ WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INTERNAL	EXTERNAL	
I	CORE COURSE – I	ABSTRACT ALGEBRA	20PMM1C1	6	5	3	25	75	100
	CORE COURSE – II	REAL ANALYSIS	20PMM1C2	6	5	3	25	75	100
	CORE COURSE –III	GRAPH THEORY	20PMM1C3	6	5	3	25	75	100
	ELECTIVE – I	DISCRETE MATHEMATICS	20PMM1E1A	6	4	3	25	75	100
		COMBINATORICS	20PMM1E1B						
	APPLICATION ORIENTED COURSE-I	ORDINARY DIFFERENTIAL EQUATIONS	20PMM1A1	6	3	3	25	75	100
	TOTAL			**30**	**22**		**125**	**375**	**500**
II	CORE COURSE – IV	LINEAR ALGEBRA	20PMM2C4	6	5	3	25	75	100
	CORE COURSE –V	COMPLEX ANALYSIS	20PMM2C5	6	5	3	25	75	100
	CORE COURSE – VI	MEASURE THEORY AND IINTEGRATION	20PMM2C6	6	5	3	25	75	100
	ELECTIVE – II	MATHEMATICAL MODELING	20PMM2E2A	6	4	3	25	75	100
		FLUID DYNAMICS	20PMM2E2B						
	APPLICATION ORIENTED COURSE-II	PARTIAL DIFFERENTIAL EQUATIONS	20PMM2A2	6	3	3	25	75	100
	TOTAL			**30**	**22**		**125**	**375**	**500**
III	CORE COURSE – VII	TOPOLOGY	20PMM3C7	6	5	3	25	75	100
	CORE COURSE – VIII	NUMERICAL ANALYSIS	20PMM3C8	6	5	3	25	75	100
	CORE COURSE – IX	FUNCTIONAL ANALYSIS	20PMM3C9	6	4	3	25	75	100
	CORE COURSE – X	CALCULUS OF VARIATIONS, TRANSFORMS AND INTEGRAL EQUATIONS	20PMM3C10	6	4	3	25	75	100
	ELECTIVE – III	STOCHASTICS PROCESSES	20PMM3E3A	6	4	3	25	75	100
		OPTIMIZATION TECHNIQUES	20PMM3E3B						
	TOTAL			**30**	**22**		**125**	**375**	**500**

IV	CORE COURSE – XI	DIFFERENTIAL GEOMETRY	20PMM4C11	6	5	3	25	75	100
	CORE COURSE – XII	CLASSICAL DYNAMICS	20PMM4C12	6	5	3	25	75	100
	CORE COURSE – XIII	MODERN PROBABILITY THEORY	20PMM4C13	6	5	3	25	75	100
	ELECTIVE – IV	AUTOMATA THEORY	20PMM4E4A	6	4	3	25	75	100
		FUZZY MATHEMATICS	20PMM4E4B						
	PROJECT WORK	PROJECT WORK	20PMM4PW	6	5	3	-	-	100
	TOTAL			**30**	**24**		**100**	**300**	**500**
	GRAND TOTAL			**120**	**90**		**475**	**1425**	**2000**

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Dr. P. SENTHIL KUMAR M.Sc.,M.Phil.,Ph.D. Assistant Professor of Mathematics Rajah Serfoji Govt. College (Autonomous) THANJAVUR-613 005.

M. ARCHANA STENO-TYPIST

P. PARAMASIVAM S. Railway.

Head of the Department Department of Mathematics Dhanalakshmi Srinivasan College of Arts & Science for Women (Autonomous) Perambalur-621 212.

LIST OF COURSES

SEM	MAJOR PAPERS	ELECTIVE PAPERS	APPLICATION COURSE	OTHERS	TOTAL
I	3	1	1	-	5
II	3	1	1	-	5
III	3	2	-	-	5
IV	3	1	-	PROJECT	4

CORE PAPER	12
ELECTIVE PAPER	5
APPLICATION ORIENTED COURSE	2
PROJECT	1

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PERAMBALUR-621 212,TAMIL NADU
DEPARTMENT OF MATHEMATICS
UG - ALLIED MATHEMATICS – COURSE STRUCTURE UNDER CBCS
(CANDIDATES ADMITTED FROM 2021-2022 ONWARDS)

YEAR/ SEM	DEPARTMENT	COURSE TITLE	COURSE CODE	INSTR PERIODS / WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INTERNAL	EXTERNAL	
IYEAR/ I SEM	B.Sc., (CS) & BCA	ALGEBRA AND CALCULUS	21UCS1A1/ 21UCA1A1	4	3	3	25	75	100
	B.Sc., (CS) & BCA	NUMERICAL ANALYSIS AND STATISTICS	21UCS1A2/ 21UCA1A2	2	-	-	-	-	-
	B.Sc., CHEMISTRY	DIFFERENTIAL & INTEGRAL CALCULUS	21UCH1A1A	4	3	3	25	75	100
	B.Sc., CHEMISTRY	ANALYTICAL GEOMETRY(3D) & TRIGONOMETRY	21UCH1A2A	2	-	-	-	-	-
	BBA	MATHEMATICS AND STATISTICS FOR MANAGERS	21UBA1A2	2	-	-	-	-	-
	TOTAL			**14**	**6**		**50**	**150**	**200**
I YEAR/ II SEM	B.Sc., (CS) & BCA	NUMERICAL ANALYSIS AND STATISTICS	21UCS1A2/ 21UCA1A2	2	3	3	25	75	100
	B.Sc., (CS) & BCA	OPERATION RESEARCH	21UCS2A3/ 21UCA2A3	4	3	3	25	75	100
	B.Sc., CHEMISTRY	ANALYTICAL GEOMETRY(3D) & TRIGONOMETRY	21UCH1A2A	2	3	3	25	75	100
	B.Sc., CHEMISTRY	DIFFERENTIAL EQUATION, LAPLACE TRANSFORM AND VECTOR CALCULUS	21UCH2A3A	4	3	3	25	75	100
	BBA	MATHEMATICAL AND STATISTICS FOR MANAGERS	21UBA1A2	3	4	3	25	75	100
	TOTAL			**15**	**16**		**125**	**375**	**500**
II YEAR/ III SEM	B.Sc., PHYSICS	CALCULUS AND VECTOR ANALYSIS	21UPH3A4	4	3	3	25	75	100
	B.Sc., PHYSICS	ALGEBRA , ANALYTICAL GEOMETRY AND TRIGONOMETRY	21UPH3A5	2	-	-	-	-	-
	B.Sc., BIO-TECHNOLOGY	LAB IN BIO INFORMATICS & BIO STATISTICS	21UBT3A5P	3	-	-	-	-	-
	B.Sc., MICRO BIOLOGY	BIO STATISTICS-I	21UMB3A4	3	2	3	25	75	100
	B.Sc., MICRO BIOLOGY	LAB IN BIO STATISTICS - I	21UMB3A5P	3	-	-	-	-	-
	TOTAL			**15**	**5**		**50**	**150**	**200**
II YEAR/	B.Sc., PHYSICS	ALGEBRA , ANALYTICAL GEOMETRY AND TRIGONOMETRY	21UPH3A5	2	3	3	25	75	100
	B.Sc., PHYSICS	ODE,LAPLACE TRANSFORM AND FOURIER SERIES	21UPH4A6	4	3	3	25	75	100
	BBA	OPERATIONS RESEARCH	21UBA4A6	4	4	3	25	75	100

IV SEM	B.Sc., MICRO BIOLOGY	BIO STATISTICS -II	21UMB4A6	3	3	3	25	75	100
	B.Sc., MICRO BIOLOGY	LAB IN BIO STATISTICS I	21UMB3A5P	3	2	3	40	60	100
	B.Sc., BIO-TECHNOLOGY	BIO STATISTICS	21UBT4A6	3	2	3	25	75	100
	B.Sc., BIO-TECHNOLOGY	LAB IN BIO INFORMATICS & BIO STATISTICS	21UBT3A5P	3	3	3	40	60	100
	TOTAL			**22**	**20**		**235**	**465**	**700**

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DEPARTMENT OF MATHEMATICS

PG - ALLIED MATHEMATICS – COURSE STRUCTURE UNDER CBC

(CANDIDATES ADMITTED FROM 2020-2021 ONWARDS)

SEM	DEPARTMENT	COURSE TITLE	COURSE CODE	INSTR PERIODS / WEEK	CREDIT	EXAM HOURS
I	MBA	MATHEMATICS AND STATISTICS	20PBA1C4	4	4	3
	MCA	MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS	20PCA1C3	4	4	3
	M.SC PHYSICS	MATHEMATICAL PHYSICS	20PPH1C1	5	5	3
	M.SC PHYSICS	NUMERICAL METHODS AND C PROGRAMMING	20PPH1E1	5	4	3
	TOTAL			**18**	**17**	
	M.COM & M.COM (CA)	QUANTITATIVE TECHINIQUES FOR BUSINESS DECISIONS	20PCO2C5/ 20PCOA2C5	6	5	3
	M.SC BIO-CHEMISTRY	BIO-STATISTICS AND BIO INFORMATICS	20PBC2E2A	4	3	3
	MBA	OPERATIONS RESEARCH	20PBA2C11	4	4	3
	MCA	OPERATIONS RESEARCH AND NUMERICAL METHODS	20PCA2C9	5	4	3
	TOTAL			**19**	**16**	

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Dr. S. S. P. Thay

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College of Arts & Science for
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Perambalur-621 212.

P. Pariya

R. Ramya

A. Sri

P. Mani

WOMEN

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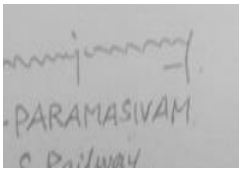
MARKS		TOTAL
INTERNAL	**EXTERNAL**	
25	75	100
25	75	100
25	75	100
25	75	100
100	**300**	**400**
25	75	100
25	75	100
25	75	100
25	75	100
100	**300**	**400**



CORE COURSE - I
THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS

Semester : I **Max.Marks:75**
Course Code: 21UMM1C1 **Credit: 05**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To impact the techniques available in the literature in solving the algebraic equations and Calculus.

Outcomes:

1. Understanding the concept of theory of equations
2. Realize the sum of the powers of the roots of an equation
3. Learn about reciprocal roots and reciprocal equations
4. Know the basic of method of successive differentiation

UNIT I (15 Periods)

Theory of equations - Remainder theorem - imaginary roots - Irrational roots - Relation between the roots and the coefficients - Symmetric functions of the roots

UNIT II (15 Periods)

Sum of the powers of the roots of an equation - Newton's theorem - Transformation of equations - Roots multiplied by a given number

UNIT III (15 Periods)

Reciprocal roots - Reciprocal equations- Standard forms - Increasing and decreasing the roots of a given equation by a given constant - Removal of terms and consequent problems.

UNIT IV (15 Periods)

Methods of successive differentiation – Leibnitz's theorem and its application - Increasing & Decreasing functions - Maxima & Minima of function of two variables

UNIT V (15 Periods)

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

TEXT BOOK(S)

1. T.K. Manicavachagom Pillay, T. Natarajan and K. S. Ganapathy, Algebra Volume I, S.Viswanathan (Printers & Publishers) Pvt Limited, Edition 2010
2. S.Narayanan and T.K. Manicavachagom Pillay, Calculus Volume I, S.Viswanathan (Printers & Publishers) Pvt Limited, Chennai -2011.

UNIT I - Chapter VI (Sections 1 to 12) of [1]
UNIT II - Chapter VI (Sections 13 to 15.2) of [1]
UNIT III - Chapter VI (Sections 15.3 to 19) of [1]
UNIT IV - Chapter III (Sections 1.1 to 2.2), Chapter IV (Section 2.1, 2.2) and Chapter V (Section 1.1 to 1.4) of [2]
UNIT V - Chapter X (Sections 2.1 to 2.6) of [2]

BOOKS FOR REFERENCE

1. S.Arumugam and Issac, Calculus, Volume1, New Gamma Publishing House, 1991.
2. S.Arumugam and A.T. Isaac, Algebra, New Gamma Publishing House, 2011.

CORE COURSE - II
ANALYTICAL GEOMETRY (3D)

Semester : I **Max. Marks: 75**
Course Code: 21UMM1C2 **Credit: 04**
Total Periods : 75 **Exam Hours: 03**

Objectives:

To get a clear idea about Geometrical figure namely sphere and good foundation in Geometry.

Outcomes:

1. To calculate the distance between two points direction ratio
2. Determine the plane angle between two planes
3. Classify the plane and the straight line
4. Solve the equation of sphere

UNIT I (15 Periods)

Distance between two points, Projections, direction ratio and direction cosines of a joining two points – Angle between the lines, Conditions for perpendicularity and parallelism.

UNIT II (15 Periods)

The plane - The Equation of the plane passing through the points - Angle between two planes – Length of the perpendicular – Bisecting plane.

UNIT III (15 Periods)

The Straight line –Symmetric form – Equation of a straight line passing through two given points – The plane and the straight line – Angle between a plane and a straight line.

UNIT IV (15 Periods)

Coplanar lines – Shortest distance between two lines – Skew lines

UNIT V (15 Periods)

The Sphere – Equation of a sphere – Equation of the tangent plane – Simple problems

TEXT BOOK(S)

1. T. K. Manicavachagom Pillay & T. Natarajan Analytical Geometry of Three dimensions, S. Viswanathan Printers, Revised Edition – 1996, Reprint 2001.

UNIT I	-	Chapter I
UNIT II	-	Chapter II
UNIT III	-	Chapter III (Sections 1 to 6)
UNIT IV	-	Chapter III (Sections 7 and 8)
UNIT V	-	Chapter IV

BOOK(S) FOR REFERENCE

1. Dr. S. Arumugam and A.T. Issac. Analytical Geometry 3D and Vector Calculus, New Gamma Publishing House, Edition Jan 2011

CORE COURSE - III
TRIGONOMETRY AND VECTOR CALCULUS

Semester : II **Max. Marks: 75**
Course Code: 21UMM2C3 **Credit: 04**
Total Periods : 75 **Exam Hours: 03**

Objectives:

To enrich with the knowledge of trigonometric functions and to have a good foundation in vector calculus.

Outcomes:

1. Illustrate the expansion of sin(nx),cos(nx),tan(nx)-expansion of $\sin^n x$, $\cos^n x$
2. Relate the relation between hyberbolic and circular functions
3. Design and implement the vector differentiation
4. Recognize the gauss divergence theorem

UNIT I (15 Periods)

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

UNIT II (15 Periods)

Hyperbolic functions – Relation between hyperbolic & Circular functions- Inverse hyperbolic functions.

UNIT III (15 Periods)

Vector differentiation – velocity & acceleration - Vector & scalar fields – Gradient of a vector - Directional derivative – divergence & curl of a vector solenoidal & irrotational vectors – Laplacian double operator – simple problems

UNIT IV (15 Periods)

Vector integration – Tangential line integral – Conservative force field – scalar potential - Work done by a force - Normal surface integral- Volume integral – simple problems

UNIT V (15 Periods)

Gauss Divergence Theorem – Stoke's Theorem- Green's Theorem – Simple problems & Verification of the theorems for simple problems

TEXT BOOK(S)

1. S. Narayanan, T.K. Manicavachagom Pillay, Trigonometry, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.
2. M.L. Khanna, Vector Calculus, Jai Prakash Nath and Co., 8th Edition, 1986.

UNIT I - Chapter 3 of [1]
UNIT II - Chapter 4 of [1]
UNIT III - Chapter 1 Section 1 & Chapter 2 Sections 2.3 to 2.6, 3, 4, 5, 7 of [2]
UNIT IV - Chapter 3 Sections 1, 2, 4 of [2]
UNIT V - Chapter 3 Sections 5 & 6 of [2]

BOOKS FOR REFERENCE

1. S.Arumugam & others, Trigonometry, New Gamma Publications -1985 (Revised Edition)
2. Duraipandian, P.Duraipandiyan and Lakshmi Vector Analysis, Emarald publishers (1986).
3. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. III, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.

CORE COURSE - IV
INTEGRAL CALCULUS

Semester : II **Max. Marks: 75**
Course Code: 21UMM2C4 **Credit: 05**
Total Periods : 75 **Exam Hours: 03**

Objectives:

To get a clear idea about integrations and good foundation in integrals.

Outcomes:

1. Represent the revision of all integral models
2. Analyze the definite integrals and integration by parts
3. Plan and deliver the area of closed curve
4. Appreciate the beta and gamma functions

UNIT I (15 Periods)

Revision of all integral models – simple problems -

UNIT II (15 Periods)

Definite integrals - Integration by parts & reduction formula

UNIT III (15 Periods)

Geometric Application of Integration-Area under plane curves: Cartesian coordinates - Area of a closed curve - Examples - Areas in polar co-ordinates.

UNIT IV (15 Periods)

Double integrals – changing the order of Integration – Triple Integrals.

UNIT V (15 Periods)

Beta & Gamma functions and the relation between them – Integration using Beta & Gamma functions

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TEXT BOOK(S)

1. S.Narayanan and T.K.Manicavachagom Pillai, Calculus Volume II, S.Viswanathan (Printers & Publishers) Pvt Limited, Chennai -2011.

UNIT I - Chapter 1 section 1 to 10
UNIT II - Chapter 1 section 11, 12 & 13
UNIT III - Chapter 2 section 1.1, 1.2, 1.3 & 1.4
UNIT IV - Chapter 5 section 2.1, 2.2 & 4
UNIT V - Chapter 7 section 2.1 to 2.5

BOOKS FOR REFERENCE

1. Shanti Narayan, Differential & Integral Calculus.

CORE COURSE - V
ALGEBRA & FOURIER SERIES

Semester : III **Max.Marks:75**
Course Code: 21UMM3C5 **Credit: 05**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of algebra

Outcomes:

1. Evaluate binomial theorem and their immediate applications to summation
2. Write about the exponential and logarithmic series
3. Understand the concept of Fourier series
4. Analyze the Fourier series and use of odd and even functions in Fourier series.

UNIT I (15 Periods)

Binomial, exponential theorems-their statements and proofs- their immediate application to summation and approximation only

UNIT II (15 Periods)

Logarithmic series theorem-statement and proof-immediate application to summation and approximation only.

UNIT III (15 Periods)

Summation of series

UNIT IV (15 Periods)

Fourier series- definition - Fourier Series expansion of periodic functions with Period 2π and period 2a – Use of odd & even functions in Fourier Series.

UNIT V (15 Periods)

Half-range Fourier series – definition- Development in Cosine series & in Sine series Change of interval

TEXT BOOK(S)

1. Algebra-T.K .Manicavachasam Pillai, T.Natarajan, K-S Canapathy. S. Viswanatham (Printers & Publishers Private Ltd-2012)
2. Higher Engineering mathematics, Dr. B.S. Grewal, khanna publishers, 38th edition 2004
   UNIT I - Chapter 3, 4
   UNIT II - Chapter 4
   UNIT III - Chapter 5
   UNIT IV - Chapter 10 of [2]
   UNIT V - Chapter 10 of [2]

BOOKS FOR REFERENCE

1. Mathematics for B.Sc. Branch I -Vol. I- P. Kandasamy and K. Thilagavathy S. Chand and Company Ltd, New Delhi, 2004.
2. Algebra. -- N.P.Bali- Laxmi publications P.Duraipandiyan and Lakshmi Duraipandian, Vector Analysis, Emarald publishers(1986).
3. Differential, Fourier & Laplace Transform, Probability P.R. Vittal

CORE COURSE – VI
THEORY OF NUMBERS

Semester : III **Max.Marks:75**
Course Code: 21UMM3C6 **Credit: 04**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To learn the basic concepts of statistics and the basic ideas of theory of numbers

Outcomes:

1. Differentiate the fundamental theorem of arithmetic
2. Obtain the mobious function μ(n)
3. Illustrate basic properties of congruence's
4. Know the concept of quadratic residues

UNIT I (15 Periods)

Introduction – Divisibility – Greatest Common Divisor – Prime numbers – The fundamental theorem of arithmetic – The Euclidean algorithm

UNIT II (15 Periods)

Introduction – The Mobius function μ(n) – The Euler totient function φ(n) – A relation connecting φ and μ – A product formula for φ(n) – Multiplicative functions.

UNIT III (15 Periods)

Definition and basic properties of Congruences – Residue classes and complete residue systems - Linear Congruences – Reduced residue systems and the Euler- Fermat Theorem – Polynomial Congruences modulo p, Lagrange's theorem – Applications of Lagrange's theorem – Simultaneous linear Congruences, The Chinese remainder theorem.

UNIT IV (15 Periods)

Quadratic residues – Legendre's symbol and its properties – Evaluation of (-1/p) and (2/p) – Gauss lemma.

UNIT V (15 Periods)

The quadratic reciprocity law – Applications of the reciprocity law – The Jacobi symbol – Applications to Diophantine equations.

TEXTBOOK(S)

1. Tom M. Apostol, Introduction to Analytical Number Theory, Narosa Publishing House, New Delhi.
   UNIT I - Chapters 1 Section 1.1 to 1.5, 1.7
   UNIT II - Chapter 2 Section 2.1 to 2.5, 2.9
   UNIT III - Chapter 5 Section 5.1 to 5.7
   UNIT IV - Chapter 9 Section 9.1 to 9.4
   UNIT V - Chapter 9 Section 9.5 to 9.8

BOOKS FOR REFERENCE

1. David M. Burton, Elementary Number Theory, W.M.C. Brown Publishers, Dubuque, Lawa, 1989
2. George Andrews, Theory of Numbers
3. Fundamentals of Number Theory, William. J. Leveque, Addison Wesley Publishing Company, Phillipines, 1977

ALLIED COURSE - IV
MATHEMATICAL STATISTICS - I

Semester : III **Max.Marks:75**
Course Code: 21UMM3A4 **Credit: 03**
Total Periods: 45 **Exam Hours: 03**

Objectives:

To learn the basic concepts of statistics and the basic ideas of statistical data's

Outcomes:

1. Recognize the statistical data and properties of above measures
2. Design and implement of measure of dispersion
3. Understanding the concept of probability, definition, axiomatic approach to probability
4. Calculate the binomial and poison distributions

UNIT I (9 Periods)

Statistical data – Primary data and Secondary data (definitions only), Formation of frequency distribution, various measures of central tendency – mean, median, mode, geometric mean, harmonic mean – simples problems – properties of above measures.

UNIT II (9 Periods)

Measures of dispersion – Range quartile deviation, mean deviation, standard deviation – their coefficients – merits and demerits (simple problems) – Skewness and kurtosis – karlpearson's coefficients – Bowley's coefficients – simple problems

UNIT III (9 Periods)

Probability – Definition, axiomatic approach to probability – Additive and Multiplicative laws of Probability (two variables only) and conditional probability – simple problems – concepts of random variables – discrete and continuous random variables – distribution function, pmf, pdf and their properties – simple problems.

UNIT IV (9 Periods)

Mathematical expectation – addition and multiplication theorems (two variables only). Moment generating and characteristics functions, their properties. Conditional expectation and conditional variance (simple problems)

UNIT V (9 Periods)

Binomial and Poisson distributions – moments, moment generating function, cumulant generating function (simple problems) – fitting binomial distribution and gamma distribution

TEXT BOOK(S)

1. Gupta S.C. and Kapoor V.K. Fundamental of Mathematical Statistics Sultan Chand & sons

   UNIT I - Chapter 1 & 2
   UNIT II - Chapter 3
   UNIT III - Chapter 4
   UNIT IV - Chapter 6
   UNIT V - Chapter 7

BOOKS FOR REFERENCE

1. S.P. Gupta, Statistical Methods (Revised edition 2001)

ALLIED COURSE - V
MATHEMATICAL STATISTICS PRACTICAL

Semester : III **Max.Marks:60**

Course Code: 21UMM3A5P **Credit: 03**

Total Periods: 45 **Exam Hours: 03**

Objectives:

To train the students in solving statistical problems

Outcomes:

1. Realize the moment of central tendency
2. Represent the bivariate discrete probability distribution
3. Know the fitting of binomial, poison and normal distribution
4. Plan and deliver the large sample tests and exact sample test.

UNIT I (9 Periods)

Moments of central tendency – A.M, median, G.M and H.M – measures of dispersion – quartile deviation, standard deviation and coefficient of variation – measures of skewness – calculations of first four moments, central moments,B_1, B_2

UNIT II (9 Periods)

Bivariate discrete probability distribution – marginal distribution and conditional distribution – calculation of mean, variance, covariance, correlation coefficient, expectation – conditional expectations and conditional variance

UNIT III (9 Periods)

Fitting of binomial, poison and normal distribution (area method only)

UNIT IV (9 Periods)

Calculation of karlpearsons coefficient of correlation, spearman's rank correlation and regression equations

UNIT V (9 Periods)

Large sample tests – test of single mean – difference between means – single proportion and difference between proportion – exact sample test –'t' test for single mean, difference between mean, paired't' test chi-square test for goodness of fit and independence of attributes

TEXT BOOK(S)

1. R.S.N. Pillai and Bagavathi, practical statistics, second edition 2013

CORE COURSE - VII
DIFERENTIAL EQUATIONS & LAPLACE TRANSFORMS

Semester : IV **Max.Marks:75**
Course Code: 21UMM4C7 **Credit: 05**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To impact the techniques an available in the literature in differential equations & transforms and good foundation in the concept of differential equations

Outcomes:

1. Calculate the first order, higher degree differential equations solvable for x
2. Solve the method of variation of parameters
3. Relate the formation of partial differential equations
4. Know the inverse and uses of laplace transform

UNIT I (15 Periods)

First order, higher degree differential equations solvable for x, solvable for y, solvable for dy/dx, Clairauts form – Conditions of integrability of M dx + N dy = 0 – simple problems.

UNIT II (15 Periods)

Particular integrals of second order differential equations with constant coefficients - Linear equations with variable coefficients – Method of Variation of Parameters (Omit third & higher order equations).

UNIT III (15 Periods)

Formation of Partial Differential Equation – General, Particular & Complete integrals – Solution of PDE of the standard forms - Lagrange's method - Solving of Charpit's method and a few standard forms.

UNIT IV (15 Periods)

Laplace Transforms –standard formulae –Basic Theorems & simple applications

UNIT V (15 Periods)

Inverse Laplace Transform – Use of Laplace Transform in solving ODE with constant coefficients

TEXT BOOK(S)

1. T.K. Manicavachagom Pillay & S. Narayanan, Differential Equations, S. Viswanathan Publishers Pvt. Ltd., 1996.

UNIT I - Chapter 4 Sections 1, 2 & 3 Chapter 2 – Section 6
UNIT II - Chapter 5 Sections 1,2,3,4 & 5 Chapter 8 – Section 4
UNIT III - Chapter 12 Sections 1 – 6
UNIT IV - Chapter 9 Section 1 – 5
UNIT V - Chapter 9 Section 6 – 10

BOOKS FOR REFERENCE

1. Arumugam & Isaac, Differential Equations, New Gamma Publishing House, Palayankottai, 2003

CORE COURSE - VIII
SEQUENCES AND SERIES

Semester : IV **Max.Marks:75**

Course Code: 21UMM4C8 **Credit: 04**

Total Periods: 75 **Exam Hours: 03**

Objectives:

To lay a good foundation for classical analysis and study the behavior of sequences and series

Outcomes:

1. Learn about sequences, bounded sequences and monotonic sequences
2. To calculate the algebra of limits and behavior of monotonic functions
3. Relate the some theorems on limits and limit points
4. Solve the Cauchy's general principal of convergence

UNIT I (15 Periods)

Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequence – Divergent Sequences – Oscillating sequences

UNIT II (15 Periods)

Algebra of Limits – Behavior of Monotonic functions

UNIT III (15 Periods)

Some theorems on limits – subsequences – limit points - Cauchy sequences

UNIT IV (15 Periods)

Series – infinite series – Cauchy's general principal of convergence –Comparison – test theorem and test of convergence using comparison test (comparison test statement only, no proof)

UNIT V (15 Periods)

Test of convergence using D Alembert's ratio test – Cauchy's root test –Alternating Series – Absolute Convergence (Statement only for all tests)

TEXT BOOK(S)

1. Dr. S. Arumugam & Mr. A. Thangapandi Isaac Sequences and Series – New Gamma Publishing House – 2002 Edition
   UNIT I - Chapter 3: Section 3.0 – 3.5 Page No: 39 - 55
   UNIT II - Chapter 3: Section 3.6, 3.7 Page No: 56 – 82
   UNIT III - Chapter 3: Section 3.8 - 3.11, Page No: 82 - 102
   UNIT IV - Chapter 4: Section (4.1 & 4.2) Page No: 112 - 128.
   UNIT V - Relevant part of Chapter 4 and Chapter 5: Section 5.1 & 5.Page No: 157 - 167.

BOOKS FOR REFERENCE

1. Algebra – Prof. S. Surya Narayan Iyer
2. Algebra – Prof. M.I. Francis Raj.

ALLIED COURSE - VI
MATHEMATICAL STATISTICS - II

Semester : IV **Max.Marks:75**

Course Code: 21UMM4A6 **Credit: 03**

Total Periods: 45 **Exam Hours: 03**

Objectives:

To learn the basic concepts of discrete continuous distribution and learn the test of significance

Outcomes:

1. Illustrate the normal distribution-m,g,f ,binomial, poison, and chi-square distribution
2. Realize the small sample test-'t' test for single mean
3. Know the basic of tests of significance
4. Understanding the concept of correlation and rank correlation

UNIT I (9 Periods)

Correlation Analysis: Introduction – Types of correlation – Methods of studying correlation – Karl Pearson's coefficient of correlation – Coefficient of correlation and probable error – Properties of Correlation coefficient – Rank correlation coefficient – concurrent deviation method – Merits and limitation of correlation.

UNIT II

Regression Analysis: Introduction – Uses of Regression Analysis – Difference between correlation and Regression Analysis – Regression Lines – Regression Equations – Standard Error – Limitation of Regression analysis.

UNIT III (9 Periods)

Normal distribution – m, g, f, Binomial, Poisson and Chi-square distribution tending to normal statement of central limit theorem. Characteristics functions and its properties. Statement of uniqueness theorem and continuity theorem

UNIT IV (9 Periods)

Continuous distributions – rectangular, exponential, beta, gamma distribution – Sampling distribution, 't', 'F' and Chi – square distribution.

UNIT V (9 Periods)

Test of significance – definition of null hypothesis, alternative hypothesis, sampling distribution, standard error and critical region. Type I and Type II errors, one tailed and two tailed tests. Large sample test for single mean, difference between mean, single proportion and difference between proportions

TEXT BOOK(S)

1. Gupta S.C. and Kapoor V.K. Fundamental of Mathematical Statistics Sultan Chand & sons

UNIT I - Chapter 10
UNIT II - Chapter 10
UNIT III - Chapter 10
UNIT IV - Chapter 12
UNIT V - Chapter 8

BOOKS FOR REFERENCE

1. S.P. Gupta, Statistical Methods (Revised edition 2001)

CORE COURSE - IX
NUMERICAL METHODS

Semester : V **Max.Marks:75**
Course Code: 21UMM5C9 **Credit: 04**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To introduce the various techniques of numerical analysis and study the behavior of numerical analysis

Outcomes:

1. Solve algebraic and transcendental equations
2. Illustrate the finite differences-forward, backward and central differences
3. Write about numerical integration using trapezoidal rule and Simpson's rule
4. Realize the numerical solution of ODE

UNIT I (15 Periods)

Algebraic and Transcendental equation – Finding a root of the given equation using Bisection Method, Method of False Position, Newton Raphson Method, Iteration method.

UNIT II (15 Periods)

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

UNIT III (15 Periods)

Numerical – Integration using Trapezoidal rule and Simpson's 1/3 and 3/8 rules - Romberg's Method

UNIT IV (15 Periods)

Solution to Linear Systems – Gauss Elimination Method – Jacobi and Gauss Siedal iterative methods

UNIT V (15 Periods)

Numerical solution of ODE – Solution by Taylor's Series Method, Picard's Method, and Euler's Method, Runge Kutta second and fourth order methods.

TEXT BOOK(S)

1. S.S. Sastry, Introductory Methods of Numerical Analysis, Prentices Hall of India Pvt., Limited, 2001 Third Edition
   - UNIT I - Chapter 2: Sections 2.2, 2.3, 2.4, 2.5
   - UNIT II - Chapter 3: Sections 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.6, 3.9, 3.9.1
   - UNIT III - Chapter 2: Sections 5.4, 5.4.1, 5.4.2, 5.4.3
   - UNIT IV - Chapter 2: Sections 6.3, 6.3.2 & 8.3.1, 8.3.2
   - UNITV - Chapter 2: Sections 7.1, 7.2, 7.3, 7.4, 7.4.2, 7.5

BOOKS FOR REFERENCE

1. S.Narayanan and Others, Numerical Analysis, S. Viswanathan Publishers, 1994
2. A. Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

CORE COURSE - X
MODERN ALGEBRA

Semester : V **Max.Marks:75**
Course Code: 21UMM5C10 **Credit: 05**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of algebra

Outcomes:

1. Understanding the concept of groups, cyclic groups
2. Discuss about the normal subgroups and quotient groups
3. Plan and deliver the vector spaces. definition and examples
4. Implement the basis and dimension

UNIT I (15 Periods)

Groups: Definition and Examples – Elementary properties of a group – Equivalence Definition of a Group – Permutation Groups.

UNIT II (15 Periods)

Subgroups – Cyclic Groups – Order of an Element – Cosets and Lagrange's Theorem.

UNIT III (15 Periods)

Normal subgroups and Quotient Groups – Isomorphism – Homomorphism.

UNIT IV (15 Periods)

Rings - Definition and Examples – Elementary properties of rings – Isomorphism - Types of rings – Characteristics of a rings – Sub rings – Ideals – Quotient rings.

UNIT V (15 Periods)

Maximal and Prime Ideals – Homomorphism of rings – Field of quotient of an integral domain – unique factorization domain – Euclidean domain.

TEXT BOOK(S)

1. N.Arumugam & A.Thangapandi Isaac, Modern Algebra, New Gamma Publishing House -June 1997

   UNIT I - Chapter 3 Sections 3.1 to 3.4
   UNIT II - Chapter 3 Sections 3.5 to 3.8
   UNIT III - Chapter 3 Sections 3.9 to 3.11
   UNIT IV - Chapter 4 Sections 4.1 to 4.8
   UNIT V - Chapter 4 Sections 4.9 to 4.11, 4.13 to 4.14.

BOOKS FOR REFERENCE

1. T.K. ManicavachagamPillai, T. Natarajan, K.S. Ganapathy, Algebra, Vol. I, S. Viswanathan Pvt Limited, Chennai, 2004
2. M.L.Santiago, Modern Algebra, Arul Publications, Madras, 1988.
3. M.L.Santiago, Modern Algebra, Tata McGraw Hill, 2003.

CORE COURSE -XI
REAL ANALYSIS

Semester : V **Max.Marks:75**
Course Code: 21UMM5C11 **Credit: 05**
Total Periods: 75 **Exam Hours: 03**

Objectives:

Understand the real number system and countable concepts in real number system and provide a Comprehensive idea about the real number system.

Outcomes:

1. Analyze the real number system in field axioms
2. Calculate the continuous function and limit of a function
3. Discuss about derivability and continuity
4. Write about role's theorem

UNIT I (15 Periods)

Real Number system – Field axioms –Order relation in R. Absolute value of a real number& its properties –Supremum & Infimum of a set – Order completeness property – Countable & uncountable sets

UNIT II (15 Periods)

Continuous functions –Limit of a Function – Algebra of Limits – Continuity of a function – Types of discontinuities – Elementary properties of continuous functions –Uniform continuity of a function.

UNIT III (15 Periods)

Differentiability of a function –Derivability & Continuity –Algebra of derivatives – Inverse Function Theorem – Daurbouxs Theorem on derivatives

UNIT IV (15 Periods)

Rolle's Theorem –Mean Value Theorems on derivatives- Taylor's Theorem with remainder- Power series expansion

UNIT V (15 Periods)

Riemann integration –definition – Daurbouxs theorem –conditions for Integrability – Integrability of continuous & monotonic functions - Integral functions –Properties of Integrable functions - Continuity & derivability of integral functions – The Fundamental Theorem of Calculus and the First Mean Value Theorem

TEXT BOOK(S)

1. M.K. Singhal & Asha Rani Singhal , A First Course in Real Analysis, R.Chand & Co., June 1997 Edition
2. Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995

UNIT I - Chapter 1 of [1]
UNIT II - Chapter 5 of [1]
UNIT III - Chapter 6 Section 1 to 5 of [1]
UNIT IV - Chapter 8 Section 1 to 6 of [1]
UNIT V - Chapter 6 Section 6.2, 6.3, 6.5, 6.7, 6.9 of [2]

BOOKS FOR REFERENCE

1. Goldberge, Richard R, Methods of Real Analysis, Oxford & IBHP Publishing Co., New Delhi,1970.

CORE COURSE - XII
STATICS

Semester : V **Max.Marks:75**

Course Code: 21UMM5C12 **Credit: 05**

Total Periods: 75 **Exam Hours: 03**

Objectives:

To provide the basic knowledge of equilibrium of a particle and develop a working knowledge to handle practical problems

Outcomes:

1. Evaluate forces acting at a point; resolution of force
2. Relate the parallel forces and moments
3. Plan and deliver the equilibrium of three forces
4. Learn about laws of friction and definitions

UNIT I (15 Periods)

Introduction – Forces acting at a point: Triangle of forces – Resolution of force –Condition of equilibrium.

UNIT II (15 Periods)

Parallel forces and Moments: Resultant of parallel forces – Theorems on Moments – Moment about an axis – couples.

UNIT III (15 Periods)

Equilibrium of three forces acting on a rigid body: Conditions of equilibrium –Trigonometrically theorems and problems - Coplanar forces: Reduction of Coplanar forces – Equation of Line of action of the resultant **–** Conditions of equilibrium\

UNIT IV (15 Periods)

Friction: Introduction – Laws of Friction – Definitions – Equilibrium of a particle on a rough inclined plane.

UNIT V (15 Periods)

Equilibrium of strings: Equation of the Common Catenary -Parabolic Catenary

TEXT BOOK(S)

1. M.K.Venkataraman, Statics, Agasthiyar Publications, 17th edition, 2014
   UNIT I - Chapter1 & 2
   UNIT II - Chapter 3 & 4
   UNIT III - Chapter 5 (Section 1-6), Chapter 6 (Section 1-12).
   UNIT IV - Chapter 7 (Section 1-13) Pages: 206 – 238.
   UNIT V - Chapter 9 (Section 1- 8)

BOOKS FOR REFERENCE

1. A.V.Dharmapadham, Statics, S.Viswanathan Publishers Pvt.Ltd, 2006.
2. P. Duraipandian, LaxmiDuraipandian and MuthamizhJayapragasam, MechanicsS.Chand& Company PVT, LTD, 2014
3. S.L.Lony, Elements of Statics and Dynamics, Part-I, A.I.T.B.S.Publishers,2007.

MAJOR BASED ELECTIVE - I
OPERATIONS RESEARCH

Semester : V **Max.Marks:75**
Course Code: 21UMM5M1A **Credit: 04**
Total Periods: 60 **Exam Hours: 03**

Objectives:

To introduce the various techniques of Operations Research and the students solve real life problems in Business and Management

Outcomes:

1. Understanding the concept of linear programming and simplex method
2. Determine the use of artificial values and dual pairs
3. Calculate the transportation problem and solution of a TP
4. Plan and deliver queuing theory

UNIT I (12 Periods)

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - Simplex method.

UNIT II (12 Periods)

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method.

UNIT III (12 Periods)

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP – Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem.

UNIT IV (12 Periods)

Queuing theory - Queuing system - Classification of Queuing models – Poisson Queuing systems Model I (M/M/1)(∞/FIFO) only.

UNIT V (12 Periods)

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT.

TEXT BOOK(S)

1. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, 13th edition, Sultan Chand and Sons, 2007.
   UNIT I - Chapter 2, 3 & 4 (Section 2.1 to 2.4, Section 3.1 to 3.5, Section 4.1 - 4.3)
   UNIT II - Chapter 4 Sec 4.4, Chapter 5 Sec 5.1 to 5.4, 5.9
   UNIT III - Chapter 10 Sec 10.1, 10.2, 10.8, 10.9, 10.12, 10.13, Chapter 11 Sec 11.1 to 11.4
   UNIT IV - Chapter 21 Sec 21.1, 21.2, 21.7 to 21.9.
   UNIT V - Chapter 25 Sec 25.1 to 25.4, 25.6, 25.7

BOOKS FOR REFERENCE

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K, Resource Management Techniques, A.R. Publications, 2002.
2. Taha H.A., Operations Research: An introduction, 7th edition, Pearson PrenticeHall, 2002

MAJOR BASED ELECTIVE - I
STOCHASTIC PROCESSES

Semester : V **Max.Marks:75**

Course Code: 21UMM5M1B **Credit: 04**

Total Periods: 60 **Exam Hours: 03**

Objectives:

To know probability and distribution function, understand the concept Stochastic Process, identify Markov chains, Poisson Process and Birth and death Process and know the concept of queuing theory with some examples

Outcomes:

1. Appreciate the differential difference equations
2. Represent the stochastic process and Markov chains
3. Determine the stability of Markov system
4. Obtain Poisson process and related distributions

UNIT I (12 Periods)

Generating function - Laplace transforms – Laplace transforms of a probability distribution function - Difference equations – Differential difference equations – Matrix analysis.

UNIT II (12 Periods)

Stochastic Process - Notion – Specification – Stationary Process - Markov Chains – Definition and examples – Higher transition probabilities.

UNIT III (12 Periods)

Classification of states and chains – Determination of higher transition probabilities – Stability of Markov system – Limiting behavior

UNIT IV (12 Periods)

Poisson Process and related distributions – Generalization of Poisson Process – Birth and death process

UNIT V (12 Periods)

Stochastic Process in queuing and reliability – queuing systems – M/M/1 models – Birth and death process in queuing theory – Multi channel models – Bulk Queues.

TEXT BOOK(S)

1. J.Medhi, Stochastic Processes,
   UNIT I - Chapter 1 Section 1.1, 1.2, 1.3 Appendix A 1, 2, 3, 4
   UNIT II - Chapter 2 Section 2.1 - 2.3 & Chapter 3 Section 3.1, 3.2
   UNIT III - Chapter 3 Section 3.4 - 3.6
   UNIT IV - Chapter 4 Section 4.1 – 4.4
   UNIT V - Chapter 10 Section 10.1 - 10.5

BOOKS FOR REFERENCE

1. First Course in Stochastic Processes by Samuel Karlin.
2. Stochastic Processes by Srinivasan and Metha (TATA McGraw Hill).
3. Elements of Applied Stochastic Processes by V

MAJOR BASED ELECTIVE - I
FUZZY MATHEMATICS

Semester : V **Max.Marks:75**
Course Code: 21UMM5M1C **Credit: 04**
Total Periods: 60 **Exam Hours: 03**

Objectives:

To know the basic definitions of fuzzy set theory and the fundamentals of fuzzy Algebra

Outcomes:

1. Learn about the fuzzy subsets and its properties
2. Calculate the algebraic product and sum of two fuzzy subsets
3. Classify the homomorphic image and pre-image of sub-groupoid
4. Implement fuzzy invariant subgroups

UNIT I (12 Periods)

Introduction- Fuzzy subsets-Lattices and Boolean Algebras- L fuzzy sets-operations on fuzzy – level sets – properties of fuzzy subsets

UNIT II (12 Periods)

Algebraic product and sum of two fuzzy subsets-properties satisfied by Addition and product-Cartesian product of fuzzy subsets

UNIT III (12 Periods)

Introduction- Algebra of fuzzy relations - logic - connectives

UNIT IV (12 Periods)

Some more connectives - Introduction-fuzzy subgroup - homomorphic image and Pre-image of sub-groupoid

UNIT V (12 Periods)

Fuzzy invariant subgroups - fuzzy sub rings

TEXT BOOK(S)

1. S. Nanda and N. R. Das Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi, 2010.

BOOKS FOR REFERENCE

1. M.Ganesh, Introduction to Fuzzy Sets & Fuzzy Logic, Prentice Hall of India Pvt.Ltd., 2006.
2. John N.Mordeson and Premch and S.Nair, Fuzzy Mathematics, Spring verlong, 2001

CORE COURSE - XIII
LINEAR ALGEBRA

Semester : VI **Max.Marks:75**

Course Code: 21UMM6C13 **Credit: 05**

Total Periods: 90 **Exam Hours: 03**

Objectives:

To give a comprehensive idea about the vector spaces and inner product spaces and good foundation in all the concepts of matrices

Outcomes:

1. Recognize the fundamental theorem of homomorphism
2. Compare linear independence and matrix of a linear transformation
3. Determine the inner product spaces and orthogonally
4. Write about bilinear forms

UNIT I (18 Periods)

Vector Spaces: Definition and Examples – Subspaces – Linear Transformation –Fundamental Theorem of Homomorphism.

UNIT II (18 Periods)

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

UNIT III (18 Periods)

Inner Product Spaces: Definition and examples – Orthogonally – Orthogonal complement.

UNIT IV (18 Periods)

Matrices: Elementary Transformation – Rank of a Matrix – Simultaneous linear equations – Characteristic Equations and Cayley Hamilton theorem – Eigen values and Eigen vectors.

UNIT V (18 Periods)

Bilinear forms: Bilinear form – Quadratic forms – Reduction of a quadratic form to the diagonal form.

TEXT BOOK(S)

1. Dr. S.Arumugam and Mr. A. Thangapandi Isaac, Modern Algebra, SciTech Publications Ltd.,Edition 2003, Reprint Nov 2011.

   UNIT I - Chapter 5 Section 5.0 to 5.3
   UNIT II - Chapter 5 Section 5.4 to 5.8
   UNIT III - Chapter 6
   UNIT IV - Chapter 7 Section 7.4 to 7.8
   UNIT V - Chapter 8

BOOKS FOR REFERENCE

1. Algebra. -- N.P.Bali- Laxmi publications P.Duraipandiyan and Lakshmi Duraipandian, Vector Analysis, Emarald publishers(1986)

CORE COURSE - XIV
COMPLEX ANALYSIS

Semester : VI **Max.Marks:75**
Course Code: 21UMM6C14 **Credit: 05**
Total Periods: 90 **Exam Hours: 03**

Objectives:

To introduce the various techniques of complex analysis and study the behavior of complex analysis

Outcomes:

1. Learn about limits and theorem on limits
2. Know about the basic of elementary transformations
3. Classify Taylor's series-zeros of analytical functions
4. Illustrate Cauchy's residue theorem

UNIT I (18 Periods)

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

UNIT II (18 Periods)

Elementary transformations – Bilinear transformations – cross ratio – fixed points of bilinear transformation – some special bilinear transformations.

UNIT III (18 Periods)

Complex integration – definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives

UNIT IV (18 Periods)

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

UNIT V (18 Periods)

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

TEXT BOOK(S)

1. S.Arumugam, A.Thangapandi Isaac & 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

BOOKS FOR REFERENCE

1. P.P.Gupta – Kedarnath & 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

CORE COURSE - XV
DYNAMICS

Semester : VI **Max.Marks:75**
Course Code: 21UMM6C15 **Credit: 05**
Total Periods: 90 **Exam Hours: 03**

Objectives:

To provide a basic knowledge of the behavior of objects in motion and develop a working knowledge to handle practical problems

Outcomes:

1. Relate the kinematics, velocity and relative velocity
2. Solve the path of a projectile and enveloping parabola
3. Calculate the collision of elastic bodies
4. Design and implement simple harmonic motion

UNIT I (18 Periods)

Introduction-Kinematics: Velocity-Relative Velocity-Angular Velocity – Acceleration-Relative Acceleration-Motion in a straight line under uniform acceleration.

UNIT II (18 Periods)

Projectile: Projectile-Path of a projectile-Characteristics-Horizontal projection-Projectile up/down an inclined plane-Enveloping parabola.

UNIT III (18 Periods)

Collision of Elastic Bodies: Introduction-Definitions-Fundamental Laws of impact-Impact of a smooth sphere on a fixed smooth plane-Direct impact of two smooth spheres-Oblique impact of two smooth spheres-Dissipation of energy due to impact- Compression and Restitution-Impact of a particle on a rough plane.

UNIT IV (18 Periods)

Simple Harmonic Motion: Introduction-S.H.M. in straight line-Compositions of simple harmonic motions of the same period.

UNIT V (18 Periods)

Motion Under The Action Of Central Forces: Velocity and acceleration in polar coordinates-Equiangular spiral-Differential Equation of central orbits-Pedal Equation of the central orbit-Two-fold problems in central orbits.

TEXT BOOK(S)

1. Dr.M.K.Venkataraman, Dynamics, Agasthiyar Publications, Thirteenth Edition, July 2009.

UNIT I - Chapter2, Chapter 3, Section 3.1-3.22
UNIT II - Chapter6, Sections 6.1-6.17
UNIT III - Chapter8, Sections 8.1-8.11
UNIT IV - Chapter 10, Sections 10.1-10.13
UNIT V - Chapter 11, Sections 11.1-11.13

BOOKS FOR REFERENCE

1. P.Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam, Mechanics S.Chand & Company PVT, LTD, 2014
2. A.V. Dharmapadham, Dynamics, S. Viswanathan Publishers Pvt.Ltd.2006.

MAJOR BASED ELECTIVE - II
GRAPH THEORY

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M2A **Credit: 04**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To introduce the notion of graph theory and its applications and learn the techniques of combinatory in Graph Theory

Outcomes:

1. Plan and deliver the Konigsberg bridge problem
2. Implement the matrices and connectedness and components
3. Know about the Hamiltonian graphs
4. Recognize the kruskal's algorithm

UNIT I (15 Periods)

Introduction - The Konigsberg Bridge Problem - Graphs and sub graphs - Definition and Examples - Degrees – Sub graphs - Isomorphism.–independent sets and coverings.

UNIT II (15 Periods)

Matrices - Operations on Graphs - Walks, Trails and Paths – Connectedness and Components - Eulerian Graphs.

UNIT III (15 Periods)

Hamiltonian Graphs (Omit Chavatal Theorem) - Characterization of Trees - Centre of a Tree

UNIT IV (15 Periods)

Planarity: Introduction - Definition and Properties - Characterization of Planar Graphs.

UNIT V (15 Periods)

Directed Graphs: Introduction - Definitions and Basic Properties – Some Applications: Connector Problem - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm.

TEXTBOOK(S)

1. S. Arumugam and S. Ramachandran, Invitation to Graph Theory, Sci Tech Publications (India) Pvt. Ltd., Chennai, 2006.

UNIT I	- Chapter 1 Sec 1.0, 1.1 and Chapter 2 Sec 2.0, 2.1, 2.2, 2.3, 2.4.2.6
UNIT II	- Chapter 2 Sec 2.8,2.9,Chapter 4 Sec 4.1,4.2 and Chapter 5 Sec 5.0,5.1
UNI III	- Chapter 5 Sec 5.2, Chapter 6 Sec 6.0, 6.1, 6.2.
UNIT IV	- Chapter 8 Sec 8.0, 8.1, 8.2
UNIT V	- Chapter 10 Sec 10.0, 10.1 Chapter 11 Sec 11.0, 11.1, 11.2

BOOKS FOR REFERENCE

1. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India, 2004.
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, Tata McGraw-Hill Edition, 2004.

MAJOR BASED ELECTIVE - II
MATHEMATICAL MODELING

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M2B **Credit: 04**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To study the mathematical models through ode and difference equations and train the students to develop mathematical models in real life problems

Outcomes:

1. Understanding the concept of linear growth and decay models
2. Appreciate the mathematical modeling through systems of ordinary differential equation
3. Analyze circular motion and motion of satellites
4. Calculate the mathematical modeling through ordinary differential equation

UNIT I (15 Periods)

Mathematical Modeling through Ordinary Differential Equations of First order: Linear Growth and Decay Models – Non-Linear Growth and Decay Models –Compartment Models – Dynamic problems – Geometrical problems.

UNIT II (15 Periods)

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

UNIT III (15 Periods)

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

UNIT IV (15 Periods)

Mathematical Modeling 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 (15 Periods)

Mathematical Modeling through Graphs: Solutions that can be Modeled Through Graphs – Mathematical Modeling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

TEXTBOOK(S)

1. J.N. Kapur, Mathematical Modeling, Wiley Eastern Limited, New Delhi, 1988.
   - UNIT I - Chapter 2, Sec 2.1 to 2.6
   - UNIT II - Chapter 3, Sec 3.1 to 3.6
   - UNIT III - Chapter 4, Sec 4.1 to 4.4
   - UNIT IV - Chapter 5, Sec 5.1to 5.5
   - UNIT V - Chapter 7, Sec 7.1 to 7.5

BOOKS FOR REFERENCE

1. J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi, 1985.

MAJOR BASED ELECTIVE - II
NON LINEAR DIFFERENTIAL EQUATIONS

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M2C **Credit: 04**
Total Periods: 75 **Exam Hours: 03**

Objectives:

To study Non - linear DE and its properties and study oscillation and stability properties of the solutions

Outcomes:

1. Know about the linear systems in matrix form
2. Illustrate averaging methods and accuracy of a period estimate
3. Represent the perturbation methods and Fourier series
4. Compare the stability and lioapunov stability

UNIT I (15 Periods)

First order systems in two variables and linearization: The general phase plane-some population models – Linear approximation at equilibrium points – Linear systems in matrix form.

UNIT II (15 Periods)

Averaging Methods: An energy balance method for limit cycles – Amplitude and frequency estimates – slowly varying amplitudes – nearly periodic solutions – periodic solutions: harmony balance – Equivalent linear equation by harmonic balance – Accuracy of a period estimate.

UNIT III (15 Periods)

Perturbation Methods: Outline of the direct method – Forced Oscillations far from resonance - Forced Oscillations near resonance with Weak excitation – Amplitude equation for undamped pendulum – Amplitude Perturbation for the pendulum equation – Lindstedt's Method – Forced oscillation of a self – excited equation – The Perturbation Method and Fourier series.

UNIT IV (15 Periods)

Linear Systems: Time Varying Systems – Constant coefficient System – Periodic Coefficients – Floquet Theory – Wronskian.

UNIT V (15 Periods)

Stability: Poincare stability – solutions, paths and norms – Liapunov stability Stability of linear systems – Comparison theorem for the zero solutions of nearly – linear systems.

TEXTBOOK(S)

1. Nonlinear Ordinary Differential Equations, D.W.Jordan, & P.Smith, Clarendon Press, Oxford, 1977.

BOOKS FOR REFERENCE

1. Differential Equations by G.F.Simmons, Tata McGraw Hill, NewDelhi (1979).
2. Ordinary Differential Equations and Stability Theory By D.A.Sanchez, Freeman (1968).

MAJOR BASED ELECTIVE - III
ASTRONOMY

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M3A **Credit: 04**
Total Periods: 90 **Exam Hours: 03**

Objectives:

To learn the concept of years and calendar

Outcomes:

1. Recognize the relevant properties of a sphere
2. Plan and design earth and dip of the horizon
3. Understanding the concept of years and calendar
4. Appreciate moon and motions of planet

UNIT I (18 Periods)

Relevant properties of a sphere & relevant formulae for spherical trigonometry (All without Proof) –Celestial sphere – Diurnal motion

UNIT II (18 Periods)

Earth – Dip of the horizon –Twilight – Astronomical refraction –Tangent & Cosines Formula – Properties &simple problems applying them.

UNIT III (18 Periods)

Keplers Laws of Planetary motion (statement only) – Newton's deductions from them –Three anomalies of the Earth and relation between them – Time- Equation of time -Seasons

UNIT IV (18 Periods)

Years and Calendar – Geocentric Parallax –Annual Parallax –Aberration of light – simple problems in the above

UNIT V (18 Periods)

Moon (except Moons liberations)-Motions of planet (assuming that orbits are circular - Eclipses

TEXTBOOK(S)

1. S. Kumaravelu and Prof. Susheela Kumaravelu, Astronomy, SKV Publications, 2004.
   - UNIT I - Chapters 1 & 2
   - UNIT II - Chapter 3 Section 1, 2, 5, 6 & Chapter 4 Sections 117 to 120,129,130
   - UNIT III - Chapter 6
   - UNIT IV - Chapter 7 Section 1, 3, 4 & Chapter 8 Sections 190 to 193
   - UNIT V - Chapter 12

BOOKS FOR REFERENCE

1. V. Thiruvenkatacharya, A Text Book of Astronomy, S. Chand and Co., Pvt Ltd., 1972

MAJOR BASED ELECTIVE - III
DESIGN AND ANALYSIS OF ALGORITHMS

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M3B **Credit: 04**
Total Periods: 90 **Exam Hours: 03**

Objectives:

To impart the students the knowledge of design and analysis of algorithms in computer science and study the complexity of algorithms

Outcomes:

1. Learn about algorithm and algorithm specification
2. Represent data structures, queues and priority queues
3. Design and implement the maximal and minimal in a set of items
4. Calculate interpolations and Lagrange's interpolation

UNIT I (18 Periods)

Algorithms: Introduction- Algorithm - Algorithm specification: Pseudo code Conventions, Recursive algorithms - Performance analysis: Space Complexity, Time Complexity, Asymptotic Notation, and Practical Complexities.

UNIT II (18 Periods)

Data structures and Queues: Linear data structures: Concepts of non-primitive data structures – storage structure for arrays - stacks - operations on stacks - queues - priority queues.

UNIT III (18 Periods)

Linked lists and trees: Linked linear lists - operations on linked linear lists - circularly linked lists –doubly linked linear lists - Non-linear data structures: trees - binary trees -operations on binary trees - storage representation and manipulations of binary trees.

UNIT IV (18 Periods)

Search and Sort: Divide and conquer - General method - Binary search - Finding the maximum and minimum in a set of items - Merge sort - Quick sort - Selection sort. Basic Traversal and Search Techniques for graphs: Breadth First Search – Depth First Search.

UNIT V (18 Periods)

Interpolations: Backtracking - The 8-Queens problem - Algebraic problems - The general method -Evaluation and interpolation - Horner's rule - Lagrange interpolation- Newtonian interpolation.

TEXTBOOK(S)

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer algorithms, Galgotia Publications Pvt. Ltd., 2004.
2. Jean-Paul Tremblay and Paul G.Sorenson, An introduction to data structures with applications, Second Edition, Tata McGraw Hill Publishing Company Limited, NewDelhi, 1995.

BOOKS FOR REFERENCE

1. A.V. Aho, J.E.Hopcroft, J.D. Ullman, The Design and Analysis of Computer Algorithms, Addison- Wesley Publ. Comp., 1974.
2. Seymour E.Goodman and S.T. Hedetniemi, Introduction to the design and analysis of algorithms, McGraw Hill International Edition, 2002.

MAJOR BASED ELECTIVE - III
FINANCIAL MATHEMATICS

Semester : VI **Max.Marks:75**
Course Code: 21UMM6M3C **Credit: 04**
Total Periods: 90 **Exam Hours: 03**

Objectives:

To study financial mathematics through various models and study the various aspects of financial mathematics.

Outcomes:

1. Determine the single period models and risk-natural probability measure
2. Obtain Markov processes and martingale theorems
3. Analyze Brownian motion and martingales in continuous time
4. Develop the girsanov theorem and geometric Brownian method

UNIT I (18 Periods)

Single Period Models: Definitions from Finance - Pricing a forward - One-step Binary Model - a ternary Model- Characterization of no arbitrage - Risk-Neutral Probability Measure.

UNIT II (18 Periods)

Binomial Trees and Discrete Parameter Martingales: Multi-period Binary model - American Options - Discrete parameter martingales and Markov processes - Martingale Theorems - Binomial Representation Theorem -Overturn to Continuous models.

UNIT III (18 Periods)

Brownian motion: Definition of the process - Levy's Construction of Brownian Motion - The Reflection Principle and Scaling - Martingales in Continuous time.

UNIT IV (18 Periods)

Stochastic Calculus: on-differentiability of Stock prices - Stochastic Integration - Ito's formula - Integration by parts and Stochastic Fubini Theorem - Girsanov Theorem – Brownian Martingale Representation Theorem – Geometric Brownian Motion - The Feynman -Kac Representation.

UNIT V (18 Periods)

Block-Scholes Model: Basic Block-Scholes Model - Block-Scholes price and hedge for European Options -Foreign Exchange - Dividends - Bonds - Market price of risk.

TEXTBOOK(S)

1. Alison Etheridge, A Course in Financial Calculus, Cambridge University Press, Cambridge, 2002.

BOOKS FOR REFERENCE

1. Martin Boxter and Andrew Rennie, Financial Calculus: An Introduction to Derivatives Pricing, Cambridge University Press, Cambridge, 1996
2. Damien Lamberton and Bernard Lapeyre, (Translated by Nicolas Rabeau and Farancois Mantion),
3. Introduction to Stochastic Calculus Applied to Finance, Chapman and Hall, 1996.

NON -MAJOR ELECTIVE - I
QUANTITATIVE APTITUDE - I

Semester : III **Max.Marks:75**

Course Code: 21UMM3N1A **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Develop number – HCF-LCM
2. Evaluate decimal fraction and simplification
3. Know about surds and indices
4. Plan and deliver ratio and proportion

UNIT I (6 Periods)

Numbers – HCF –LCM –Problems on numbers

UNIT II (6 Periods)

Decimal Fractions and Simplification

UNIT III (6 Periods)

Surds and Indices –Partnership –Allegation or Mixture

UNIT IV (6 Periods)

Ratio and Proportion – Partnership – Allegation or Mixture

UNIT V (6 Periods)

Average –Problems on Age

TEXT BOOK(S)

Scope and treatment as in "Quantitative Aptitude" by R.S.Aggarwal, S.Chand & Company Ltd., Ram Nagar ,New Delhi (2007

UNIT I - Chapters 1, 2 & 7
UNIT II - Chapters 3 & 4
UNIT III - Chapters 9, 10 & 11
UNIT IV - Chapters 12, 13 & 20
UNIT V - Chapters 6 & 8

NON MAJOR ELECTIVE - I
OPERATION RESEARCH

Semester : III **Max.Marks:75**
Course Code: 21UMM3N1B **Credit: 02**
Total Periods: 30 **Exam Hours: 03**

Objectives:

To introduce the various techniques of Operations Research and make the students solve real life problems in Business and Management

Outcomes:

1. Understanding the concept of operation research scope and phase
2. Recognize graphical solution of linear programming problem
3. Represent transportation problem and initial basic feasible solution
4. Calculate assignment problem and Hungarian methods

UNIT I (6 Periods)

Introduction to Operations Research, scope, phases- merits and limitations – concept of optimization

UNIT II (6 Periods)

Operation Research – An Overview – Mathematical Formulation of Linear Programming Problem - Graphical Solution of Linear Programming Problem

UNIT III (6 Periods)

Transportation Problem – General Transportation Problem – Loops In T.P – Solution of TP –Initial Basic Feasible Solution

UNIT IV (6 Periods)

Assignment Problem – Mathematical Formulation – Hungarian Methods

UNIT V (6 Periods)

Network Scheduling By Critical Path Method (CPM)

TEXT BOOK(S)

Operation Research by Kanthiswarup, P.K. Gupta, Manmohan 9th Revised Edition 2001, Reprint 2002.Sultan Chand & Sons, New Delhi.

UNIT I	- Chapter 1
UNIT II	- Chapter 1, 2 & 3 section 3.1 to 3.5
UNIT III	- Chapter 10 section 10.1 to 10.8 excluding 10.6
UNIT IV	- Chapter 11 section 11.1, 11.2, 11.3
UNIT V	- Chapter 21 section 21.1 to 21.5

NON MAJOR ELECTIVE - I
STATISTICS-I

Semester : III **Max.Marks:75**

Course Code: 21UMM3A4 **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of statistics

Outcomes:

1. Analyze one, two, and three dimensional diagrams
2. Appreciate graphic representation-histogram, frequency polygon
3. Develop measure of central tendency
4. Illustrate simple correlation and Karl Pearson's co-efficient of correlation

UNIT I (6 Periods)

Statistics – Definition – Nature – Scope and Objectives – Diagrammatic representation – One, two and three dimensional diagrams

UNIT II (6 Periods)

Graphic representation-Histogram, Frequency Polygon, Frequency Curve, Histogram and Pie diagram – Classification and tabulation

UNIT III (6 Periods)

Measures of Central Tendency - Mean, Median, Mode, Geometric Mean and Harmonic Mean

UNIT IV (6 Periods)

Measures of Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation and co-efficient of variation

UNIT V (6 Periods)

Simple Correlation - Karl Pearson's Co-efficient of Correlation and Spearman's Rank Correlation – Problems

TEXT BOOK(S)

1. S.P. Gupta , Statistical Methods (Revised edition2001)

BOOKS FOR REFERENCE

1. R.S.N. Pillai and Bagavathi ,Practical statistics, Second edition(2013)

NON -MAJOR ELECTIVE - II
QUANTITATIVE APTITUDE – II

Semester : IV **Max.Marks:75**
Course Code: 21UMM4N2A **Credit: 02**
Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Represent chain rule and time and work
2. Plan and design time, distance, boat and stream problem
3. Calculate simple interest, compound interest
4. Write a note on permutations and combinations

UNIT I (6 Periods)

Chain Rule – Time and Work – Pipes and Cisterns

UNIT II (6 Periods)

Time and Distance – Problems on Trains –Boats and Streams

UNIT III (6 Periods)

Simple Interest – Compound Interest – Stocks and Shares

UNIT IV (6 Periods)

Clocks – Area - Volume and Surface Area

UNIT V (6 Periods)

Permutations and Combinations

TEXT BOOK(S)

Scope and treatment as in “Quantitative Aptitude “ by R.S.Aggarwal, S.Chand & company limited, Ram Nagar,New Delhi – 2015

UNIT I - Chapters 14, 15 &16
UNIT II - Chapters 21, 22 & 29
UNIT III - Chapters 17, 18 & 19
UNIT IV - Chapters 24, 25 & 28
UNIT V - Chapters 30 & 31

NON -MAJOR ELECTIVE - II
NUMERICAL METHODS

Semester : IV **Max.Marks:75**

Course Code: 21UMM4N2B **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To introduce the various techniques of numerical analysis and study the behavior of numerical analysis

Outcomes:

1. Solve algebraic and transcendental equation
2. Develop interpolation with unevenly spaced intervals
3. Appreciate integration using trapezoidal rule and simpson''s 1/3 rule
4. Know about numerical solution of ODE

UNIT I (6 Periods)

Algebraic and Transcendental equation – Finding a root of the given equation using Bisection Method, Method of False Position

UNIT II (6 Periods)

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

UNIT III (6 Periods)

Numerical – Integration using Trapezoidal rule and Simpson's 1/3 and 3/8 rules & Romberg integration

UNIT IV (6 Periods)

Solution to Linear Systems – Gauss Elimination Method – Laplace Equation - Jacobi and Gauss Siedal iterative methods

UNIT V (6 Periods)

Numerical solution of ODE – Solution by Taylor's Series Method, Picard's Method, Euler's Method

TEXT BOOK(S)

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 to 2.4
    UNIT II - Chapter 3: Sections 3.3.1, 3.3.2, 3.3.4, 3.9, 3.9.1
    UNIT III - Chapter 5: Sections 5.4, 5.4.1, 5.4.2, 5.4.3, 5.4.6
    UNIT IV - Chapter 6 & 8: Sections 6.3, 6.3.2 & 8.3.1, 8.3.2
    UNITV - Chapter 7: Sections 7.1, 7.2, 7.3, 7.4, 7.4.2

BOOKS FOR REFERENCE

1. S.Narayanan and Others, Numerical Analysis, S. Viswanathan Publishers, 1994
2. A. Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

NON -MAJOR ELECTIVE - II
STATISTICS-II

Semester : IV **Max.Marks:75**
Course Code: 21UMM4N2C **Credit: 02**
Total Periods: 30 **Exam Hours: 03**

Objectives:

To impact the techniques an available in the literature in and good foundation in the concept of statistics

Outcomes:

1. Learn about simple regression and line regression
2. Illustrate skewness, kurtosis and moments
3. Develop small sample tests and independence of attributes
4. Plan and deliver probability and conditional probability

UNIT I (6 Periods)

Simple Regression – Regression co-efficient – Line Regression – Properties of Regression co –efficient -Problems

UNIT II (6 Periods)

Skewness, Kurtosis, Moments, Meaning, test of skewness, characteristics of dispersion and skewness. Measures of skewness, objectives. Karl Pearson's Coefficient of skewness, Bowley's coefficient of skewness

UNIT III (6 Periods)

Probability- Definition, axiomatic approach to probability - Additive and Multiplicative laws of Probability (two variables only) and Conditional probability – simple problems

UNIT IV (6 Periods)

Test of significance – Definition of null hypothesis, alternativehypothesis, Type Iand Type II errors, one tailed and two tailed tests.Large sample testfor single mean, Difference between means.

UNIT V (6 Periods)

Small sample tests –'t' test for single mean. Difference between means. Chi-square test for goodness of fit and independence of attributes

TEXT BOOK(S)

1. S.P. Gupta , Statistical Methods (Revised edition2001)

BOOKS FOR REFERENCE

1. R.S.N. Pillai and Bagavathi ,Practical statistics, Second edition(2013)

SKILL BASED ELECTIVE - I
QUANTITATIVE APTITUDE – I

Semester : V **Max.Marks:75**
Course Code: 21UMM5S1A **Credit: 02**
Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Discuss numbers-HCF-LCM
2. Illustrate problems on numbers
3. Calculate percentage and profit and loss
4. Analyze ratio and proportion

UNIT I (6 Periods)

Numbers – HCF –LCM –Problems on numbers

UNIT II (6 Periods)

Decimal Fractions and Simplification

UNIT III (6 Periods)

Problems on Numbers - Surds and Indices

UNIT IV (6 Periods)

Percentage – Profit and Loss

UNIT V (6 Periods)

Ratio and Proportion - Partnership

TEXT BOOK(S)

1. Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand & Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I - Chapters 1 &2
UNIT II - Chapters 3 & 4
UNIT III - Chapters 7 &9
UNIT IV - Chapters 10 & 11
UNIT V - Chapters 12 & 13

SKILL BASED ELECTIVE - I
ARITHMETIC AND MENTAL ABILITY - I

Semester : V **Max.Marks:75**

Course Code: 21UMM5S1B **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Appreciate problems on train
2. Develop allegation and mixture
3. Know about simple interest
4. Plan and deliver compound interest

UNIT I (6 Periods)

Problems on trains

UNIT II (6 Periods)

Boats & Streams

UNIT III (6 Periods)

Allegation & Mixture

UNIT IV (6 Periods)

Simple Interest

UNIT V (6 Periods)

Compound Interest

TEXT BOOK(S)

Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I - Chapters 18
UNIT II - Chapters 19
UNIT III - Chapters 20
UNIT IV - Chapters 21
UNIT V - Chapters 22

SKILL BASED ELECTIVE - I

GENERAL APTITUDE FOR COMPETITIVE EXAMINATION - I

Semester : V **Max.Marks:75**

Course Code: 21UMM5S1C **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Understanding the concept of probability
2. Recognize square roots and cube roots
3. Represent races and games of skill
4. Write a note on calendar

UNIT I (6 Periods)

Probability

UNIT II (6 Periods)

Square roots & Cube roots

UNIT III (6 Periods)

Logarithms

UNIT IV (6 Periods)

Races & Games of Skill

UNIT V (6 Periods)

Calendar

TEXT BOOK(S)

Scope and treatment as in “Quantitative Aptitude” by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I - Chapters 31
UNIT II - Chapters 5
UNIT III - Chapters 23
UNIT IV - Chapters 26
UNIT V - Chapters 27

SKILL BASED ELECTIVE - II
QUANTITATIVE APTITUDE – II

Semester : V **Max.Marks:75**

Course Code: 21UMM5S2A **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Illustrate problems on age
2. Solve chain rule
3. Discuss time and work
4. Learn about pipes and cistern

UNIT I (6 Periods)

Problems on Ages

UNIT II (6 Periods)

Chain Rule

UNIT III (6 Periods)

Time & Work

UNIT IV (6 Periods)

Pipes & Cistern

UNIT V (6 Periods)

Time & Distances

TEXT BOOK(S)

Scope and treatment as in “Quantitative Aptitude “ by R.S.Aggarwal, S.Chand& company limited, Ram Nagar,New Delhi – 2015

UNIT I - Chapters 8
UNIT II - Chapters 14
UNIT III - Chapters 15
UNIT IV - Chapters 16
UNIT V - Chapters 17

SKILL BASED ELECTIVE - II
ARITHMETIC AND MENTAL ABILITY - II

Semester : V **Max.Marks:75**

Course Code: 21UMM5S2B **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Design and implement area
2. Plan and deliver volume and surface of area
3. Recognize stocks and shares
4. Represent permutations and combinations

UNIT I (6 Periods)

Area

UNIT II (6 Periods)

Volume & Surfaces Areas

UNIT III (6 Periods)

Clocks

UNIT IV (6 Periods)

Stocks & Shares

UNIT V (6 Periods)

Permutations & Combinations

TEXT BOOK(S)

Scope and treatment as in “Quantitative Aptitude” by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I - Chapters 24
UNIT II - Chapters 25
UNIT III - Chapters 28
UNIT IV - Chapters 29
UNIT V - Chapters 30

SKILL BASED ELECTIVE - II

GENERAL APTITUDE FOR COMPETITIVE EXAMINATION - II

Semester : V **Max.Marks:75**

Course Code: 21UMM5S2C **Credit: 02**

Total Periods: 30 **Exam Hours: 03**

Objectives:

To learn the problems solving techniques for aptitude problems and enable to students prepare themselves for various competitive examinations

Outcomes:

1. Understanding the concept of true discount
2. Appreciate banker's discount
3. Develop heights and distances
4. Illustrate odd man out and series

UNIT I (6 Periods)

True Discount

UNIT II (6 Periods)

Banker's Discount

UNIT III (6 Periods)

Heights & Distances

UNIT IV (6 Periods)

Odd Man Out & Series

UNIT V (6 Periods)

Average

TEXT BOOK(S)

Scope and treatment as in "Quantitative Aptitude" by R.S. Aggarwal, S.Chand& Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I - Chapters 32
UNIT II - Chapters 33
UNIT III - Chapters 34
UNIT IV - Chapters 35
UNIT V - Chapters 6