YEAR/ SEM	PART	COURSE	COURSE TITLE	COURSE CODE	INSTR PERIODS / WEEK	CREDIT	EXAM HOURS	INTERNAL	EXTERNAL	TOTAL
I YEAR I SEM	I	LANGUAGE COURSE - I	CHEYYUL (EKKALA ELAKKIYAM), SIRUKADHAI, ILLAKIYAVARALURU / HINDI/ FRENCH/ SANSKRIT/ ARABIC	18U1LT1 / 18U1LH1 / 18U1LF1 / 18U1LS1 / 18U1LA1	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE - I	ENGLISH FOR COMMUNICATION-I	18U1EL1	6	3	3	25	75	100
	III	CORE COURSE - I	THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS	18UMM1C1	5	5	3	25	75	100
		CORE COURSE - II	ANALYTICAL GEOMETRY 3D	18UMM1C2	5	4	3	25	75	100
		ALLIED COURSE - I	GENERAL PHYSICS –I	18UMM1A1	3	3	3	25	75	100
		ALLIED CORSE - II	GENERAL PHYSICS PRACTICAL - I	18UMM1A2P	3	-	-	-	-	-
	IV	ENVIRONMENTAL STUDIES	ENVIRONMENTAL STUDIES	18U1EVS	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	18U2LT2 / 18U2LH2 / 18U2LF2 / 18U2LS2 / 18U2LA2	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE - II	ENGLISH FOR COMMUNICATION-II	18U2EL2	6	3	3	25	75	100
	III	CORE COURSE - III	TRIGONOMETRY & VECTOR CALCULUS	18UMM2C3	5	4	3	25	75	100
		CORE COURSE - IV	INTEGRAL CALCULUS	18UMM2C4	5	5	3	25	75	100
		ALLIED COURSE - II	GENERAL PHYSICS PRACTICAL - I	18UMM1A2P	3	3	3	40	60	100
		ALLIED COURSE - III	GENERAL PHYSICS - II	18UMM2A3	3	3	3	25	75	100
	IV	VALUE EDUCATION	VALUE EDUCATION	18U2VED	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	18U3LT3 / 18U3LH3 / 18U3LF3 / 18U3LS3 / 18U3LA3	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE-III	ENGLISH THROUGH LITERATURE	18U3EL3	6	3	3	25	75	100
	III	CORE COURSE - V	ALGEBRA AND FOURIER SERIES	18UMM3C5	5	5	3	25	75	100
		CORE COURSE - VI	THEORY OF NUMBERS	18UMM3C6	5	4	3	25	75	100
		ALLIED COURSE -IV	MATHEMATICAL STATISTICS-I	18UMM3A4	3	3	3	25	75	100
		ALLIED COURSE -V	MATHEMATICAL STATISTICS PRACTICAL	18UMM3A5P	3	-	-	-	-	-
	IV	NON-MAJOR ELECTIVE – I	QUANTITATIVE APTITUDE - I	18UMM3N1A						
			OPERATIONS RESEARCH	18UMM3N1B	2	2	3	25	75	100
			STATISTICS - I	18UMM3N1C						
		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	18U4LT4 / 18U4LH4 / 18U4LF4 / 18U4LS4 / 18U4LA4	6	3	3	25	75	100
	II	ENGLISH LANGUAGE COURSE-IV	ENGLISH FOR COMPETITIVE EXAMINATIONS	18U4EL4	6	3	3	25	75	100
	III	CORE COURSE- VII	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM	18UMM4C7	5	5	3	25	75	100
		CORE COURSE- VIII	SEQUENCE AND SERIES	18UMM4C8	5	4	3	25	75	100
		ALLIED COURSE -V	MATHEMATICAL STATISTICS PRACTICAL	18UMM3A5P	3	3	3	40	60	100
		ALLIED COURSE -VI	MATHEMATICAL STATISTICS - II	18UMM4A6	3	3	3	25	75	100
	IV	NON-MAJOR ELECTIVE – II	QUANTITATIVE APTITUDE - II	18UMM4N2A						
			NUMERICAL METHODS	18UMM4N2B	2	2	3	25	75	100
			STATISTICS - II	18UMM4N2C						
		TOTAL			**30**	**23**	**21**	**190**	**510**	**700**
		CORE COURSE – IX	NUMERICAL ANALYSIS	18UMM5C9	5	4	3	25	75	100

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

CORE COURSE - I
THEORY OF EQUATIONS & DIFFERENTIAL CALCULUS

Semester   : I   **Max.Marks:75**
Course Code: 18UMM1C1   **Credit: 05**
Total Periods: 75   **Exam Hours: 03**

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

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: 18UMM1C2   **Credit: 04**
Total Periods : 75   **Exam Hours: 03**

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

UNIT I   (15 Periods)
   Distance between two points direction ratio and direction cosines of a joining two points - Equation of a straight line joining two points. Equations of a straight line in slope – Incorrect form.

UNIT II   (15 Periods)
   The plane Angle between two planes – Length of the perpendicular – Bisecting plane – Distance between two planes.

UNIT III   (15 Periods)
   The Straight line –Symmetric form – Image of a point and Image of a line on a plane – 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: 18UMM2C3   **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.

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: 18UMM2C4   **Credit: 05**
Total Periods : 75   **Exam Hours: 03**

Objectives:

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

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
　.

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: 18UMM3C5   **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

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. Summation of series (first two types)

UNIT III   (15 Periods)

    Summation of series (Remaining four types)

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, 5
    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: 18UMM3C6   **Credit: 04**
Total Periods: 75   **Exam Hours: 03**

Objectives:

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

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 $\mu(n)$ – The Euler totient function $\varphi(n)$ – A relation connecting φ and μ – A product formula for $\varphi(n)$ – 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: 18UMM3A4   **Credit: 03**
Total Periods: 45   **Exam Hours: 03**

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

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: 18UMM3A5P   **Credit: 03**
Total Periods: 45   **Exam Hours: 03**

Objectives:

   To train the students in solving statistical problems

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: 18UMM4C7   **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

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: 18UMM4C8   **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

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: 18UMM4A6   **Credit: 03**
Total Periods: 45   **Exam Hours: 03**

Objectives:

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

UNIT I   (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 II   (9 Periods)

Sampling distribution't', 'F' and chi-square distribution - Small sample test – 't' test for single mean, difference between mean. Paired't' test, chi-square test for goodness of fit and independence of attributes.

UNIT III   (9 Periods)

Correlation – Rank correlation, karlpearsons correlation coefficient and its properties. Linear regression and its properties.

UNIT IV   (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

UNIT V   (9 Periods)

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

TEXT BOOK(S)

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

   UNIT I   - Chapter 7, 8 & 13 (Section 7.3 & 8.2)
   UNIT II   - Chapter 13
   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 ANALYSIS

Semester   : V   **Max.Marks:75**
Course Code: 18UMM5C9   **Credit: 04**
Total Periods: 75   **Exam Hours: 03**

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

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
ABSTRACT ALGEBRA

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

Course Code: 18UMM5C10   **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

UNIT I   (15 Periods)

Groups - Subgroups – Cyclic groups – Order of an element – Co-sets and Lagrange's theorem.

UNIT II   (15 Periods)

Normal subgroups and Quotient groups – Isomorphism – Homomorphism's

UNIT III   (15 Periods)

Rings - Definition and Examples – Elementary properties of rings – Types of rings – Characteristics of a rings – Sub rings – Ideals – Quotient rings – Maximal & Prime ideals – Homomorphism of rings – Isomorphism of rings.

UNIT IV   (15 Periods)

Vector Spaces -Definition and Examples – Subspaces – Linear Transformation – Span of a set – Linear independence.

UNIT V   (15 Periods)

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

TEXT BOOK(S)

1.   N.Arumugam & A.Thangapandi Isaac, Modern Algebra, New Gamma Publishing House -June 1997
     UNIT I   - Chapter 3 Sections 3.5 to 3.8
     UNIT II   - Chapter 3 Sections 3.9 to 3.11
     UNIT III   - Chapter 4 Sections 4.1 to 4.10
     UNIT IV   - Chapter 5 Sections 5.1, 5.2 to 5.5
     UNIT V   - Chapter 5 Sections 5.6 to 5.8

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: 18UMM5C11   **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.

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: 18UMM5C12   **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

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: 18UMM5M1A   **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

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: 18UMM5M1B   **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

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: 18UMM5M1C   **Credit: 04**
Total Periods: 60   **Exam Hours: 03**

Objectives:

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

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: 18UMM6C13   **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

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: 18UMM6C14   **Credit: 05**
Total Periods: 90   **Exam Hours: 03**

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

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: 18UMM6C15   **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

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: 18UMM6M2A   **Credit: 04**

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

Objectives:

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

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: 18UMM6M2B   **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

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.

NON LINEAR DIFFERENTIAL EQUATIONS

Semester   : VI   **Max.Marks:75**
Course Code: 18UMM6M2C   **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

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: 18UMM6M3A   **Credit: 04**
Total Periods: 90   **Exam Hours: 03**

Objectives:

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: 18UMM6M3B   **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

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: 18UMM6M3C   **Credit: 04**

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

Objectives:

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

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

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