THIRUVALLUVAR UNIVERSITY

BACHELOR OF SCIENCE

DEGREE COURSE

B.Sc. MATHEMATICS

UNDER CBCS

(with effect from 2008-2009)

The Course of Study and the Scheme of Examinations

Year/ Semester	Part	Subject	Paper	Title of the Paper	Ins. hrs/ Week	Credit	Exam hrs	Max. Marks		
								IA	Uni. Exam.	Total
I Year I Semester	I	Language	Paper I		6	3	3	25	75	100
	II	English	Paper I		6	3	3	25	75	100
	III	Core	Paper I	Algebra	5	3	3	25	75	100
	III	Core	Paper II	Trigonometry	4	3	3	25	75	100
	III	Allied I	Paper I	To choose 1 out of 6	7	5	3	25	75	100
	III	Allied Practical	-	-			-	-	-	-
	IV			**Environmental Studies**	2	2	3	25	75	100
I Year II Semester	I	Language	Paper II		6	3	3	25	75	100
	II	English	Paper II		6	3	3	25	75	100
	III	Core	Paper III	Calculus	5	3	3	25	75	100
	III	Core	Paper IV	Analytical Geometry	4	3	3	25	75	100
	III	Allied I	Paper II	To choose 1 out of 6	7	5	3	25	75	100
	III	Allied Practical	Practical I					20	30	50
				Value Education	2	2		-	50	50
II Year III Semester	I	Language	Paper III		6	3	3	25	75	100
	II	English	Paper III		6	3	3	25	75	100
	III	Core	Paper V	Differential Equations	6	6	3	25	75	100
	III	Allied II	Paper III	To choose 1 out of 6	7	5	3	25	75	100
	III	Allied Practical	-				-			
	IV	Skill based Subject I	Paper I	Fundamentals of Applied Mathematics	3	3	3	25	75	100
		Non-Major Elective I	Paper I	Basic Mathematics	2	2	3	25	75	100
II Year IV Semester	I	Language	Paper IV		6	3	3	25	75	100
	II	English	Paper IV		6	3	3	25	75	100
	III	Core	Paper VI	Vector Analysis and Fourier Analysis	6	6	3	25	75	100

Year / Semester	Part	Subject	Paper	Title of the Paper	Ins. hrs/ Week	Credit	Exam hrs	Max. Marks		
								IA	Uni. Exam.	Total
	III	Allied	Paper IV	To choose 1 out of 6	7	5	3	25	75	100
	III	Allied Practical	Practical II	Allied II Practical			3	20	30	50
	IV	Skill based Subject II	Paper II	Linear Programming	3	3	3	25	75	100
		Non-Major Elective II	Paper II	Foundation Mathematics for Competitive Examination	2	2	3	25	75	100
III Year V Semester	III	Core	Paper VII	Abstract Algebra	6	5	3	25	75	100
	III	Core	Paper VIII	Real Analysis I	6	5	3	25	75	100
	III	Core	Paper IX	Complex Analysis	5	5	3	25	75	100
	III	Core	Paper X	Mechanics I	5	5	3	25	75	100
		Elective I	Paper I	To choose 1 out of 2 1. Graph Theory 2. Astronomy	5	5	3	25	75	100
	IV	Skill based Subject III	Paper III	Quantitative Techniques	3	3	3	25	75	100
III Year VI Semester	III	Core	Paper XI	Linear Algebra	6	5	3	25	75	100
	III	Core	Paper XII	Real Analysis II	6	6	3	25	75	100
	III	Core	Paper XIII	Mechanics II	5	5	3	25	75	100
		Elective II	Paper II	To choose 1 out of 3 1. Operations Research 2. Special Functions 3. Calculus of Finite Differences & Numerical Methods (To be chosen only by those students who have nor taken numerical methods as allied subject)	5	5	3	25	75	100
		Elective III	Paper III	Theory : Programming in C. Language	5	5	3	25	75	100
				Practical in C Language				20	30	50
	IV	Skill based	Paper IV	Mathematics for	3	3	3	25	75	100

Year/ Semester	Part	Subject	Paper	Title of the Paper	Ins. hrs/ Week	Credit	Exam hrs	Max. Marks		
								IA	Uni. Exam.	Total
		Subject IV		Competitive Examinations						
		Extension Activities				1		-	-	50
				Total	180	140				3850

ALLIED SUBJECTS FOR MATHEMATICS STUDENTS

To choose any two out of the following six Allied Subjects as Allied I and Allied II. Each Allied subject consists of two Examination Papers as Paper I and Paper II.

1. Numerical methods (Paper I and II)
2. Physics (Paper - I and II)
3. Chemistry (Paper- I and II)
4. Mathematical Statistics (Paper- I and II)
5. Financial Accounting (Paper-I and II)
6. Cost and Management Accounting (Paper- I and II)

THIRUVALLUVAR UNIVERSITY

B.Sc. MATHEMATICS

SYLLABUS

UNDER CBCS

(with effect from 2008-2009)

I SEMESTER

PAPER I

ALGEBRA

Objectives

In this Course students are exposed to topics like Theory of Equations, Summation of Series, Matrices, Continued Fractions and Elementary Number Theory. The stress is on the development of problem solving skills.

UNIT-I: THEORY OF EQUATIONS

Polynomial Equations - Imaginary and Irrational roots - Symmetric Functions of roots in terms of Coefficients - Sum of r-th powers of roots - Reciprocal Equations - Transformation of Equations.

UNIT-II: THEORY OF EQUATIONS (Contd)

Descartes Rule of Signs - Approximate Solutions of Polynomials by Horner's method - Newton Raphson method of Solution of a Cubic Polynomial.

UNIT-III: SUMMATION OF SERIES

Summation of series using Binomial - Exponential and Logarithmic series (Theorems without proofs) - Approximation using Binomial & Exponential series.

UNIT-IV: MATRICES

Symmetric - Skew symmetric, - Hermitian - Skew Hermitian - Orthogonal and Unitary Matrices - Rank of Matrix - Consistency and Solutions of Linear Systems - Cayley-Hamilton Theorem(without proof) -Eigen Values–Eigen Vectors–Similar Matrices - Diagonalisation of a Matrix.

UNIT-V: ELEMENTARY NUMBER THEORY

Prime Number - Composite Number - Decomposition of a Composite Number as a Product of Primes uniquely (without proof) - Divisors of a Positive Integer - Congruence Modulo *n* - Euler Function (without Proof) - Highest Power of a Prime Number p contained in *n!* - Fermat's and Wilson's Theorems.

Recommended Texts

1. T.K.Manicavachagom Pillay, T.Natarajan and K.S.Ganapathy. (2004) *Algebra,* Volume I & II S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.
2. P.Kandasamy, K.Thilagavathy (2004), Mathematic for B.Sc. Vol-I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.

Reference Books

1. S.Arumugam (2003) *Algebra*. New Gamma Publishing House, Palayamkottai.
2. A.Singaravelu (2003) *Algebra and Trigonometry*, Vol.-I & II Meenakshi Agency, Chennai.
3. S.Sudha.(1998) *Algebra and Trigonometry*. Emerald Publishes, Chennai.

PAPER II

TRIGONOMETRY

Objectives

This course is a fundamental one for many courses of this Degree Programme. This covers topics on the expansions of trigonometric functions, hyperbolic functions, inverse circular, inverse hyperbolic functions and it aims to develop computational skills.

UNIT-I:

Expansions of cos nθ , sin nθ - Expansion of tan nθ in terms of tan θ - Expansion of tan(A+B+C+ …) - Formation of Equations.

UNIT-II:

Powers of sines and cosines of θ in terms of functions of multiples of θ - expansions of sin θ and cos θ in a series of ascending powers of θ - Expansion of Inverse Circular Functions.

UNIT-III: Hyperbolic Functions

Definition - Relation between Hyperbolic Functions - Inverse Hyperbolic Functions.

UNIT-IV:

Resolution into Factors - de Moivre's Property on the Circle and Cote's Property on the Circle. Logarithm of complex quantities.

UNIT-V:

Summation of Trigonometric Series: Method of Differences - Gregory Series - Euler Series.

Recommended Text

1. S.Narayanan and T.K.Manicavachagom Pillay (2004) *Calculus.* S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.
2. P.Kandasamy, K.Thilagavathy (2004), Mathematic for B.Sc. Vol.-I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.

Reference Books

1. S.Duraipandian and Laxmi Duraipandian (1984) *Trigonometry.* Emerald Publishers, Chennai
2. B.S.Grewal. (2002) *Higher Engineering Mathematics.* Khanna Publishers. New Delhi.
3. S.L.Loney. (1982) *Plane Trigonometry,* Part II, Cambridge University Press, London..
4. A.Singaravelu (2003) *Algebra and Trigonometry*, Vol.-I Meenakshi Agency, Chennai.
5. P.R.Vittal. (2004) *Trigonometry*, Margham Publications, Chennai.

ALLIED I

(to choose any 1 out of the given 6)

PAPER I.1

NUMERICAL METHODS I

Objectives

This course will cover basic methods for finding the Finite differences, Central differences, Inverse interpolation, Summation of series, Interpolation for equal & unequal intervals, Solutions of simultaneous equations, Important principles, Method and Processes to get numerical results, Reliability of numerical result.

UNIT-I: Finite Differences

First and higher order differences-forward differences and Back ward differences-Properties of operators-Differences of a Polynomial-Factorial Polynominals-Operator E, Relation between ▲,▼and E – Interpolation - Newton - Gregory forward & backward formulae for interpolation.

UNIT-II: Central Differences

Central difference Operators-Central differences formulae: Gauss Forward and Backward formulae-Sterling's formula-Bessel's formula.

UNIT-III: Interpolation for Unequal Intervals

Divided differences-Newton's divided differences formula and Lagrange's-Estimating the Missing terms (With one or more missing values).

UNIT-IV: Inverse Interpolation

Lagrange's method and Reversion of series method (Using Newton's forward formula only). Summation of series: Sum to n term of the series whose general term is the first difference of a function-summation by parts.

UNIT-V: Solutions of Simultaneous Linear Equations

Gauss elimination method-matrix inversion method-Gauss-Jordan Method, Gauss-Seidal method-Crout's method (Three unknowns only).

Recommended Text

1. B.D. Gupta.(2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Reference Books

1. S. Arumugham. (2003) *Numerical Methods*, New Gamma Publishing, Palamkottai.
2. H.C. Saxena. (1991) *Finite differences and Numerical analysis* S.Chand & Co., Delhi
3. A.Singaravelu (2004). *Numerical Methods* Meenakshi Agency, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite difference & Numerical Analysis, S.Chand & Company Ltd., New Delhi-55.

PAPER I.2

PHYSICS I

UNIT-I : PROPERTIES OF MATTER

Elasticity: Hooke's law - Elastic constants - bending of beam - Bending moment - cantilever Depression at the loaded end of a cantilever - determination of Young's modulus by non-uniform bending.

Torsion: Torsion couple - Potential energy in a twisted wire - Torsional pendulum - Time period - Rigidity Modulus - Determination of rigidity modulus by Torsional oscillation (without masses).

Viscosity: viscosity of a liquid - Viscous force - Co-efficient of viscosity of a liquid - comparison of viscosities of two liquids by graduated burette method

Surface Tension: Surface Tension - interfacial surface tension - determination of surface tension and interfacial tension by the method of drops.

UNIT-II: HEAT

Heat: Specific heat - Callender's Barne's method to determine the specific heat of a liquid-Newton's law of cooling - determination of specific heat of a liquid using Newton's law of cooling - Emissivity and Emissive power.

Low Temperature: J.K. Effect - Positive effect - Negative effect - Temperature of inversion - liquefaction of air Linde's method - Helium I and II - production of low temperature- adiabatic demagnatisation

UNIT-III : ELECTRICITY AND MAGNETISM

Electricity: Potentiometer - Principle - Calibration of low range voltmeter - Measurement of internal resistance of cell - measurement of an unknown resistance

Magnetism - Moment and pole strength of a magnet - Deflection magnetometer - Tan C position - Vibration magnetometer - Theory - period of oscillation - Determination of M and B_H using the deflection magnetometer in Tan C position and the vibration magnetometer.

UNIT-IV: SOUND AND ACOUSTICS OF BUILDING

Sound: Transverse vibration of strings - Vibration of strings - Velocity and frequency of vibrations of a stretched string - laws of vibrations along a stretched string - sonometer - A.C. Frequency - Steel wire - Brass wire

Ultrasonics - Production by Piezo - electric method - properties and uses.

Acoustics of buildings: Reverberation - Reverberation time - Sabine's formula (definition only) - Sound absorption co-efficient of surface - conditions for the perfect acoustics.

UNIT-V :GEOMETRICAL OPTICS AND PHYSICAL OPTICS

Defects of Images (Lens): Spherical aberration - minimizing spherical aberration by using two thin lenses in contact - chromatic aberration- Achromatic combination of two thin lenses in contact

Physical Optics: Interference - Air Wedge - description - Determination of diameter of a thin wire by air wedge

Diffraction: Theory of transmission grating - Normal Incidence - Determination of Wavelength of monochromatic source and Wavelength of mercury lines using a grating by normal Incidence.

Polarisation: Optical activity - specific rotatory power - Polarimeter - Determination of specific rotatory power of a solution using the polarimeter

Reference Books

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co.(2004)
8. Electronic Principles and applications - A. B. Bhattacharya, New Central Book Agency, Culcutta.
9. Introduction to Solid state Physics - C. Kittel, 5th Edition Wiley Eastern Ltd.
10. Renewable & sustainable energy sources - Agarwal.
11. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

PAPER I.3

CHEMISTRY I

UNIT - I

1.1 Extraction of Metals Minerals and Ore difference - Minerals of Iron, Aluminum and Copper - Ore Dressing or concentration of Ore - Types of Ore Dressing Froth Floatation and Magnetic separation.

1.2 Refining of Metals - Types of Refining - Electrolytic, Van Arkel and Zone Refining.

1.3 Extraction of Uranium and Thorium.

UNIT - II

2.1 Cyclo-alkanes preparation properties of Cyclo-hexane -- Bayers strain theory.

2.2 Polarization - Inductive effect, mesomeric effect and steric effect - (Acid and Base strength.)

2.3 Stereo isomerism - Types, Causes of optical activity of (lactic acid) and tartaric acid - Racemisation - Resolution - Geometrical isomerism - maleic and fumaric acid.

UNIT - III

3.1 Chemical Kinetics - Distinction between Order and Molecularity - derivation of First order rate equation - half life period of first order reaction - determination of rate constant of hydrolysis of ester

Catalysis - catalyst - auto catalyst - enzyme catalyst - promoters - catalytic poisoning - Active center - Distinction between homogeneous and heterogeneous catalysts - Industrial application of catalysts.

3.3 Photochemistry - Grothus Drapers law, stark einsteines law - quantum yield - photosynthesis, phosphorescence - fluorescence - chemiluminescence's - photosensitization.

UNIT - IV

4.1 VSEPR Theory - Shapes of Simple Molecules BF_3, PCl_5, SF_6 and XeF_6

4.2 Fuels - Calorific value of fuels - Non-conventional fuels - need of Solar energy - Applications - Bio-fuels.

4.3 Osmosis - Osmotic pressure - reverse osmosis - desalination of sea water.

UNIT - V

5.1 Nuclear Chemistry - Definition of Half life period - Group displacement law - Radioactive series. Nuclear Fission and Fusion - Application of nuclear chemistry in Medicine, agriculture, industries - C^{14} dating.

5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking. Naphthalene - Preparations, Properties and uses of Naphthalene - Structure of Naphthalene.

5.3 Elements of symmetry - unit cell - crystal lattice - types of cubic lattice - one example for each.

PAPER I.4

MATHEMATICAL STATISTICS I

Objective

To apply Statistics Methods for Mathematical Problems

UNIT-I

Concept of Sample Space - Events - Definition of Probability (Classical, Statistical and Axiomatic) - Addition and Multiplication laws of Probability - Independence of Events - Conditional Probability - Baye's Theorem - Simple Problems.

UNIT -II

Random Variables (Discrete and Continuous) - Distribution Function - Expectation and Moments - Moment Generating Function - Probability Generating Function - Cumulant Generating Function - Simple Problems.

UNIT-III

Characteristic Function - Properties - Uniqueness and Inversion Theorem (Statement only) Chebychev's Inequality - Simple Problems

UNIT-IV

Concept of Bivariate Distribution - Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation - Linear Regression - Concept of Partial and Multiple Correlation (Three Variables only).

UNIT-V

Standard distributions: Discrete distributions - Binomial, Poisson, Hyper Geometric and Negative Binomial Distributions - Continuous Distributions Normal, Uniform, Exponential, Gamma and Beta Distributions - Interrelationship among these Distributions

Books for Reference

1. Hogg, R.V. & Craig.A.T.(1998) : Introduction to Mathematical Statistics, Macmillan
2. Mood. A.M. Graybill. F.A.& Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967) : Statistical Methods, Oxford and IBH
4. Hoel, P.G(1971) : Introduction to Mathematical Statistics, Wiley.
5. S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical Statistics, Sultan & sons
6. Wilks S.S. Elementary Statistical Analysis, Oxford and IBH

PAPER I.5

FINANCIAL ACCOUNTING I

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : INTRODUCTION

Basic Accounting Concepts and Conventions - Groups interested in accounting - Accounting Equation - Journal - Ledger - Subsidiary Books - Trial Balance - Errors - Types - Rectification of Errors - Bank Reconciliation Statement.

UNIT-II: FINAL ACCOUNTS

Meaning - Preparation of Final Accounts - Trading Account - Profit and Loss Account - Manufacturing Account - Balance Sheet - Distinction between Trial Balance and Balance Sheet - Adjustment Entries.

UNIT-III : DEPRECIATION ACCOUNTING

Meaning of Depreciation - Methods of providing Depreciation - Fixed Percentage on Original Cost - Fixed Percentage on Diminishing balance (including change in the method of depreciation).

UNIT-IV : AVERAGE DUE DATE

Meaning, practical uses of average due data - basic problems in Average Due Data.

UNIT-V: SINGLE ENTRY SYSTEM

Definition - Salient features - Limitations - Differences between single entry system and double entry system - Methods.

Reference Books

1. R.L. Gupta & V.K.Gupta., Financial Accounting, sultan chand & Sons, New Delhi.
2. Jain & Naurang - Advanced Accounts, Kalyani Publishers, New Delhi.
3. Shukla & Grewal - Advanced Accounts Vol. 1, S. Chand & Co, New Delhi.
4. R.L. Gupta & Radhaswami - Advanced Accountancy Sultan Chand & Sons, New Delhi.
5. T.S. Grewal - Principles of Accountancy, S. Chand & Co., New Delhi.

PAPER I.6

COST AND MANAGEMENT ACCOUNTING

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : INTRODUCTION

Cost Accounting - definition - Meaning and Objectives - Advantage and Importance - Distinction between cost accounting and Financial accounting.

UNIT-II: ELEMENTS OF COST

Material - Purchase Order - Goods Received Note - Bin Card - Stores Ledger - Purchase, Receipt and inspection - Inventory Control - ABC Analysis - EOQ - Ordering levels - Methods of Pricing Material Issues. Labour: - Methods of incentive (bonus) Schemes - Treatment of Overtime and Idle time - Labour Turnover. Overheads: - Classification - allocation and apportionment - redistribution of overheads including Machine Hour Rate.

UNIT-III: COST SHEETS

Preparation of Cost Sheets - Preparation of Tenders and Quotations.

UNIT-IV : MANAGEMENT ACCOUNTING

Introduction : Management Accounting - Definition - meaning and objectives - advantages and importance - distribution between Management Accounting and Cost Accounting - Tools and techniques of Management Accounting.

UNIT-V: BUDGETING AND BUDGETARY CONTROL

Types of Budgets - Sales budget - Production Budget - Materials budget - Labour Budget - Overhead budget - Cash Budget including flexible budget.

Reference Books

1. S.N. Maheshwari, Princiles of Management accounting sultan cand & sons, New Delhi.
2. M. Ravi, Kishore – Cost and management accounting taxamann, New Delhi.
3. V.K. Sexena & Vashist. C.D. - cost and management accounting (Methods, Techniques and applications), sultan chand & sons, New Delhi.
4. J. Batty, Management accountancy, Elbs edition, London.
5. Brown & Howard - managerial accounting & Finance, Elbs edition, London.

ENVIRONMENTAL STUDIES

(For all UG Degree Courses)

UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES: NATURAL RESOURCES :

Environmental Sciences - Relevance - Significance - Public awareness - Forest resources - Water resources - Mineral resources - Food resources - conflicts over resource sharing - Exploitation - Land use pattern - Environmental impact - fertilizer - Pesticide Problems - case studies.

UNIT-II: ECOSYSTEM, BIODIVERSITY AND ITS CONSERVATION:

Ecosystem - concept - structure and function - producers, consumers and decomposers - Food chain - Food web - Ecological pyramids - Energy flow - Forest, Grassland, desert and aquatic ecosystem.

Biodiversity - Definition - genetic, species and ecosystem diversity - Values and uses of biodiversity - biodiversity at global, national (India) and local levels - Hotspots, threats to biodiversity - conservation of biodiversity - Insitu & Exsitu.

UNIT-III: ENVIRONMENTAL POLLUTION AND MANAGEMENT

Environmental Pollution - Causes - Effects and control measures of Air, Water, Marine, soil, solid waste, Thermal, Nuclear pollution and Disaster Management - Floods, Earth quake, Cyclone and Land slides. Role of individuals in prevention of pollution - pollution case studies.

UNIT-IV: SOCIAL ISSUES - HUMAN POPULATION

Urban issues - Energy - water conservation - Environmental Ethics - Global warming - Resettlement and Rehabilitation issues - Environmental legislations - Environmental production Act. 1986 - Air, Water, Wildlife and forest conservation Act - Population growth and Explosion - Human rights and Value Education - Environmental Health - HIV/AIDS - Role of IT in Environment and Human Health - Women and child welfare - Public awareness - Case studies.

UNIT-V: FIELD WORK

Visit to a local area / local polluted site / local simple ecosystem - Report submission

REFERENCES

1. KUMARASAMY, K., A.ALAGAPPA MOSES AND M.VASANTHY, 2004. ENVIRONMENTAL STUDIES, BHARATHIDSAN UNIVERSITY PUB, 1, TRICHY

2. RAJAMANNAR, 2004, ENVIRONEMNTAL STUDIES, EVR COLLEGE PUB, TRICHY

3. KALAVATHY,S. (ED.) 2004, ENVIRONMENTAL STUDIES, BISHOP HEBER COLLEGE PUB., TRICHY

II SEMESTER

PAPER III

CALCULUS

Objectives

The course introduces students to the fundamental principles, concepts and knowledge in the areas of Differential and Integral Calculus. This prepares the students to apply these fundamental concepts and working knowledge to other courses.

UNIT-I:

Differential Calculus: n^{th} derivative - Leibnitz's theorem(Without proof) and its application - Jacobians - Total differential - maxima and minima functions of 2 & 3 independent variable, Lagranges method (without proof), problems on this concepts.

UNIT-II: Differential Calculus (Contd)

Curvature, Radius of Curvature in Cartesian and Polar coordinates, p-r equation, Evolutes.

UNIT-III: Differential Calculus (Contd)

Asymptotes: Methods (without proof) of finding asymptotes of rational algebraic curves with special cases.

UNIT-IV: Integral Calculus

Reduction formulae, Beta and Gamma Functions - Properties and Problems.

UNIT-V: Integral Calculus (Contd)

Double Integrals - Change of order of Integration - Triple Integrals - Applications to Area, Surface Area and Volume.

Recommended Text

1. S.Narayanan and T.K.Manicavachagom Pillay (2004) *Calculus.* S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.
2. P.Kandasamy, K.Thilagavathy (2004), Mathematic for B.Sc. Vol.-I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.

Reference Books

1. Shanti Narayan (2001) *Differential Calculus*. Shyamlal Charitable Trust, New Delhi.
2. Shanti Narayan (2001) *Integral Calculus.* S.Chand & Co. New Delhi.
3. S.Sudha (1998) *Calculus.* Emerald Publishers, Chennai.
4. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th Edn.), Mass. (Indian Print)
5. P.R.Vittal. (2004) *Calculus*, Margham Publication, Chennai.

PAPER IV

ANALYTICAL GEOMETRY

Objectives

Students are exposed to fundamental aspects of Two and Three Dimensional Analytical Geometry and Polar Co-ordinates and it develops logical and systematic computational skills.

UNIT-I: Two Dimensional Analytical Geometry: Conics

Chord in terms of middle points using r- method (or) otherwise - Pole, Polar.

UNIT-II: Two Dimensional Analytical Geometry(Contd) Conics

Conjugate Hyperbola, Conjugate Diameter for Ellipse Hyperbola

UNIT-III: Three Dimensional Analytical Geometry

Planes and Straight lines

UNIT-IV: Three Dimensional Analytical Geometry: Sphere

Section of a Sphere by a Plane- Tangent Plane, Orthogonal Spheres.

UNIT-V: Three Dimensional Analytical Geometry: Cone and Cylinder

Equation of a Cone - Cone whose vertex is at the origin - Quadric Cone with the vertex at the origin - Right Circular Cone - Cylinder- Right Circular Cylinder- Equation of a Cylinder

Recommended Text

T.K.Manickavachagom Pillay & others. (2004) *Analytical Geometry* (Two & Three Dimensions) S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

Reference Books

1. P.Duraipandian and Laxmi Duraipandian (1965) *Analytical Geometry-2D,* Asia Publishing company, Bombay
2. P.Duraipandian and Laxmi Duriapandian (1975) *Analytical Geometry-3 D*, Emerald Publishers, Chennai.
3. G.B.Thomas and R.L.Finney.(1998) *Calculus and Analytic Geometr*y, Addison Wesley (9th Edn.), Mass. (Indian Print).
4. P.R.Vittal (2003) *Coordinate Geometry.* Margham Publishers, Chennai

ALLIED I

(to choose any 1 out of the given 6)

PAPER II.1

NUMERICAL METHODS II

Objectives

This course covers the techniques of Numerical Differentiation and Numerical Integration. It also deals with solution of difference equations, Algebraic and Transcendental equations and Numerical solution of Ordinary differential equations of first order.

UNIT-I: Numerical Differentiation

Newton's forward and backward differences to compute derivatives-derivative using divided differences formula-maxima and minima using the above formulae.

UNIT-II: Numerical Integration

General Quadrature formula-Trapezoidal rule-Simpson's one third rule- Simpson's three-eight rule, Weddle's rule- Euler-Maclaurin Summation Formula

UNIT-III: Difference Equations

Linear differences equations-Linear homogeneous difference equation with constant co-efficient-Particular integrals fro a^x, x^m, sinax, cosax and a^x f(x).

UNIT-IV: Solution of Algebraic and Transcendental Equations

Bisection method-Iteration method-Regula-falsi method (False Position Method)-Newton-Rapson Method.

UNIT-V: Numerical Solution of Ordinary Differential Equations (First order only)

Euler's method- Euler's modified method-Picard's method - Taylor's methods-Runge-Kutta method (Fourth order only).

Recommended Text

1. B.D. Gupta. (2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. M.K.Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Reference Books

1. Gupta-Malik, Calculus of finite differences and numerical Analysis, Krishba Prakashan Mandir, Meerut Seveenth Edition.
2. S.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand & Co., New Delhi. IX Edition.
3. A.Singaravelu, Numerical methods, Meenakshi Publications-First Edition 1992.
4. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite Difference & Numerical Analysis, S.Chand & Company Ltd., New Delhi-55.

PAPER II.2

PHYSICS II

UNIT-I WAVE MECHANICS

Wave Mechanics - De Broglie Waves - Dual nature - Phase velocity - Group velocity-Relation between phase velocity and group velocity-Experimental study of matter waves - Davisson and Germer's experiment - G.P. Thomson's experiment - Heisenberg's uncertainty Principle - The position and momentum of a particle

UNIT-II NUCLEAR PHYSICS

Particle accelerators - cyclotron, particle detectors - GM Counter-Artificial Transmutation - Rutherford's experiment - The Q value equation for a nuclear reaction - Threshold energy - Nuclear reactions.

Conservation Laws: Conservation of Charge - Conservation of Nucleons - Conservation of Mass - Energy - Conservation of Parity - Quantities conserved and quantities not conserved in a nuclear reaction

Biological effects of radiation - control of radiation hazards.

UNIT-III : ENERGY PHYSICS

Sources of conventional energy - Need for non-conventional energy - resources - solar energy utilization - solar water heater - solar drier - conversion of light into electrical energy - solar cell - merits and demerits of solar energy - wind energy - its conversion systems - energy from Bio mass - Bio gas generation - Industrial and spaceapplication.

UNIT-IV : CRYSTALLOGRAPHY AND FIBRE OPTICS

Crystallography: The crystal structure - Unit cell - Miller indices - Reciprocal lattice vectors-properties of Reciprocal Lattice-Bragg's law-Types of bonding in crystal-crystal packing - examples of simple structures like NaCl, CaCl and Diomand.

Fiber Optics: Principle - classification of optical fibres - modes of propagation-single mode-multi mode - advantages and disadvantages. Fiber optic communication system block diagram.

UNIT-V : ELECTRONICS

Electronics: **Zener diode - Characteristics - Voltage regulation using zener diode - LED - uses of LED.**

Digital electronics: AND, OR NOT, NAND and NOR gates - NAND and NOR as universal building blocks - elementary ideas of Integrated circuits-Fabrication of Integrated circuits by monolithic technology - Advantages and limitations of an integrated circuit - LSI, MSI and VLSI.

Reference Books

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co.(2004)
8. Electronic Principles and applications - A. B. Bhattacharya, New Central Book Agency, Culcutta.
9. Introduction to Solid state Physics - C. Kittel, 5th Edition Wiley Eastern Ltd.
10. Renewable & sustainable energy sources - Agarwal.
11. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

PAPER II.3

CHEMISTRY II

UNIT - I

1.1 **Co-ordination Chemistry:**

Nomenclature of co-ordination compounds - Werner Theory of Co-ordination Compound - Chelation - Functions and structure of Haemoglobin and Chlorophyll.

1.2 **Industrial Chemistry:**

Fertilizers and manures - Bio-fertilizers- Organic Manures and their importance - Role of NPK in plants - preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Contents in Match sticks and match box - Industrial making of safety matches. Preparation and uses of chloroform, DDT, gamhexane and Freon.

UNIT - II

2.1 **Carbohydrates:**

Classification - structure of glucose - Properties and uses of starch - uses of Cellulose Nitrate - Cellulose acetate.

2.2 **Amino Acid and Protein:**

Classification of Amino Acids - preparation and properties of Glycine - Classification of Protein based on Physical properties and biological functions

2.3 Primary and Secondary structures of protein (Elementary Treatment only) composition of RNA and DNA and their biological role. Tanning of leather - alum (aluminum tri chloride tanning - vegetable tanning)

UNIT - III

3.1 **Electro Chemistry:**

Specific and equivalent conductivity - their determination - effect of dilution of conductance.

3.2 Kohlrawsh Law - Determination of dissociation constant of weak Electrolyte using Conductance measurement - Conductometric Titrations

3.3 P^H and determination by indicator method - Buffer solutions - Buffer action - Importance of buffer in the living system - Derivation of Henderson equation.

UNIT - IV

4.1 Paints - Pigments - Components of Paint - Requisites of a good paint. Colour and Dyes - Classification based on constitution and application.

4.2 **Vitamins:**

Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K - **Hormones** - Functions of insulin and adrenaline.

4.3 Chromatography - Principles and application of column, paper and thin layer chromatography

UNIT - V

5.1 **Drugs-** Sulpha Drugs - Uses and Mode of action of Sulpha Drugs -- Antibiotics - Uses of Penicillin, Chloramphenicaol, streptomycin. Drug abuse and their implication alcohol - LSD

5.2 **Anaesthetics** - General and Local Anaesthetics - Antiseptics - Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers, sedatives, causes for diabetes, cancer and AIDS.

5.3 Electrochemical corrosion and its prevention - fuel cells.

PAPER II.4

MATHEMATICAL STATISTICS II

Objective

To apply Statistics for Mathematical problems

UNIT-I

Statistical Population Census and Sampling Survey - Parameter and Statistics - Sampling and Sampling Distribution and Standard Error. Sampling distributions - students 't', chi - square and F distributions.

UNIT-II

Test of significance - Large sample test for proportion, mean and standard deviation - Exact test based on 't', Chi - square and F distribution with respect to population mean, variance and correlation coefficient - Tests of independence of attributes - goodness of fit tests.

UNIT-III

Point estimation - Concept of unbiasedness, consistency, efficiency and sufficiency - Cramer- Rao Inequality - Methods of Estimation - Maximum Likelihood Estimation - Method of Moments - Interval Estimation - Confidence Interval for Population Mean, Proportion and Variance Based on Normal, 't' Chi-square and F Distributions.

UNIT-IV

Test of Hypothesis: Null and Alternate Hypothesis - Type I and Type II error - Power of the test - Neymann Pearson lemma - Likelihood Ratio Test - Concept of Most Powerful test (Statement and Results only) - Simple Problems

UNIT-V

Analysis of Variance - One - way and Two-way Classification - Basic Principles of Design of Experiments - Randomization, Replication, Local Control, Completely Randomized Design, Randomized Block Design and Latin Square Design

Books for Reference

1. Hogg, R.V. & Craig. A. T. (1998): Introduction to Mathematical Statistics, Macmillan
2. Mood.A.M., Graybill. F.A.& Boes. D.G.(1974): Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967): Statistical Methods, Oxford and IBH
4. Hoel.P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. Wilks . S. S.Elementary Statistical Analysis, Oxford and IBH
6. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan & sons
7. O. Kempthone - Design of Experiments
8. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan & sons
9. Das and Giri : Design of Experiments Wiley Eastern

PAPER II.5

FINANCIAL ACCOUNTING II

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : BRANCH ACCOUNTS

Dependent Branches - Stock and Debtors System - Distinction between Wholesale profit and retail profit - independent branch (foreign branches excluded).

UNIT-II : DEPARTMENTAL ACCOUNTS

Basis for allocation of expenses - Inter departmental transfer at cost or selling price - Treatment of expenses which cannot be allocated.

UNIT-III : HIRE PURCHASE SYSTEM

Meaning and Legal Position - Accounting aspects - Default and Repossession - Hire Purchase Trading account. Installment Purchase system Meaning and Legal Position - Distinction between Hire Purchase System and Installment Purchase System - Accounting Treatment.

UNIT-IV : PARTNERSHIP ACCOUNTS

Admission of a Partner - Retirement of a Partner - Death of a Partner - Dissolution of Partnership - Insolvency of a Partner - (Garner vs. Murray) - Insolvency of all Partners - Gradual realization of assets and piecemeal distribution.

UNIT-V: MECHANISED SYSTEM OF ACCOUNTING

Advantages - Limitations - EDP

Reference Books

1. R.L. Gupta & V.K.Gupta., Financial Accounting, sultan chand & Sons, New Delhi.
2. Jain & Naurang - Advanced Accounts, Kalyani Publishers, New Delhi.
3. Shukla & Grewal - Advanced Accounts Vol. 1, S. Chand & Co, New Delhi.
4. R.L. Gupta & Radhaswami - Advanced Accountancy Sultan Chand & Sons, New Delhi.
5. T.S. Grewal - Principles of Accountancy, S. Chand & Co., New Delhi.

PAPER II.6

COST AND MANAGEMENT ACCOUNTING II

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : METHODS OF COSTING

Unit Costing - Job Costing - Process Costing (Excluding equivalent production and interprocess profits) - Operation and Operating Costing.

UNIT-II: RECONCILIATION OF COST & FINANCIAL ACCOUNTS

Reasons for difference in Profits - Procedure for reconciliation.

UNIT-III: ANALYSIS OF FINANCIAL STATEMENTS

Type of Financial Analysis - Techniques - Limitations - Ratio Analysis - Meaning - Classification - Advantages - Limitations.

UNIT-IV : FUNDS FLOW AND CASH FLOW ANALYSIS

Schedule of Changes in working capital - Preparation of funds flow Statement - Preparation of Cash flow Statement - Importance of Cash Flow and Funds flow analysis – Difference between funds flow statement and cash flow statement.

UNIT-V: MANAGEMENT REPORTING

Management Reporting System - Essentials of Good System - Modes of Reporting - Requisites of a Good Report - Steps for Effective Reporting - Kinds of Reports.

Reference Books

1. S.N. Maheshwari, Princiles of Management accounting sultan cand & sons, New Delhi.
2. M. Ravi, Kishore - Cost and management accounting taxamann, New Delhi.
3. V.K. Sexena & Vashist. C.D. - cost and management accounting (Methods, Techniques and applications), sultan chand & sons, New Delhi.
4. J. Batty, Management accountancy, Elbs edition, London.
5. Brown & Howard - managerial accounting & Finance, Elbs edition, London.

ALLIED PRACTICAL

PHYSICS

1. Young's Modulus - Non-uniform bending method using Pin and Microscope.
2. Rigidity modulus - Static Torsion method using Scale and Telescope.
3. Rigidity Modulus - Torsional oscillation method (without symmetric masses).
4. Determination of Co-efficient of viscosity - Graduated Burette.
5. Specific heat capacity of a liquid - by Newton's law of cooling.
6. Sonometer - Determining A.C Frequency. (Screw Gauge is given).
7. Newton's Rings - Radius of curvature.
8. Spectrometer Grating - Normal incidence - Wavelength of mercury lines.
9. Potentiometer - measurement of internal resistance of a cell.
10. Potentiometer - calibration of low range voltmeter.
11. Determination of M and B_H using Deflection magnetometer in Tan C position and vibration magnetometer.
12. Figure of merit and voltage sensitiveness of galvanometer.
13. Construction of AND, OR, NOT gates using diodes and NOT by transistors, NAND as universal gate.
14. Zener diode - Voltage Regulation.

ALLIED CHEMISTRY PRACTICALS

VOLUMETRIC ANALYSIS

1) Estimation of hydrochloric acid using std. sulphuric acid
2) Estimation of Borax using std sodium carbonate
3) Estimation of sodium hydroxide using std sodium carbonate.
4) Estimation of $FeSO_4$ using std. Mohr salt Solution.
5) Estimation of Oxalic acid using std $FeSO_4$
6) Estimation of FAS using Std oxalic acid
7) Estimation of Fe^{2+} using diphenylamine / N phenyl anthranilic acid as indicator.

ORGANIC ANALYSIS:

Reactions of aldehyde (aromatic), carbhohydrate, carboxylic acid (mono and dicarbox ylic), phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterizationsss by confirmatory tests.

ALLIED PRACTICAL

MATHEMATICAL STATISTICS I AND II

1. Measures of location and Dispersion (absolute and relative)
2. Computation of Correlation Coefficient for raw and Grouped data, Rank Correlation Coefficient
3. Computation of Regression Equations for Raw and Grouped Data
4. Curve Fitting by the Method of Least Squares
   a. $y=ax+b$
   b. $y=ax^2+bx+c$
   c. $y=ae^{bx}$
   d. $y=ax^b$
5. Fitting of Binomial, Poisson, Normal distributions and tests of goodness of fit.
6. Large sample tests with regard to population mean, proportion, standard deviation
7. Exact tests with Respect to Mean, Variance and Coefficient of Correlation
8. Test for Independence of Attributes Based on Chi-Square Distribution
9. Confidence Interval based on Normal, t and Chi-square and F Distributions
10. Problems based on ANOVA-one way and two way Classification
11. Completely Randomized Design
12. Randomized Block Design
13. Latin Square Design

Note

Use of scientific calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

P.S.* The syllabus content involves more of Technical aspects of Statistical methods, only statistics faculty alone can be appointed as Examiners.

Books for Reference

1. Hogg, R.V. & Craig.A.T.(1998): Introduction to Mathematical Statistics, Macmillan.
2. Mood.A.M. , Graybill. F.A.& Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967): Statistical Methods, Oxford and IBH
4. Hoel.P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan &sons
6. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan & sons
7. Wilks . S. S. Elementary Statistical Analysis, Oxford and IBH
8. O. Kempthone - Design of Experiments

VALUE EDUCATION
(For all UG Degree Courses)

UNIT-I

Value Education - Definition - relevance to present day - Concept of Human Values - self introspection - Self esteem.

UNIT-II

Family values - Components, structure and responsibilities of family - Neutralization of anger - Adjustability - Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

UNIT-III

Ethical values - Professional ethics - Mass media ethics - Advertising ethics - Influence of ethics on family life - psychology of children and youth - Leadership qualities - Personality development.

UNIT-IV

Social values - Faith, service and secularism - Social sense and commitment - Students and Politics - Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms.

UNIT-V

Effect of international affairs on values of life/ Issue of Globalization - Modern warfare - Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

Reference Books

1. T. Anchukandam and J. Kuttainimathathil (Ed) Grow Free Live Free, Krisitu Jyoti Publications, Bangalore (1995)
2. Mani Jacob (Ed) Resource Book for Value Education, Institute for Value Education, New Delhi 2002.
3. DBNI, NCERT, SCERT, Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
4. Daniel and Selvamony - Value Education Today, (Madras Christian College, Tambaram and ALACHE, New Delhi, 1990)
5. S. Ignacimuthu - Values for Life - Better Yourself Books, Mumbai, 1991.
6. M.M.M.Mascaronhas Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.

WEBSITES AND e-LEARNING SOURCES:

www.rkmissiondhe/.org/education.html/

www.clallam:;org/lifestyle/education.html/

www.sun.com/../edu/progrmws/star.html/

www.infoscouts.com

www.secretofsuccess.com

www.1millionpapers.com

http://militarlyfinance.umuc.edu/education/edu-network.html/

III SEMESTER

PAPER V

DIFFERENTIAL EQUATIONS

Objectives

This course aims to provide logical skills in the formation of differential equations, to expose to different techniques of finding solutions to these equations and in addition stress is laid on the application of these equations in geometrical and physical problems.

UNIT-I: Ordinary Linear Differential Equations

Bernoulli Equation – Exact Differential Equations – Equations Reducible to Exact Equations – Equations of First order and Higher degree: Equations solvable for p, Equation solvable for x and Equations Solvable for y – Clairaut's Equation.

UNIT-II: Ordinary Linear Differential Equations [Contd..]

Method of Variation of Parameters – 2^{nd} order Differential Equations with Constant Coefficients for finding the P.I's of the form e^{ax} V, where V is sin(mx) or cos(mx) and x^n – Equations reducible to Linear equations with constant coefficients – Cauchy's homogeneous Linear Equations – Legendre's Linear Equations – Linear Dependence of Solutions – Simultaneous Equations with Constant Coefficients.

UNIT-III: Differential Equations of Other Types

Equations of form $d^2y/dx^2 = f(x)$ – Equations of the form $d^2y/dx^2=f(y)$ – Equations which do not contain y – Equations which do not contain x – Total Differential Equations Simultaneous Total Differential Equations – Equations of the form $dx/P = dy/Q = dz/R$ – Method of Grouping.

UNIT-IV: Laplace Transform

Transform-Inverse Transform – Properties – Application of Laplace Transform to solution of first and second order Linear Differential equations [with constant coefficients] and simultaneous Linear Differential Equations.

UNIT-V: Partial Differential Equations

Formation of PDF – Complete Inegral – Particular Integral – Singular Integral – Quations Solvable by direct Integration – Linear Equations of the first order – Non-linear Equations of the first Order – Non-linear Equations of the first Order: Types: f[p, q]=O, f[x, p, q]=O, f[y, p, q]=O, f[z, p, q]=O, f[x, q]= f[y, p], Z= p x + q y + f[p, q]

Recommended Texts

1. B.S.Grewal [2002] Higher Engineering Mathematics, Khanna Publishers, New Delhi.
2. Sheply L.Ross, [1984] Differential Equations, III Edition John Wiley & Sons, New York.

Reference Books

1. M.D. Raisinghania, [2001] Ordinary and Partial Differential Equations, S.Chand and Co., New Delhi.
2. M.R.Spiegel [2005] Advanced mathematics for Engineers and Scientists, Tata McGraw Hill Edition, New Delhi.
3. M.R.Spiegel [2005] Laplace Transforms, Tata McGraw Hill Edition, New Delhi.
4. S.Sudha [2003] Differential Equations and Integral Transforms, Emerald Publishers, Chennai.
5. M.K.Venkataraman [1998] Higher Engineering Mathematics, III-B, National Publishing Co., Chennai.
6. P.r.Vittal [2004] Differential Equations and Laplace Transform, Margham Publications, Chennai.
7. P.Kandasamy, K.Thilagarathy [2004] Mathematics for B.Sc. Vol. III S.Chand & Co., Ltd., New Delhi-55.
8. S.Narayanan & T.K.Manickavazagapillai [2004] Calculus S.Viswanathan Printers & Publishers Pvt. Ltd., Chennai.

ALLIED II

(to choose any 1 out of the given 6)

PAPER III.1

NUMERICAL METHODS I

Objectives

This course will cover basic methods for finding the Finite differences, Central differences, Inverse interpolation, Summation of series, Interpolation for equal & unequal intervals, Solutions of simultaneous equations, Important principles, Method and Processes to get numerical results, Reliability of numerical result.

UNIT-I: Finite Differences

First and higher order differences-forward differences and Back ward differences-Properties of operators-Differences of a Polynomial-Factorial Polynominals-Operator E, Relation between ▲,▼and E – Interpolation - Newton - Gregory forward & backward formulae for interpolation.

UNIT-II: Central Differences

Central difference Operators-Central differences formulae: Gauss Forward and Backward formulae-Sterling's formula-Bessel's formula.

UNIT-III: Interpolation for Unequal Intervals

Divided differences-Newton's divided differences formula and Lagrange's-Estimating the Missing terms (With one or more missing values).

UNIT-IV: Inverse Interpolation

Lagrange's method and Reversion of series method (Using Newton's forward formula only). Summation of series: Sum to n term of the series whose general term is the first difference of a function-summation by parts.

UNIT-V: Solutions of Simultaneous Linear Equations

Gauss elimination method-matrix inversion method-Gauss-Jordan Method, Gauss-Seidal method-Crout's method (Three unknowns only).

Recommended Text

1. B.D. Gupta.(2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Reference Books

1. S. Arumugham. (2003) *Numerical Methods*, New Gamma Publishing, Palamkottai.
2. H.C. Saxena. (1991) *Finite differences and Numerical analysis* S.Chand & Co., Delhi
3. A.Singaravelu (2004). *Numerical Methods* Meenakshi Agency, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite difference & Numerical Analysis, S.Chand & Company Ltd., New Delhi-55.

PAPER III.2

PHYSICS I

UNIT-I : PROPERTIES OF MATTER

Elasticity: Hooke's law - Elastic constants - bending of beam - Bending moment - cantilever Depression at the loaded end of a cantilever - determination of Young's modulus by non-uniform bending.

Torsion: Torsion couple - Potential energy in a twisted wire - Torsional pendulum - Time period - Rigidity Modulus - Determination of rigidity modulus by Torsional oscillation (without masses).

Viscosity: viscosity of a liquid - Viscous force - Co-efficient of viscosity of a liquid - comparison of viscosities of two liquids by graduated burette method

Surface Tension: Surface Tension - interfacial surface tension - determination of surface tension and interfacial tension by the method of drops.

UNIT-II: HEAT

Heat: Specific heat - Callender's Barne's method to determine the specific heat of a liquid-Newton's law of cooling - determination of specific heat of a liquid using Newton's law of cooling - Emissivity and Emissive power.

Low Temperature: J.K. Effect - Positive effect - Negative effect - Temperature of inversion - liquefaction of air Linde's method - Helium I and II - production of low temperature- adiabatic demagnatisation

UNIT-III : ELECTRICITY AND MAGNETISM

Electricity: Potentiometer - Principle - Calibration of low range voltmeter - Measurement of internal resistance of cell - measurement of an unknown resistance

Magnetism - Moment and pole strength of a magnet - Deflection magnetometer - Tan C position - Vibration magnetometer - Theory - period of oscillation - Determination of M and B_H using the deflection magnetometer in Tan C position and the vibration magnetometer.

UNIT-IV: SOUND AND ACOUSTICS OF BUILDING

Sound: Transverse vibration of strings - Vibration of strings - Velocity and frequency of vibrations of a stretched string - laws of vibrations along a stretched string - sonometer - A.C. Frequency - Steel wire - Brass wire

Ultrasonics - Production by Piezo - electric method - properties and uses.

Acoustics of buildings: Reverberation - Reverberation time - Sabine's formula (definition only) - Sound absorption co-efficient of surface - conditions for the perfect acoustics.

UNIT-V :GEOMETRICAL OPTICS AND PHYSICAL OPTICS

Defects of Images (Lens): Spherical aberration - minimizing spherical aberration by using two thin lenses in contact - chromatic aberration- Achromatic combination of two thin lenses in contact

Physical Optics: Interference - Air Wedge - description - Determination of diameter of a thin wire by air wedge

Diffraction: Theory of transmission grating - Normal Incidence - Determination of Wavelength of monochromatic source and Wavelength of mercury lines using a grating by normal Incidence.

Polarisation: Optical activity - specific rotatory power - Polarimeter - Determination of specific rotatory power of a solution using the polarimeter

Reference Books

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co.(2004)
8. Electronic Principles and applications - A. B. Bhattacharya, New Central Book Agency, Culcutta.
9. Introduction to Solid state Physics - C. Kittel, 5th Edition Wiley Eastern Ltd.
10. Renewable & sustainable energy sources - Agarwal.
11. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

PAPER III.3

CHEMISTRY I

UNIT - I

1.1 Extraction of Metals Minerals and Ore difference - Minerals of Iron, Aluminum and Copper - Ore Dressing or concentration of Ore - Types of Ore Dressing Froth Floatation and Magnetic separation.

1.2 Refining of Metals - Types of Refining - Electrolytic, Van Arkel and Zone Refining.

1.3 Extraction of Uranium and Thorium.

UNIT - II

2.1 Cyclo-alkanes preparation properties of Cyclo-hexane -- Bayers strain theory.

2.2 Polarization - Inductive effect, mesomeric effect and steric effect - (Acid and Base strength.)

2.3 Stereo isomerism - Types, Causes of optical activity of (lactic acid) and tartaric acid - Racemisation - Resolution - Geometrical isomerism - maleic and fumaric acid.

UNIT - III

3.1 Chemical Kinetics - Distinction between Order and Molecularity - derivation of First order rate equation - half life period of first order reaction - determination of rate constant of hydrolysis of ester

Catalysis - catalyst - auto catalyst - enzyme catalyst - promoters - catalytic poisoning - Active center - Distinction between homogeneous and heterogeneous catalysts - Industrial application of catalysts.

3.3 Photochemistry - Grothus Drapers law, stark einsteines law - quantum yield - photosynthesis, phosphorescence - fluorescence - chemiluminescence's - photosensitization.

UNIT - IV

4.1 VSEPR Theory - Shapes of Simple Molecules BF_3, PCl_5, SF_6 and XeF_6

4.2 Fuels - Calorific value of fuels - Non-conventional fuels - need of Solar energy - Applications - Bio-fuels.

4.3 Osmosis - Osmotic pressure - reverse osmosis - desalination of sea water.

UNIT - V

5.1 Nuclear Chemistry - Definition of Half life period - Group displacement law - Radioactive series. Nuclear Fission and Fusion - Application of nuclear chemistry in Medicine, agriculture, industries - C^{14} dating.

5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking. Naphthalene - Preparations, Properties and uses of Naphthalene - Structure of Naphthalene.

5.3 Elements of symmetry - unit cell - crystal lattice - types of cubic lattice - one example for each.

PAPER III.4

MATHEMATICAL STATISTICS I

Objective

To apply Statistics Methods for Mathematical Problems

UNIT-I

Concept of Sample Space - Events - Definition of Probability (Classical, Statistical and Axiomatic) - Addition and Multiplication laws of Probability - Independence of Events - Conditional Probability - Baye's Theorem - Simple Problems.

UNIT -II

Random Variables (Discrete and Continuous) - Distribution Function - Expectation and Moments - Moment Generating Function - Probability Generating Function - Cumulant Generating Function - Simple Problems.

UNIT-III

Characteristic Function - Properties - Uniqueness and Inversion Theorem (Statement only) Chebychev's Inequality - Simple Problems

UNIT-IV

Concept of Bivariate Distribution - Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation - Linear Regression - Concept of Partial and Multiple Correlation (Three Variables only).

UNIT-V

Standard distributions: Discrete distributions - Binomial, Poisson, Hyper Geometric and Negative Binomial Distributions - Continuous Distributions Normal, Uniform, Exponential, Gamma and Beta Distributions - Interrelationship among these Distributions

Books for Reference

1. Hogg, R.V. & Craig.A.T.(1998) : Introduction to Mathematical Statistics, Macmillan
2. Mood. A.M. Graybill. F.A.& Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967) : Statistical Methods, Oxford and IBH
4. Hoel, P.G(1971) : Introduction to Mathematical Statistics, Wiley.
5. S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical Statistics, Sultan & sons
6. Wilks S.S. Elementary Statistical Analysis, Oxford and IBH

PAPER III.5

FINANCIAL ACCOUNTING I

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : INTRODUCTION

Basic Accounting Concepts and Conventions - Groups interested in accounting - Accounting Equation - Journal - Ledger - Subsidiary Books - Trial Balance - Errors - Types - Rectification of Errors - Bank Reconciliation Statement.

UNIT-II: FINAL ACCOUNTS

Meaning - Preparation of Final Accounts - Trading Account - Profit and Loss Account - Manufacturing Account - Balance Sheet - Distinction between Trial Balance and Balance Sheet - Adjustment Entries.

UNIT-III : DEPRECIATION ACCOUNTING

Meaning of Depreciation - Methods of providing Depreciation - Fixed Percentage on Original Cost - Fixed Percentage on Diminishing balance (including change in the method of depreciation).

UNIT-IV : AVERAGE DUE DATE

Meaning, practical uses of average due data - basic problems in Average Due Data.

UNIT-V: SINGLE ENTRY SYSTEM

Definition - Salient features - Limitations - Differences between single entry system and double entry system - Methods.

Reference Books

1. R.L. Gupta & V.K.Gupta., Financial Accounting, sultan chand & Sons, New Delhi.
2. Jain & Naurang - Advanced Accounts, Kalyani Publishers, New Delhi.
3. Shukla & Grewal - Advanced Accounts Vol. 1, S. Chand & Co, New Delhi.
4. R.L. Gupta & Radhaswami - Advanced Accountancy Sultan Chand & Sons, New Delhi.
5. T.S. Grewal - Principles of Accountancy, S. Chand & Co., New Delhi.

PAPER III.6

COST AND MANAGEMENT ACCOUNTING

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : INTRODUCTION

Cost Accounting - definition - Meaning and Objectives - Advantage and Importance - Distinction between cost accounting and Financial accounting.

UNIT-II: ELEMENTS OF COST

Material - Purchase Order - Goods Received Note - Bin Card - Stores Ledger - Purchase, Receipt and inspection - Inventory Control - ABC Analysis - EOQ - Ordering levels - Methods of Pricing Material Issues. Labour: - Methods of incentive (bonus) Schemes - Treatment of Overtime and Idle time - Labour Turnover. Overheads: - Classification - allocation and apportionment - redistribution of overheads including Machine Hour Rate.

UNIT-III: COST SHEETS

Preparation of Cost Sheets - Preparation of Tenders and Quotations.

UNIT-IV : MANAGEMENT ACCOUNTING

Introduction : Management Accounting - Definition - meaning and objectives - advantages and importance - distribution between Management Accounting and Cost Accounting - Tools and techniques of Management Accounting.

UNIT-V: BUDGETING AND BUDGETARY CONTROL

Types of Budgets - Sales budget - Production Budget - Materials budget - Labour Budget - Overhead budget - Cash Budget including flexible budget.

Reference Books

1. S.N. Maheshwari, Princiles of Management accounting sultan cand & sons, New Delhi.
2. M. Ravi, Kishore – Cost and management accounting taxamann, New Delhi.
3. V.K. Sexena & Vashist. C.D. - cost and management accounting (Methods, Techniques and applications), sultan chand & sons, New Delhi.
4. J. Batty, Management accountancy, Elbs edition, London.
5. Brown & Howard - managerial accounting & Finance, Elbs edition, London.

SKILL BASED SUBJECT I

PAPER I

FUNDAMENTALS OF APPLIED MATHEMATICS

Objectives

This course aims to develop mathematical maturity and ability to deal with abstraction and to develop construction and verification of formal logical manipulation.

UNIT-I: Recurrence Relations and Generating Functions

Recurrence - Polynomials and their Evaluations - Recurrence Relations - Solution of Finite Order Homogeneous [linear] Relations - Solutions of Non-homogeneous Relations.

UNIT-II: Mathematical Logic

TF Statements - Connectives - Atomic and Compound Statements - Well-formed [Statement Formulae] - Parsing - Truth Table of a Formula - Tautology - Tautological Implications and Equivalence of Formulae.

UNIT-III: Mathematical Logic [Contd..]

Replacement process - Functionally complete sets of connectives and Duality law - Normal Forms - Principal Normal Forms.

UNIT-IV: Lattices

Lattices [omit example 15 Pp No.10.6) - Some properties of Lattices - New Lattices (omit remark Pp 10.14) - Modular and Distributive Lattices (omit theorem 10 and 17, Example 4 - Pp 10.23, Example 11 - Pp 10.24)

UNIT-V: Boolean Algebra

Boolean Algebra (omit theorem 25) – Boolean Polynomials – Karnaugh Maps (omit K–map for 5 and 6 variables)

Recommended Text

M.K.Venkataraman, N.Sridharan and N.Chandrasekaran, [2003] Discrete Mathematics, The National Publishing Company, Chennai.

Reference Books

1. R.Johnsonbaugh [2001] Discrete Mathematics [5th Edn.] Pearson Education, Asia.,
2. C.L.Liu, [1985] elements of Discrete Mathematics, McGraw Hill, New York,
3. J.Truss. [2000] Discrete Mathematics for Computer Scientists [2nd Edn.] Pearson Education, Asia.
4. M.K.Sen and B.C.Chakraborthy [2002] Discrete Mathematics [2nd Edition,] Books and allied private Ltd., Kolkata.

NON-MAJOR ELECTIVE I

PAPER I

BASIC MATHEMATICS

Objectives

To introduce a few basic and elementary concepts of mathematics for other major students.

UNIT-I: Sets

Definition - Subsets - Power sets - Equality of sets - Finite and Infinite sets - Set operations - De-Morgan's laws - Distributive tables - Cartesian products.

UNIT-II: Functions

Basic definitions - One to one and onto, bijective, inverse functions - composition of functions - properties of functions.

UNIT-III: Symbolic logics

Logical statements - connectives - truth tables - tautologies - induction - binary operations - groups - semigroups (problems and simple properties only).

UNIT-IV: Determinants

Definition - properties (without proof) - application of determinants - cramer's rule for the solution of a system of equations

UNIT-V: Matrices

Definition - types of matrices - operations on matrices - adjoint and inverse - applications - solving non-homogeneous equations.

Recommended Texts

1. Dr.M.K.Venkataraman & others, "Discrete mathematics and structures", The National Publishing Company, Madras.
2. Trembly J.P and Manohar.R "Discrete Mathematical Structures with applications to computer science" Tata McGraw - Hill Pub., Co., Ltd. New Delhi 2003.

Reference Books

1. P.R.Vittal "Algebra, Analytical Geometry and trigonometry" Margham Publications, Chennai.
2. Richard Johnsonbaugh, "Discrete Mathematics" fifth Edn., Pearson Education Asia, New Delhi 2002.

IV SEMESTER

PAPER VI

VECTOR ANALYSIS AND FOURIER ANALYSIS

Objectives

This course covers the topics in vector and tensor calculus which are essential tools of modern applied mathematics. To develop deep understanding of key concepts followed by problems of applied nature. The portion on Fourier Analysis will lead to post-graduate studies and research in pure as well as applied mathematics.

UNIT-I: Differential Vector Calculus

Differentiation of a Vector - Geometrical Interpretation of the Derivative - Differentiation Formulae - Differentiation of dot and Cross Products - Partial Derivatives of Vectors - Differentials of Vectors.

UNIT-II: Gradient, Divergence and Curl

Vector Differential Operator Del - Gradient of a Scalar Function - Directional Derivative - Geometric Interpretation - Gradient of the sum of Functions; of the product of functions and of a function of function - Operations involving Del - Divergence of a Vector and its Physical Interpretation - Curl of a Vector and its Physical Interpretation - Expansion Formulae for Operators involving Del - Solenoidal and Irrotational.

UNIT-III: Vector Integration

The Line Integral - Surface Integral and its Physical Meaning - Surface Integral and the Concept of Divergence of a Vector - Equivalence of two Definitions of Divergence - Statements of Gauss Divergence Theorem and Green's Theorem (only) and Problems - Line Integral - The Concept of the Curl of a Vector - Statement of Stoke's Theorem (only) and Problems.

UNIT-IV: Fourier Series

Euler's Formulae - Conditions for Fourier Expansion - Functions having Discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even periodic Functions - Half-range Series-Typical Wave Forms - Parseval's Formula.

UNIT-V: Fourier Transform

Definition - Fourier Integrals - Fourier Since and Cosine Integral - Complex Form of Fourier Integral - Fourier Transform: Fourier Since and Cosine Transforms - Finite Fourier Sine and Cosine Transforms (with out proof) - Properties of Fourier Transforms - Convolution Theorem for Fourier Transforms - Parseval's Identity for Fourier Transforms - (with out derivation)

Recommended Text

B.S.Grewal. *Higher Engineering Mathematics* (2002), Khanna Publishers, New Delhi.

Reference Books

1. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th Edn), Mass. (Indian Print).
2. M.K.Venkataraman. (1992) *Engineering Mathematics-Part B*. National Publishing Company, Chennai.
3. P.R.Vittal. (2004) *Vector Calculus, Fourier Series and Fourier Transform*. Margham Publications, Chennai.

ALLIED II

(to choose any 1 out of the given 6)

PAPER IV.1

NUMERICAL METHODS II

Objectives

This course covers the techniques of Numerical Differentiation and Numerical Integration. It also deals with solution of difference equations, Algebraic and Transcendental equations and Numerical solution of Ordinary differential equations of first order.

UNIT-I: Numerical Differentiation

Newton's forward and backward differences to compute derivatives-derivative using divided differences formula-maxima and minima using the above formulae.

UNIT-II: Numerical Integration

General Quadrature formula-Trapezoidal rule-Simpson's one third rule- Simpson's three-eight rule, Weddle's rule- Euler-Maclaurin Summation Formula

UNIT-III: Difference Equations

Linear differences equations-Linear homogeneous difference equation with constant co-efficient-Particular integrals fro a^x, x^m, sinax, cosax and a^x f(x).

UNIT-IV: Solution of Algebraic and Transcendental Equations

Bisection method-Iteration method-Regula-falsi method (False Position Method)-Newton-Rapson Method.

UNIT-V: Numerical Solution of Ordinary Differential Equations (First order only)

Euler's method- Euler's modified method-Picard's method - Taylor's methods-Runge-Kutta method (Fourth order only).

Recommended Text

1. B.D. Gupta. (2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. M.K.Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Reference Books

1. Gupta-Malik, Calculus of finite differences and numerical Analysis, Krishba Prakashan Mandir, Meerut Seveenth Edition.
2. S.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand & Co., New Delhi. IX Edition.
3. A.Singaravelu, Numerical methods, Meenakshi Publications-First Edition 1992.
4. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite Difference & Numerical Analysis, S.Chand & Company Ltd., New Delhi-55.

PAPER IV.2

PHYSICS II

UNIT-I WAVE MECHANICS

Wave Mechanics - De Broglie Waves - Dual nature - Phase velocity - Group velocity-Relation between phase velocity and group velocity-Experimental study of matter waves - Davisson and Germer's experiment - G.P. Thomson's experiment - Heisenberg's uncertainty Principle - The position and momentum of a particle

UNIT-II NUCLEAR PHYSICS

Particle accelerators - cyclotron, particle detectors - GM Counter-Artificial Transmutation - Rutherford's experiment - The Q value equation for a nuclear reaction - Threshold energy - Nuclear reactions.

Conservation Laws: Conservation of Charge - Conservation of Nucleons - Conservation of Mass - Energy - Conservation of Parity - Quantities conserved and quantities not conserved in a nuclear reaction

Biological effects of radiation - control of radiation hazards.

UNIT-III : ENERGY PHYSICS

Sources of conventional energy - Need for non-conventional energy - resources - solar energy utilization - solar water heater - solar drier - conversion of light into electrical energy - solar cell - merits and demerits of solar energy - wind energy - its conversion systems - energy from Bio mass - Bio gas generation - Industrial and spaceapplication.

UNIT-IV : CRYSTALLOGRAPHY AND FIBRE OPTICS

Crystallography: The crystal structure - Unit cell - Miller indices - Reciprocal lattice vectors-properties of Reciprocal Lattice-Bragg's law-Types of bonding in crystal-crystal packing - examples of simple structures like NaCl, CaCl and Diomand.

Fiber Optics: Principle - classification of optical fibres - modes of propagation-single mode-multi mode - advantages and disadvantages. Fiber optic communication system block diagram.

UNIT-V : ELECTRONICS

Electronics: **Zener diode - Characteristics - Voltage regulation using zener diode - LED - uses of LED.**

Digital electronics: AND, OR NOT, NAND and NOR gates - NAND and NOR as universal building blocks - elementary ideas of Integrated circuits-Fabrication of Integrated circuits by monolithic technology - Advantages and limitations of an integrated circuit - LSI, MSI and VLSI.

Reference Books

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005)
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co.(2004)
8. Electronic Principles and applications - A. B. Bhattacharya, New Central Book Agency, Culcutta.
9. Introduction to Solid state Physics - C. Kittel, 5th Edition Wiley Eastern Ltd.
10. Renewable & sustainable energy sources - Agarwal.
11. Introduction to Fiber optics by K. Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999)

PAPER IV.3

CHEMISTRY II

UNIT - I

1.1 **Co-ordination Chemistry:**

Nomenclature of co-ordination compounds - Werner Theory of Co-ordination Compound - Chelation - Functions and structure of Haemoglobin and Chlorophyll.

1.2 **Industrial Chemistry:**

Fertilizers and manures - Bio-fertilizers- Organic Manures and their importance - Role of NPK in plants - preparation and uses of Urea, Ammonium nitrate, potassium nitrate and super phosphate of lime.

1.3 Contents in Match sticks and match box - Industrial making of safety matches. Preparation and uses of chloroform, DDT, gamhexane and Freon.

UNIT - II

2.1 **Carbohydrates:**

Classification - structure of glucose - Properties and uses of starch - uses of Cellulose Nitrate - Cellulose acetate.

2.2 **Amino Acid and Protein:**

Classification of Amino Acids - preparation and properties of Glycine - Classification of Protein based on Physical properties and biological functions

2.3 Primary and Secondary structures of protein (Elementary Treatment only) composition of RNA and DNA and their biological role. Tanning of leather - alum (aluminum tri chloride tanning - vegetable tanning)

UNIT - III

3.1 **Electro Chemistry:**

Specific and equivalent conductivity - their determination - effect of dilution of conductance.

3.2 Kohlrawsh Law - Determination of dissociation constant of weak Electrolyte using Conductance measurement - Conductometric Titrations

3.3 P^H and determination by indicator method - Buffer solutions - Buffer action - Importance of buffer in the living system - Derivation of Henderson equation.

UNIT - IV

4.1 Paints - Pigments - Components of Paint - Requisites of a good paint. Colour and Dyes - Classification based on constitution and application.

4.2 **Vitamins:**

Biological activities and deficiency diseases of Vitamin A, B, C, D, E and K - **Hormones** - Functions of insulin and adrenaline.

4.3 Chromatography - Principles and application of column, paper and thin layer chromatography

UNIT - V

5.1 **Drugs-** Sulpha Drugs - Uses and Mode of action of Sulpha Drugs -- Antibiotics - Uses of Penicillin, Chloramphenicaol, streptomycin. Drug abuse and their implication alcohol - LSD

5.2 **Anaesthetics** - General and Local Anaesthetics - Antiseptics - Example and their application. Definition and one example each for analgesics antipyretics, tranquilizers, sedatives, causes for diabetes, cancer and AIDS.

5.3 Electrochemical corrosion and its prevention - fuel cells.

PAPER IV.4

MATHEMATICAL STATISTICS II

Objective

To apply Statistics for Mathematical problems

UNIT-I

Statistical Population Census and Sampling Survey - Parameter and Statistics - Sampling and Sampling Distribution and Standard Error. Sampling distributions - students 't', chi - square and F distributions.

UNIT-II

Test of significance - Large sample test for proportion, mean and standard deviation - Exact test based on 't', Chi - square and F distribution with respect to population mean, variance and correlation coefficient - Tests of independence of attributes - goodness of fit tests.

UNIT-III

Point estimation - Concept of unbiasedness, consistency, efficiency and sufficiency - Cramer- Rao Inequality - Methods of Estimation - Maximum Likelihood Estimation - Method of Moments - Interval Estimation - Confidence Interval for Population Mean, Proportion and Variance Based on Normal, 't' Chi-square and F Distributions.

UNIT-IV

Test of Hypothesis: Null and Alternate Hypothesis - Type I and Type II error - Power of the test - Neymann Pearson lemma - Likelihood Ratio Test - Concept of Most Powerful test (Statement and Results only) - Simple Problems

UNIT-V

Analysis of Variance - One - way and Two-way Classification - Basic Principles of Design of Experiments - Randomization, Replication, Local Control, Completely Randomized Design, Randomized Block Design and Latin Square Design

Books for Reference

1. Hogg, R.V. & Craig. A. T. (1998): Introduction to Mathematical Statistics, Macmillan

2. Mood.A.M., Graybill. F.A.& Boes. D.G.(1974): Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967): Statistical Methods, Oxford and IBH
4. Hoel.P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. Wilks . S. S.Elementary Statistical Analysis, Oxford and IBH
6. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan & sons
7. O. Kempthone - Design of Experiments
8. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan & sons
9. Das and Giri : Design of Experiments Wiley Eastern

PAPER IV.5

FINANCIAL ACCOUNTING II

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : BRANCH ACCOUNTS

Dependent Branches - Stock and Debtors System - Distinction between Wholesale profit and retail profit - independent branch (foreign branches excluded).

UNIT-II : DEPARTMENTAL ACCOUNTS

Basis for allocation of expenses - Inter departmental transfer at cost or selling price - Treatment of expenses which cannot be allocated.

UNIT-III : HIRE PURCHASE SYSTEM

Meaning and Legal Position - Accounting aspects - Default and Repossession - Hire Purchase Trading account. Installment Purchase system Meaning and Legal Position - Distinction between Hire Purchase System and Installment Purchase System - Accounting Treatment.

UNIT-IV : PARTNERSHIP ACCOUNTS

Admission of a Partner - Retirement of a Partner - Death of a Partner - Dissolution of Partnership - Insolvency of a Partner - (Garner vs. Murray) - Insolvency of all Partners - Gradual realization of assets and piecemeal distribution.

UNIT-V: MECHANISED SYSTEM OF ACCOUNTING

Advantages - Limitations - EDP

Reference Books

1. R.L. Gupta & V.K.Gupta., Financial Accounting, sultan chand & Sons, New Delhi.
2. Jain & Naurang - Advanced Accounts, Kalyani Publishers, New Delhi.
3. Shukla & Grewal - Advanced Accounts Vol. 1, S. Chand & Co, New Delhi.
4. R.L. Gupta & Radhaswami - Advanced Accountancy Sultan Chand & Sons, New Delhi.
5. T.S. Grewal - Principles of Accountancy, S. Chand & Co., New Delhi.

PAPER IV.6

COST AND MANAGEMENT ACCOUNTING II

Objectives

To provide wide options for students to enter in to the fields like C.A., I.C.W.A., M.B.F., M.I.B.& M.B.A., successfully.

UNIT-I : METHODS OF COSTING

Unit Costing - Job Costing - Process Costing (Excluding equivalent production and interprocess profits) - Operation and Operating Costing.

UNIT-II: RECONCILIATION OF COST & FINANCIAL ACCOUNTS

Reasons for difference in Profits - Procedure for reconciliation.

UNIT-III: ANALYSIS OF FINANCIAL STATEMENTS

Type of Financial Analysis - Techniques - Limitations - Ratio Analysis - Meaning - Classification - Advantages - Limitations.

UNIT-IV : FUNDS FLOW AND CASH FLOW ANALYSIS

Schedule of Changes in working capital - Preparation of funds flow Statement - Preparation of Cash flow Statement - Importance of Cash Flow and Funds flow analysis – Difference between funds flow statement and cash flow statement.

UNIT-V: MANAGEMENT REPORTING

Management Reporting System - Essentials of Good System - Modes of Reporting - Requisites of a Good Report - Steps for Effective Reporting - Kinds of Reports.

Reference Books

1. S.N. Maheshwari, Princiles of Management accounting sultan cand & sons, New Delhi.
2. M. Ravi, Kishore - Cost and management accounting taxamann, New Delhi.
3. V.K. Sexena & Vashist. C.D. - cost and management accounting (Methods, Techniques and applications), sultan chand & sons, New Delhi.
4. J. Batty, Management accountancy, Elbs edition, London.
5. Brown & Howard – managerial accounting & Finance, Elbs edition, London.

ALLIED PRACTICAL

PHYSICS

1. Young's Modulus - Non-uniform bending method using Pin and Microscope.
2. Rigidity modulus - Static Torsion method using Scale and Telescope.
3. Rigidity Modulus - Torsional oscillation method (without symmetric masses).
4. Determination of Co-efficient of viscosity - Graduated Burette.
5. Specific heat capacity of a liquid - by Newton's law of cooling.
6. Sonometer - Determining A.C Frequency. (Screw Gauge is given).
7. Newton's Rings - Radius of curvature.
8. Spectrometer Grating - Normal incidence - Wavelength of mercury lines.
9. Potentiometer - measurement of internal resistance of a cell.
10. Potentiometer - calibration of low range voltmeter.
11. Determination of M and B_H using Deflection magnetometer in Tan C position and vibration magnetometer.
12. Figure of merit and voltage sensitiveness of galvanometer.
13. Construction of AND, OR, NOT gates using diodes and NOT by transistors, NAND as universal gate.
14. Zener diode - Voltage Regulation.

ALLIED CHEMISTRY PRACTICALS

VOLUMETRIC ANALYSIS

1. Estimation of hydrochloric acid using std. Sulphuric acid
2. Estimation of Borax using std sodium carbonate
3. Estimation of $FeSO_4$ using std. Mohr salt Solution.
4. Estimation of Oxalic acid using std $FeSO_4$
5. Estimation of $K_2 Cr_2 O_7$ using std $K_2Cr_2O_7$
6. Estimation of copper using std copper Sulphate
7. Estimation of Fe^{2+} using diphenylamine / N phenyl anthranilic acid as indicator.

Students must write the short procedure for the given Estimation in the Examination and submit the paper for evaluation.

ORGANIC ANALYSIS

Reactions of aldehyde (arometic), carbhohydrate, carboxylic acid (mono and dicarbox ylic), phenol, aromatic primary amine, amide and diamide. Systematic analysis of organic compounds containing one functional group and characterisation by confirmatory tests.

ALLIED PRACTICAL

MATHEMATICAL STATISTICS I AND II

1. Measures of location and Dispersion (absolute and relative)
2. Computation of Correlation Coefficient for raw and Grouped data, Rank Correlation Coefficient
3. Computation of Regression Equations for Raw and Grouped Data
4. Curve Fitting by the Method of Least Squares
   a. $y=ax+b$
   b. $y=ax^2+bx+c$
   c. $y=ae^{bx}$
   d. $y=ax^b$
5. Fitting of Binomial, Poisson, Normal distributions and tests of goodness of fit.
6. Large sample tests with regard to population mean, proportion, standard deviation
7. Exact tests with Respect to Mean, Variance and Coefficient of Correlation
8. Test for Independence of Attributes Based on Chi-Square Distribution
9. Confidence Interval based on Normal, t and Chi-square and F Distributions
10. Problems based on ANOVA-one way and two way Classification
11. Completely Randomized Design
12. Randomized Block Design
13. Latin Square Design

Note

Use of scientific calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

P.S.* The syllabus content involves more of Technical aspects of Statistical methods, only statistics faculty alone can be appointed as Examiners.

Books for Reference

1. Hogg, R.V. & Craig.A.T.(1998): Introduction to Mathematical Statistics, Macmillan.
2. Mood.A.M. , Graybill. F.A.& Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967): Statistical Methods, Oxford and IBH
4. Hoel.P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan &sons
6. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan & sons
7. Wilks . S. S. Elementary Statistical Analysis, Oxford and IBH
8. O. Kempthone - Design of Experiments

SKILL BASED SUBJECT II

PAPER II

LINEAR PROGRAMMING

Objectives

To improve the skills of solving very common problems which we come across in various fields like transportation, games and industries with machines.

UNIT-I:

Linear programming problem - Mathematical formulation of the problem - Graphical solution method - simple method - Simplex Algorithm - Duality - primal and dual relation (simple Problems).

UNIT-II:

Transportation problem - Mathematical formulation - The transportation table - The Transportation Algorithm - Degeneracy in transportation problem.

UNIT-III:

The Assignment problem - The assignment algorithm - Routing problems.

UNIT-IV:

Game theory - two persons zero sum game - the maximin minimax principle - saddle points - games without saddle points.

UNIT-V:

Simulation - application - advantages and disadvantages - Monte Carlo method - simple problems.

Recommended Text

Gupta P.K.and Hira D.S., (2000) Problems in Operations Research, S.Chand & Co. Delhi

Reference Books

1. Kanti Swaroop, Gupta P.K. and Manmohan, (2002) *Problems in Operation Research*, Sultan Chand & Sons.
2. Taha H.A. (2003) *Operations Research,* Macmillan Publishing Company, New York.
3. V.K.Kapoor [1989] *Operations Research*, Sultan Chand & sons.
4. P.R.Vittal (2003) *Operations Research*, Margham Publications, Chennai.
5. J.K.Sharma, (2001) *Operations Research: Theory And Applications* Macmillan, Delhi
6. S.J.Venkatesan, *Operations Research*, J.S. Publishes, Cheyyar-604 407.

NON-MAJOR ELECTIVE II

PAPER II

FOUNDATION MATHEMATICS FOR COMPETETIVE EXAMINATIONS

Objectives

To introduce concepts of mathematics with emphasis on analytical ability and computational skill needed in competitive examinations.

UNIT-I: Problems on General Arithmetic

L.C.M & G.C.D of numbers - their relations, Ratio and proportions - Inverse ratio - properties (Addendo, subtrahendo, componendo & dividendo) - ratio of four numbers - increasing and decreasing order of fractions - percentages - gain and loss percents - partnership problems.

UNIT-II: Time, Distance and Work

Problems on speed, time, distance and work - application to train, boat, tank filling and direction problems and on completion of work.

UNIT-III: Sequences and series

General sequences and series - A.P & G.P - n^{th} term - summations of series - determination of series in A.P & G.P.

UNIT-IV: Commercial Arithmetic

Simple & compound interest - effective rate of interest - annuity - present value - future value - problems on R.D and installments

UNIT-V: Linear Equations, Permutations and Combinations

Formation and solution of linear equations with one variable - simultaneous equations with two and three variables - application to division of a number, problems on ages. Definitions of nPr, nCr - relationship between them - formulae - permutations with restrictions - circular permutations.

Reference Books

1. Quantitative Apptitude - R.S. Aggarwal (S.Chand & Co. - New Delhi 2008)
2. Quantitative Apptitude for Competitive Examinations - Abhigit Guha (Tata McGraw - Hill Pub., Co., Ltd. New Delhi - III Edn.)
3. Course in Mental Abilities and Quantitative Apptitude for Competitive Examinations - Edgar Thorpe (Tata McGraw - Hill Pub., Co., Ltd. New Delhi - II Edn.)

V SEMESTER

PAPER VII

ABSTRACT ALGEBRA

Objectives

This course aims to impart emphasis on concepts and technology of the groups and rings as these algebraic structures have applications in Mathematical Physics, Mathematical Chemistry and Computer Science.

UNIT-I: Groups

Definition of a Group - Examples - Subgroups;

UNIT-II: Groups (Contd)

Counting Principle - Normal Subgroups - Homomorphisms.

UNIT-III: Groups (Contd)

Automorphisms - Cayley's Theorem - Permutation Groups.

UNIT-IV: Rings

Definition and Examples - Integral Domain - Homomorphism of Rings - Ideals and Quotient Rings.

UNIT-V: Rings (Contd)

Prime Ideal and Maximal Ideal - The field of quotients of an Integral domain - Euclidean rings.

Recommended Text

I.N.Herstein. (1989) Topics in Algebra, (2nd Edn.) Wiley Eastern Ltd. New Delhi

Chapter-2: Sections 2.1-2.10 (Omit Applications 1 and 2 of 2.7)

Chapter-3: Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7

Reference Books

1. S.Arumugam. (2004) *Modern Algebra.* Scitech Publications, Chennai.
2. J.B.Fraleigh (1987). *A First Course in Algebra* (3rd Edition) Addison Wesley, Mass. (Indian Print)
3. Lloyd R.Jaisingh and Frank Ayres,Jr. (2005) *Abstract Algebra,* (2nd Edition), Tata McGraw Hill Edition, New Delhi.
4. M.L.Santiago (2002) *Modern Algebra,* Tata McGraw Hill, New Delhi.
5. Surjeet Singh and Qazi Zameeruddin. (1982) *Modern Algebra*. Vikas Publishing House Pvt. Ltd. New Delhi.

PAPER VIII

REAL ANALYSIS I

Objectives

To understand various limiting behaviour of sequences and series

To explore the various limiting processes viz. continuity, uniform continuity, differentiability and integrability and to enhance the mathematical maturity and to work comfortably with concepts.

UNIT-I: Functions & Sequences

Functions – real valued functions – equivalence – countability and real numbers – least upper bound – definition of sequence and subsequence – limit of a sequence – convergent sequence

Ch. 1.4 to 1.7, 2.1 to 2.3 of Goldberg.

UNIT-I: Sequences [Contd..]

Divergent sequences – Bounded sequences – Monotone sequence – Operations on convergent sequences – Operations on divergent sequences – Limit superior and Limit inferior – Cauchy sequences

Ch. 2.4 to 2.10 of Goldberg.

UNIT-III: Series of Real Numbers

Convergence and Divergence – Series with non negative terms – Alternating series – conditional convergence and Absolute convergence – Test for Absolute convergence.

Ch. 3.1 to 3.4 and 3.6 of Goldberg.

UNIT-IV: Series of Real Numbers [Contd..]

Test for Absolute convergence – The class ℓ^2 – Limit of a function on the real line – Metric spaces – Limits in Metric spaces.

Ch. 3.7, 3.10, 4.1 to 4.3 of Goldberg.

UNIT-V: Continuous Functions on Metric Spaces

Functions Continuous at a point on the real line – Reformulation – Functions Continuous on a Metric Spaces – Open Sets – Closed Sets.

Ch. 5.1 to 5.5 of Goldberg

Recommended Text

R.Goldberg [2000] Methods of Real Analysis. Oxford & IBH Publishing Co., New Delhi.

Reference Books

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley New York.
2. Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York.
3. Malik, S.C. and Savita Arora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansi Lal [1991], Introduction to Real Analysis, Satya Prakashan, New Delhi.

PAPER IX

COMPLEX ANALYSIS

Objectives

This course provides

(i) a modern treatment of concepts and techniques of complex function theory

(ii) methods to solve problems in pure as well as in applied mathematics

UNIT-I:

Complex Numbers - Point at Infinity- Stereographic Projection.

Analytic functions:

Definitions of Function of a Complex Variable- Mappings- Limits, Continuity - Derivatives and Differentiation Formula - Cauchy-Riemann Equations - Properties of Analytic Functions - Necessary and Sufficient Conditions for Analytic Functions - Harmonic Functions - Determination of Harmonic Conjugate and Analytic Function.

UNIT-II: Mappings

Conformal Mapping - The transformations $w = az+b$, $w = 1/z$, $w = z^2$, $w = \sqrt{z}$, $w = e^z$, Bilinear Transformation and special Bilinear Transformation.

UNIT-III: Integrals

Contours - Line Integrals _ Cauchy-Goursat's Theorem (with out proof) Cauchy's Integral Formula - Derivatives of Analytic Functions - Maximum Modulus Theorem.

UNIT-IV: Power series

Taylor's and Laurent's Theorem - Singularities and Classification - Problems.

UNIT-V: Residues and Poles

Residues - Cauchy's residue theorem - simple problems.

Evaluation of real improper integrals, improper intervals involving sine & cosine.

Recommended Text

R.V.Churchill and J.W.Brown, (1984) *Complex Variables and Applications*. McGraw Hill International Book Co., Singapore.

Sections 8 to 20, 29 to 39, 41, 43 to 46, 54 to 60, 63 to 68, 70, 74 .

Reference Books

1. P.Duraipandian *and Laxmi Duraipandian* (1976) *Complex Analysis:* Emerald Publishers, Chennai.
2. S.Ponnusamy. (2000) *Foundations of Complex Analysis*, Narosa Publishing House, New Delhi.
3. Murray R.Spiegel. (2005) *Theory and Problems of Complex Variable*. Tata-McGraw Hill Edition, New Delhi.

PAPER X

MECHANICS I

Objectives

This course introduces the students the basic concepts of forces, moments, couple, friction laws, virtual displacement and work, catenary and the centre of gravity and kinematics This course stresses the development of skills in formation of suitable mathematical models and problems solving techniques.

UNIT-I:

Types of forces, magnitude and direction of the resultant of the forces acting on a particle. Simple problems.

UNIT-II:

Triangle of forces, Lami's theorem, equilibrium of a particle under several co-planar forces, parallel forces, moments, couples. Simple problems

UNIT-III:

Laws of friction, angle of friction, equilibrium of a body on a rough inclined plane acted on by several forces. Simple problems

UNIT-IV:

Centre of mass of simple uniform bodies, triangle lamina, rods forming a triangle, trapezium, centre of gravity of a circular are elliptic quadrant, solid and hollow hemisphere, solid and hollow core. Simple problems

UNIT-V:

Kinematics of a particle, velocity, acceleration, relative velocity, relative acceleration, angular velocity, Acceleration components in coplanar motion along.

(a) two fixed perpendicular directions

(b) tangential and normal directions

(c) radial and transverse directions. Simple problems

Recommended Text

P.Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam. (2006) *Mechanics,* S.Chand & Co., New Delhi.

Reference Books

1. A.V.Dharmapadam (1991) *Mechanics*. S.Viswanathan Printers & Publishers. Chennai.
2. S.L.Loney, (1982) *Elements of Statics*, Macmillan India, Delhi
3. M.K.Venkataraman(1990) *Statics*, Agasthier Book Depot, Trichy
4. P.N.Chatterji. (1996) *Statics.* A Rajhans Publications. (16th Edn), Meerut
5. Joseph F.Shelley (2005) *Vector Mechanics for Engineers Vol-I: Statics,* Tata McGraw Hill Edition, New Delhi

SKILL BASED SUBJECT III

PAPER III

QUANTITATIVE TECHNIQUES

Objectives

To formulate/ design and solve the practical problems in various fields using the quantitative techniques.

UNIT-I: Statistical Techniques: Statistical Quality Control:

Introduction – basis of control charts – control charts for variables – control charts for attributes – control charts for mean and variance.

UNIT-II: Index Numbers:

Introduction – construction of index number – classification of index number – wholesale index number – cost of living index numbers – base shifting – index of industrial productions (Importance to be given only to simple problems)

UNIT-III: Time series analysis:

Introduction – components of time series – analysis of time series – measurement of trends – measurement of seasonal fluctuations (Importance to be given only to simple problems).

UNIT-IV: Test of significance

Definition of t-test and its applications, x^2–test and its applications

UNIT-V: Z-Transform Techniques

Z-transform – elementary properties – Inverse Z – transforms – Introduction of finite differences [Δ & E] & difference equations – solution of difference equations using Z-transforms.

Recommended Text

1. S.C. Gupta and V.K.Kapoor, Fundamentals of Applied Statistics, S.Chand & Co., Delhi.
2. Kanti Swaroop, Gupta P.K. and Manmohan, Operations Research, Sultan Chand & Sons.
3. A.Singaravelu-[2007] – Engineering mathematics III, meenakshi agency, Chennai-601302.

Reference Books

1. P.Kandasamy and others, Probability statistics and queuing theory, Sultan Chand & Sons.
2. V.Sundaresan, K.S. Ganapathy Subramanian and K.Ganesan, Resource management techniques, Meenakshi Pub., Arapakkam-609111 [Ph.04364–71417–20081]
3. Arumugam & Issac, Linear programming, New Gamma Pub., House Palayamkottai

ELECTIVE I

(to choose 1 out of the given 5)

PAPER I.1

GRAPH THEORY

Objectives

To study and develop the concepts of graphs, subgraphs, trees connectivity, Eulerian and Hamiltonian graphs, matching colorings of graphs and planar graphs

UNIT-I:

Graphs, subgraphs, Degree of a vertex, Isomorphism of graphs, independent sets and coverings; intersection graphs;

UNIT-II:

Adjacency and incidence of matrices; Operations on graphs; degree sequences; graphic sequences; Walks; trails; paths;

UNIT-III:

Connectedness and components; cut point, bridge, block; Connectivity theorems and simple problems;

UNIT-IV:

Eulerian graphs and Hamiltonian graphs; simple problems; Trees, theorems, and simple problems;

UNIT-V:

Planarity; definition and properties; Characterisation of planar graph, Colour ability; chromatic number and index;

Recommended Text

S.Arumugam and S.Ramachandran, "Invitation to Graph Theory", SITECH Publications India Pvt. Ltd., 7/3C, Madley Road, T.Nagar, Chennai - 17

Chapters: 2 (omit 2.5), 3, 4, 5, 6, 8 (omit 8.3) and 9 (9.1 only).

Reference Books

1. S.Kumaravelu, Susheela Kumaravelu, Graph Theory, Publishers, 182, Chidambara Nagar, Nagercoil-629 002.
2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.
3. Robin J.Wilson, Introduction to Graph Theory, Longman Group Ltd.
4. J.A.Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillon, London.

PAPER I.2

OPERATIONS RESEARCH

Objectives

To develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solutions to these problems.

UNIT-I:

Network scheduling by CPM/PERT - project network diagram - Critical path method (CPM) - PERT Computations.

UNIT-II:

Inventory models - EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages - Inventory control with Price Breaks.

UNIT-III:

Sequencing problem - n jobs through 2 machines, n jobs through 3 machines - two jobs through m machines - n jobs through m machines.

UNIT-IV:

Queuing Theory - Basic concepts - Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities.

UNIT-V:

Replacement problem - introduction - replacement of items that deteriorate with time - replacement of items that fail completely.

Recommended Text

Gupta P.K. and Hira D.S. (2000) *Problems in Operations Research*, S.Chand & Co. Delhi

Reference Books

1. J.K.Sharma, (2001) Operations Research: Theory and Applications, Macmillan, Delhi
2. Kanti Swaroop, Gupta P.K. and Manmohan, (1999) *Problems in Operation Research*, Sultan Chand & Sons., Delhi.
3. V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.
4. Ravindran A., Philips D.T. and Solberg J.J., (1987)*Operations research*, John Wiley & Sons, New York.
5. Taha H.A. (2003) *Operations Research,* Macmillan Publishing Company, New York.
6. P.R.Vittal (2003) *Operations Research*, Margham Publications, Chennai.
7. S.J.Venkatesan, *Operations Research,* J.S. Publishers, Cheyyar-604 407.
8. Arumugam & Issac, Operation research - Vol. - I, New Gamma Pub., House. Palayamkottai.

PAPER I.3

ASTRONOMY

Objectives

This course aims to provide working knowledge about the universe.

UNIT-I:

Celestial Sphere - Diurnal motion - Simple Problems. Sec 39 - 83

UNIT-II:

Zones of Earth - Terrestrial Latitudes and Longitudes - Rotation of Earth - Dip of the horizon - Twilight - Simple problems. Sec 104 - 116

UNIT-III:

Astronomical refraction - Simple problems. Sec 117 - 134

UNIT-IV:

Kepler's Laws - simple problems. Sec 146 - 163

UNIT-V:

Moon - phases of moon - Eclipses - Introduction - umbra and penumbra - lunar eclipse - solar eclipse - condition for the occurrence of lunar and solar eclipses. Sec 229 - 275

Recommended Text

S.Kumaravelu and Susheela Kumaravelu. (2004) *Astronomy.* SKV Publishers, Nagarkoil

Reference Books

1. L.W.Frederick and R.H.Baker (1976) *Astronomy* (10th Edn) Vas Nostrand, New York.
2. R.Jastrow and M.H.Thompson (1984) *Astronomy : Fundamentals and Frontiers,* (4th Edn) John Wiley & Sons, New York.
3. H.Karttunen et. al. (2003) *Fundamental Astronomy* (4th Edn) Springer Verlag, Berlin.
4. L.Motz and A.Duveen. (1977) *Essentials of Astronomy* (2nd Edn) Columbia University Press, New York.
5. G.V.Ramachandran. (1965) *A Text Book of Astronomy* (5th Edn) Published by Mrs. Rukmani Ramachandran, Tiruchirappalli
6. M.Zeilik (2002) *Astronomy: The Evolving Universe* (9th Edn) Cambridge University Press, Cambridge.

PAPER I.4

SPECIAL FUNCITONS

Objectives

To develop computational skill in certain special functions which are frequently occurring in higher mathematics and mathematical physics.

UNIT-I:

Properties of Linear Operators - Simultaneous Linear Differential Equations - Special Solvable Types of Nonlinear Equations.

UNIT-II:

Numerical Solutions Using Taylor Series - Adams and Modified Adams Method - Extrapolation with Differences

UNIT-III:

Properties of Power Series - Examples - Singular Points of Linear Second Order Differential Equations - Method of Frobenius.

UNIT-IV:

Bessel Functions - Properties - Legendre Functions.

UNIT-V:

Term by Term Differentiation of Fourier Series, Legendre Series - Fourier Integral.

Recommended Text

F.B.Hildebrand. (1977) *Advanced Calculus for Applications.* Prentice Hall. New Jersey.

Reference Books

1. J.N.Sharma and R.K.Gupta (1998) *Special Functions*, Krishna Prakashan Mandir, Meerut.
2. Satya Prakash. (2004)*Mathematical Physics.* Sultan & Sons. New Delhi.
3. B.D.Gupta (1978) Mathematical Physics, Vikas Publishing House.

PAPER I.5

CALCULUS OF FINITE DIFFERENCES AND NUMERICAL METHODS

Objectives

This course covers the basic methods for finding the finite difference, solution of simultaneous equations and the techniques of Numerical Differentiation and Numerical Integration. It also deals with solution of Algebraic and Transcendental equations.

(Note: All The Formulae Without Proof - Units I to V)

UNIT-I: Finite differences & Interpolation

Forward difference operator ▲ and Backward difference operator ▼ and shifting operator E, Relation between ▲, ▼and E - Interpolation - Newton - Gregory forward & backward formulae, Guass Forward and Backward formulae, Lagranges and Newtons divided difference Formula for unequal intervals.

UNIT-II: Solutions of simultaneous linear equations

Gauss elimination method - matrix inversion method - Gauss-Jordan Method, Gauss - Seidal method.

UNIT-III: Numerical Differentiation

Newton's forward and backward differences formulae to compute derivatives - derivative using Guass forward and backward formulae.

UNIT-IV: Numerical Integration

General Quadrature formula - Trapezoidal rule - Simpson's one third rule - Simpson's three-eight rule, Weddle's rule.

UNIT-V: Solution of Algebraic and Transcendental Equations (first order only)

Bisection method - Regula - falsi method (False Position method) - Newton-Raphson method, Euler's method, modified Euler's method, Picard's method, Runge - Kutta method

Recommended Text

1. B.D. Gupta. (2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. H.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand & Co., New Delhi. IX Edition.

Reference Books

1. M.K.Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.
2. S. Arumugam (2003) - Numerical Methods, New Gamma Pub., for Palayamkottai.
3. A.Singaravelu, Numerical Methods, Meenakshi Publications-First Edition 1992.

VI SEMESTER

PAPER XI

LINEAR ALGEBRA

Objectives

To study the Algebraic structures of Vector Spaces and Linear Transformation

UNIT-I: Vector Spaces

Definition and examples-Linear dependence and independence

UNIT-II: Vector Spaces (contd)

Dual space - Inner Product spaces.

UNIT-III: Linear Transformation

Algebra of linear transformations - Characteristic roots

UNIT-IV: Linear Transformation (Contd)

Matrices, Canonical forms; Triangular forms.

UNIT-V: Linear Transformation (Contd)

Trace and Transpose, Determinants

Recommended Text

I.N.Herstein. (1989) *Topics in Algebra*. Wiley Eastern Ltd. New Delhi.

Chapter-4: Sections 4.1, 4.2, 4.3, 4.4,

Chapter-6: Sections 6.1, 6.2, 6.3, 6.4, 6.8, 6.9

Reference Books

1. S.Arumugam. (2004) *Modern Algebra.* Scitech Publications, Chennai.
2. J.B.Fraleigh (1986) *A First Course in Algebra* (3rd Edition) Addison Wesley. Mass. (Indian Print)
3. S.Lipschutz (2005) *Beginning Linear Algebra*, Tata McGraw Hill Edition, New Delhi.
4. M.L.Santiago. (2002) *Modern Algebra,* Tata McGraw Hill, New Delhi.
5. Surjeet Singh and Qazi Zameeruddin. (1982) *Modern Algebra.* Vikas Publishing House Pvt. Ltd., New Delhi, 1982

PAPER XII

REAL ANALYSIS II

Objectives

To understand Integration process of Riemann
To develop the understanding of pointwise and uniform convergence of sequence and series of functions.
To enhance the mathematical maturity and to work comfortably with concepts.

UNIT-I: Connectedness, Completeness

Open Sets – Connected Sets – Bounded Sets and Totally Bounded Sets – Complete Metric Spaces.

Ch. 6.1 to 6.4 of Goldberg

UNIT-II: Compactness

Compact Metric Space – Continuous Functions on Compact Metric Spaces - Continuity of Inverse Functions – Uniform Continuity.

Ch. 6.5 to 6.8 of Goldberg

UNIT-III: Riemann Integration

Sets of measure zero - Definition Riemann Integral – Properties of Riemann Integral – Derivatives.

Ch. 7.1, 7.2 7.4, 7.5 of Goldberg.

UNIT-IV: Riemann Integration [Contd..]

Rolle's Theorum – The law of mean – Fundamental theorems of calculus – Taylor's theorem.

Ch. 7.6 to 7.8 and 8.5 of Goldberg.

UNIT-V: Sequences and Series of Functions

Pointwise convergence of sequences of functions – Uniform convergence of sequences of functions – consequences of uniform convergence – Convergence and uniform convergence of series of functions.

Ch. 9.1 to 9.4 of Goldberg.

Recommended Text

R.Goldberg. Methods of Real Analysis Oxford & IBH Publishing Co., New Delhi.

Reference Books

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley Publishing Company Inc. New York.
2. Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York,
3. Malik, S.C. and Savita Arora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansi Lal [1991] Introduction to Real Analysis, Satya Prakashan, New Delhi.

PAPER XIII

MECHANICS II

Objectives

This course aims to provide models for some real life problems. This covers topics like Simple Harmonic Motion, Projectiles, Central Orbits and Moment of inertia. Stress is on the mathematical formulation of the physics aspects of the problems and it develops logical deduction and interpretation.

UNIT-I: Newton's Laws of Motion

Work, power, energy, principle of work and energy. Rectilinear motion with uniform acceleration. Simple Harmonic Motion Simple problems.

UNIT-II:

Motion of a projectile, Nature of a trajectory, Results pertaining to the motion of a projectile, Range on an inclined plane. Maximum range on the inclined plane. Simple problems.

UNIT-III:

Impulsive force, impulse, Newton's experimental law, Direct and oblique impact of two smooth spheres. Impact of smooth sphere on a fixed smooth plane. Simple problems.

UNIT-IV:

Central force and central of orbit, equation of central orbit, finding law of force and speed of a given orbit, finding the orbit given the law of force. Simple problems.

UNIT-V:

Moment of Inertia of simple bodies, Theorems of parallel and perpendicular axes, Movement of Inertia of triangular lamina, circular lamina, circular ring, right circular cone, sphere (solid and hollow). Simple problems.

Recommended Text

P.Duraipandian, Lakshmi Duraipandian and Muthamizh Jayapragasam. (2006) *Mechanics.* (Sixth Revised Edition) S.Chand and Co., New Delhi.

Reference Books

1. A.V.Dharmapadam, (1991) *Mechanics.* S. Viswanathan and Co., Chennai.
2. S.L.Loney, (1982) *Elements of Dynamics*, Macmillan India, Delhi
3. M.K.Venkataraman, (1990) *Dynamics*, Agasthier Book Depot, Trichy-1.
4. P.N.Chatterjee. (1992) *Dynamics*. A Rajhans Publication, (19th Edn) Meerut-5.
5. Joseph F.Shelley (2005) *Vector Mechanics for Engineers Vol-I: Dynamics,* Tata McGraw Hill Edition, New Delhi

ELECTIVE I

(to choose 1 out of the given 2)

PAPER I.1

GRAPH THEORY

Objectives

To study and develop the concepts of graphs, subgraphs, trees connectivity, Eulerian and Hamiltonian graphs, matching colorings of graphs and planar graphs

UNIT-I:

Graphs, subgraphs, Degree of a vertex, Isomorphism of graphs, independent sets and coverings; intersection graphs;

UNIT-II:

Adjacency and incidence of matrices; Operations on graphs; degree sequences; graphic sequences; Walks; trails; paths;

UNIT-III:

Connectedness and components; cut point, bridge, block; Connectivity theorems and simple problems;

UNIT-IV:

Eulerian graphs and Hamiltonian graphs; simple problems; Trees, theorems, and simple problems;

UNIT-V:

Planarity; definition and properties; Characterisation of planar graph, Colour ability; chromatic number and index;

Recommended Text

S.Arumugam and S.Ramachandran, "Invitation to Graph Theory", SITECH Publications India Pvt. Ltd., 7/3C, Madley Road, T.Nagar, Chennai - 17

Chapters: 2 (omit 2.5), 3, 4, 5, 6, 8 (omit 8.3) and 9 (9.1 only).

Reference Books

1. S.Kumaravelu, Susheela Kumaravelu, Graph Theory, Publishers, 182, Chidambara Nagar, Nagercoil-629 002.
2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.
3. Robin J.Wilson, Introduction to Graph Theory, Longman Group Ltd.
4. J.A.Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillon, London.

PAPER I.2

ASTRONOMY

Objectives

This course aims to provide working knowledge about the universe.

UNIT-I:

Celestial Sphere - Diurnal motion - Simple Problems. Sec 39 - 83

UNIT-II:

Zones of Earth - Terrestrial Latitudes and Longitudes - Rotation of Earth - Dip of the horizon - Twilight - Simple problems. Sec 104 - 116

UNIT-III:

Astronomical refraction - Simple problems. Sec 117 - 134

UNIT-IV:

Kepler's Laws - simple problems. Sec 146 - 163

UNIT-V:

Moon - phases of moon - Eclipses - Introduction - umbra and penumbra - lunar eclipse - solar eclipse - condition for the occurrence of lunar and solar eclipses. Sec 229 - 275

Recommended Text

S.Kumaravelu and Susheela Kumaravelu. (2004) *Astronomy.* SKV Publishers, Nagarkoil

Reference Books

1. L.W.Frederick and R.H.Baker (1976) *Astronomy* (10th Edn) Vas Nostrand, New York.
2. R.Jastrow and M.H.Thompson (1984) *Astronomy : Fundamentals and Frontiers,* (4th Edn) John Wiley & Sons, New York.
3. H.Karttunen et. al. (2003) *Fundamental Astronomy* (4th Edn) Springer Verlag, Berlin.
4. L.Motz and A.Duveen. (1977) *Essentials of Astronomy* (2nd Edn) Columbia University Press, New York.
5. G.V.Ramachandran. (1965) *A Text Book of Astronomy* (5th Edn) Published by Mrs. Rukmani Ramachandran, Tiruchirappalli
6. M.Zeilik (2002) *Astronomy: The Evolving Universe* (9th Edn) Cambridge University Press, Cambridge.

ELECTIVE II

PAPER II.1

OPERATIONS RESEARCH

Objectives

To develop computational skill and logical thinking in formulating industry oriented problems as a mathematical problem and finding solutions to these problems.

UNIT-I:

Network scheduling by CPM/PERT - project network diagram - Critical path method (CPM) - PERT Computations.

UNIT-II:

Inventory models - EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages - Inventory control with Price Breaks.

UNIT-III:

Sequencing problem - n jobs through 2 machines, n jobs through 3 machines - two jobs through m machines - n jobs through m machines.

UNIT-IV:

Queuing Theory - Basic concepts - Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities.

UNIT-V:

Replacement problem - introduction - replacement of items that deteriorate with time - replacement of items that fail completely.

Recommended Text

Gupta P.K. and Hira D.S. (2000) *Problems in Operations Research*, S.Chand & Co. Delhi

Reference Books

1. J.K.Sharma, (2001) Operations Research: Theory and Applications, Macmillan, Delhi
2. Kanti Swaroop, Gupta P.K. and Manmohan, (1999) *Problems in Operation Research*, Sultan Chand & Sons., Delhi.
3. V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.
4. Ravindran A., Philips D.T. and Solberg J.J., (1987)*Operations research*, John Wiley & Sons, New York.
5. Taha H.A. (2003) *Operations Research,* Macmillan Publishing Company, New York.
6. P.R.Vittal (2003) *Operations Research*, Margham Publications, Chennai.
7. S.J.Venkatesan, *Operations Research,* J.S. Publishers, Cheyyar-604 407.
8. Arumugam & Issac, Operation research - Vol. - I, New Gamma Pub., House. Palayamkottai.

PAPER II.2

SPECIAL FUNCITONS

Objectives

To develop computational skill in certain special functions which are frequently occurring in higher mathematics and mathematical physics.

UNIT-I:

Properties of Linear Operators - Simultaneous Linear Differential Equations - Special Solvable Types of Nonlinear Equations.

UNIT-II:

Numerical Solutions Using Taylor Series - Adams and Modified Adams Method - Extrapolation with Differences

UNIT-III:

Properties of Power Series - Examples - Singular Points of Linear Second Order Differential Equations - Method of Frobenius.

UNIT-IV:

Bessel Functions - Properties - Legendre Functions.

UNIT-V:

Term by Term Differentiation of Fourier Series, Legendre Series - Fourier Integral.

Recommended Text

F.B.Hildebrand. (1977) *Advanced Calculus for Applications.* Prentice Hall. New Jersey.

Reference Books

1. J.N.Sharma and R.K.Gupta (1998) *Special Functions*, Krishna Prakashan Mandir, Meerut.
2. Satya Prakash. (2004)*Mathematical Physics.* Sultan & Sons. New Delhi.
3. B.D.Gupta (1978) Mathematical Physics, Vikas Publishing House.

PAPER II.3

CALCULUS OF FINITE DIFFERENCES AND NUMERICAL METHODS

(to be chosen only by those students who have not
taken Numerical Methods as Allied subject)

Objectives

This course covers the basic methods for finding the finite difference, solution of simultaneous equations and the techniques of Numerical Differentiation and Numerical Integration. It also deals with solution of Algebraic and Transcendental equations.

(Note: All The Formulae Without Proof - Units I to V)

UNIT-I: Finite differences & Interpolation

Forward difference operator ▲ and Backward difference operator ▼ and shifting operator E, Relation between ▲, ▼and E - Interpolation - Newton - Gregory forward & backward formulae, Guass Forward and Backward formulae, Lagranges and Newtons divided difference Formula for unequal intervals.

UNIT-II: Solutions of simultaneous linear equations

Gauss elimination method - matrix inversion method - Gauss-Jordan Method, Gauss - Seidal method.

UNIT-III: Numerical Differentiation

Newton's forward and backward differences formulae to compute derivatives - derivative using Guass forward and backward formulae.

UNIT-IV: Numerical Integration

General Quadrature formula - Trapezoidal rule - Simpson's one third rule - Simpson's three-eight rule, Weddle's rule.

UNIT-V: Solution of Algebraic and Transcendental Equations (first order only)

Bisection method - Regula - falsi method (False Position method) - Newton-Raphson method, Euler's method, modified Euler's method, Picard's method, Runge - Kutta method

Recommended Text

1. B.D. Gupta. (2001) *Numerical Analysis.* Konark Pub. Ltd., Delhi
2. H.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand & Co., New Delhi. IX Edition.

Reference Books

1. M.K.Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.
2. S. Arumugam (2003) - Numerical Methods, New Gamma Pub., for Palayamkottai.
3. A.Singaravelu, Numerical Methods, Meenakshi Publications-First Edition 1992.

ELECTIVE III

PAPER III

THEORY-PROGRAMMING IN C LANGUAGE

Objectives

To develop programming skill in the Computer Language C

UNIT-I:

C Constants, variables, Data-type, Declaration of variables, assigning values to variables.

UNIT-II: Operators

Arithmetic, Relational, Logical, Assignment, Increment and decrement, Conditional, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic operators, Formatted input and output.

UNIT-III: Operators and Arrays

Decision making and branching If, simple if, If else, Nesting of if - else, Else - If ladder, Switch statement, the ?: operator, Go to statement. Decision making with looping: While, Do, For statement, Jumps in loops. **Arrays:** 1 - dimensional array, 2 - dimensional array, Initializing 2 - dimensional array, Multi - dimensional arrays.

UNIT-IV: User-Defined Function

Need for User-defined function, Multi-function program, the form of C-Function, Return Value and their types.

Structures and Unions:

Structure definition, Structure initialization, Comparison of structure variables, union.

UNIT-V: Pointers

Understanding Pointers, Accessing the address of a variable, Declaring and initializing of pointers, accessing a variable through its pointer, Pointer expression. Pointers and arrays, Pointers and structures.

Recommended Text

E.Balagurusamy. (1996) *Programming in* ANSI *C*. Tata McGraw Hill, New Delhi

Chapters:

2.5 to 2.9, 3.2 to 3.7, 3.10 to 3.12, 4.4 to 4.5

5.2 to 5.9, 6.2 to 6.5, 7.2 to 7.5, 9.2 to 9.5

10.2, 10.4, 10.5, 10.10, 11.2 to 11.6, 11.8, 11.11

Reference Books

1. V.Rajaraman. (1995) *Computer Programming in C*. Prentice Hall. New Delhi
2. H. Schildt, Obsborne. (1994) *Teach Yourself C* McGraw Hill. New York.
3. Mullish Cooper. *The Spirit of C- An Introduction to Modern Programming.* Jaico Publishing House. Delhi. 1998.
4. Yashavant kanetkar, let us C, 16TH edition BPB publication

ELECTIVE III

PRACTICAL

COMPUTER PRACTICAL IN C LANGUAGE

Objectives

This computer practice course aims to provide strong logical thinking, and error-free syntax codes writing, to master the debugging techniques and to present the results in neat form in C Language for numerical methods. Students will be able to solve problems numerically whenever theoretical methods are not available.

The following exercises shall be performed as minimum mandatory requirements (for eligibility to take the practical examination) and a RECORD of the code-listing and outputs shall be maintained by each students.

1. Assigning the ASCII value.
2. Square of numbers: Using For loop, While loop
3. Square of numbers: Do-While loop, Goto statement.
4. Characters between two given characters.
5. Number of vowels and consonants.
6. Three – dimensional matrix.
7. Prime numbers between two give numbers.
8. Fibonacci series.
9. Factorial numbers
10. Power of a value.
11. Interchange sort.
12. Shell sort.
13. Student record.

Reference Books

1. The spirit of C, Mullish Cooper, Inidan Edition by Jaico Publishers, 1987.
2. Teach yourself C, Herbert Schildt, Obsbome Megrawhill, 2nd Edition 1994.
3. Programming in C, Schaum Series.

SKILL BASED SUBJECT IV

PAPER IV

MATHEMATICS FOR COMPETETIVE EXAMINATIONS

Objectives

To introduce concepts of mathematics with emphasis on analytical ability and computational skill needed in competitive examinations.

UNIT-I: Problems on General Arithmetic

Inequalities, Ratio and proportions - Inverse ratio - properties (Addendo, subtrahendo, componendo & dividendo) - ratio of four numbers - increasing and decreasing order of fractions - percentages - gain and loss percents - partnership problems.

UNIT-II: Time, Distance and Work

Problems on speed, time, distance and work - application to train , boat, tank filling and direction problems and on completion of work.

Applications of Set theory: Sets, functions, relations and their applications.

UNIT-III: Sequences and series

General sequences and series - A.P & G.P - n^{th} term - summations of series - Determination of series in A.P & G.P.

Commercial Arithmetic: Simple & compound interest - effective rate of interest - annuity - present value - future value - problems on R.D and installments, shares and stocks.

UNIT-IV: Permutations and Combinations, Linear Equations

Definitions of nPr, nCr - relationship between them - formulae - permutations with restrictions - circular permutations.

Equations: Formation and solution of linear equations with one variable - simultaneous equations with two and three variables - application to division of a

number, problems on ages, angles of geometrical structures (st.angles on a line, angle of a triangle, angle of a quadrilateral.

UNIT-V: Basic statistics

Problems on representations of statistical data, frequency distribution, graphical representation, bar charts, diagrammatic representation, pie diagram, measures of central tendencies, mean, median, mode, G.M & H.M, error corrections, application, properties.

Measures of dispersion - range, S.D, Q.D, percentiles and deciles applications

Reference Books

1. Quantitative Apptitude - R.S. Aggarwal (S.Chand & Co - New Delhi 2008)
2. Quantitative Apptitude for Competitive Examinations - Abhigit Guha (Tata McGraw - Hill Pub., Co., Ltd. New Delhi - III Edn.,)
3. Course in Mental Abilities and Quantitative Apptitude for Competitive Examinations - Edgar Thorpe (Tata McGraw - Hill Pub., Co., Ltd. New Delhi - II Edn.,)
4. Statistic, RSN Pillai and A. Bagavathi, S.Chand & Co.,
5. Elements of statistics, Sivadanu Pillai.
6. Algebra, Manickavachakam Pillai & Narayanan

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