DEPARTMENT OF MATHEMATICS

PROGRAMME SPECIFIC OUTCOME

PSO1: Enable the students to acquire the knowledge in algebra, analytical geometry, differential and Integral calculus, differential equations and Numerical analysis.

PSO2: Enable the students to enhance their knowledge in Transform Techniques, Statics, Differential equations, Integral Calculus and Mathematical statistics.

PSO3: Facilitate the students to have a thorough knowledge on Dynamics, Algebraic structures, Real and Complex Analysis, Discrete mathematics, Graph theory and Operations Research.

PSO4: Help the students to have a fair knowledge in fundamentals of company law, basic principles of management, soft skills and computing skills with C-programming.

PSO5: Analyse Fermat's,Wilson's,Gauss,Green's,stoke's,Liouvillie's theorem and fundamental theorem of algebra and apply the theorems to solve problems.

PSO6: Analyse the test of significance for mean, proportion, variance based on normal, t, F,chi-square statistics and apply the concepts to solve problems.

SYLLABUS

Subject Name: Algebra **Year : I**
Subject Code : TAM1A **Semester : I**

Unit - 1: Polynomial equations; imaginary and irrational roots; Relation between roots and coefficient; Symmetric functions of roots in terms of coefficients; Transformations of equations; Reciprocal equations. Chapter6: Section9 to 12, 15, 15.1, 15.2, 15.3, 16, 16.1, 16.2.

Unit - 2: Increase or decrease the roots of the given equation: Removal ofterm: Descartes' rule of signs: Approximate solutions of roots of polynomials by Horner's method; Cardan's method of solution of a cubic polynomial. Summation of Series using Binomial, Exponential and Logarithmic series:Chapter 6: Section 17,19,24,30,34,34.1
Chapter 3: Section 10, Chapter 4: Section3,3.1,7.

Unit - 3: Symmetric; Skew Symmetric; Hermitian; Skew Hermitian ; Orthogonal Matrices; Eigen values; Eigen vectors; Cayley - Hamilton Theorem; Similar matrices; Diagonalization of a matrix. Chapter 2: Section 6.1 to 6.3, 9.1,9.2,16,16.1,16.2,16.3

Unit - 4: Prime number; Composite number; Decomposition ofa composite number as a product of primes uniquely; Divisors of a positive integer n; Euler function.
Chapter 5,Section 1 to 11

Unit - 5: Congruencemodulon; Highestpowerofa prime number p contained in n! ; Fermat's and Wilson's theorems . Chapter 5, Section 12 to 17

Reference Book:

1. Algebra by S.Arumugam.

COURSE OUTCOME

CO1: Evaluate the roots of polynomial equations and solving Problems on transformation of equations and reciprocal equations.
CO2: Solve the problems based on exponential and logarithmic series and finding the approximate solutions of roots of polynomials.
CO3: Summarize the concepts of symmetric, skew symmetric Eigen values, Eigen vectors, Cayley-Hamilton and solving problems based on it.
CO4: Understand the basic concepts of composite number, decomposition, product of primes and Euler function.
CO5: Analyze congruence modulo and Fermat's and Wilson's theorems and apply the theorems to solve problems.

Subject Name: Trignometry **Year : I**
Subject Code : TAM1B **Semester : I**

Unit –1: Expansions of powers of sinθ, cosθ - Expansions of $cos^n\theta$, sin^n,$cos^m\theta sin^n\theta$ Chapter 2, Section 2.1, 2.1.1, 2.1.2, 2.1.3

Unit - 2: Expansions of sin nθ, cosnθ, tan nθ - Expansions of $\tan(\theta_1+\theta_2+\cdots+\theta_n)$ - Expansion of sinx, cosx, tanxinterms of x -Sum of roots of trigonometric equations - Formation of equation with trigonometric roots. Chapter 3: Section 3.1 to 3.6

Unit - 3: Hyperbolic functions - Relation between circular and hyperbolic functions - Formulas inhyperbolic functions -Inverse hyperbolic functions. Chapter 4: Section 4.1 to 4.7

Unit - 4: Inverse function of exponential function -Values of Log (u+iv) - Complex index. Chapter 5: Section 5.1 to 5.3.

Unit - 5: Sums of Trigonometrical series - Applicationsof binomial, exponential, logarithmic and Gregory's series - Difference method. Chapter 6: Section 6.1 to 6.6.3.

Reference Book:

1. Trigonometry by T.K.Manickavachagam Pillay.

COURSE OUTCOME

CO1: Explain the concepts of expansion of sinθ,cosθ, cos$^n\theta$, sin$^n\theta$ and solving problems based on it.
CO2: Calculate sinx, cosx, in terms of x-sum of roots of trigonometric equation and workout problems on it.
CO3: Solve problems based on hyperbolic functions and inverse hyperbolic functions.
CO4: Solve problems based on inverse functions of exponential functions.
CO5: Evaluate the sum of trignometrical series and understand its applications.

Subject Name:Calculus of Finite Differences and Numerical Analysis-I **Year : I**
Subject Code : SBAME **Semester : I**

Unit–1: Solution of algebraic and transcendental equations, Bisection method,Iteration method, Regulafalsimethod,NewtonRaphsons method.

Unit–2: Solution of Simultaneous linear equations**:** Guass-elimination method, Gauss-Jordanmethod ,Guass-Siedel method, Crout's method.

Unit–3: Finite differences:E operators and relation between them,Differencesof a polynomial, factorial polynomials, differences of zero, summation series.

Unit-4: Interpolation with equal intervals: Newton's forward and backwardInterpolation formulae. Central differences formulae-Gauss forward and backward formulae, Sterling's formula and Bessel's formula.

Unit-5: Interpolation with unequal intervals:Divided differences and Newton's divided differences formula for interpolation and Lagrange's formulafor interpolation. Inverse Interpolation - Lagrange's method, Reversion of series method.

Reference Books:

1. Calculus of finite differences and Numerical analysis by Gupta-Malik, Krishna Prakastan Mandir, Meerut.
2. Numerical methods in Science and Engineering by M.K.Venkataraman, National publishing house, Chennai.
3. Numerical Analysis by B.D.Gupta, Konark publishing.

COURSE OUTCOME

CO1: Solve the solution of simultaneous linear equations using Gauss Elimination method, Gauss Jordan method, Gauss Seidel method andsolve Bisection, Regulafalsi, Newton raphson method.

CO2: Understand differences of a polynomial, factorial polynomial, differences of zero and summation series.

CO3: Find the solution using Newton's forward and backward ,stirling,Besselsinterpolation methods .

CO4: Illustrate Interpolations with unequal intervals using Lagrange's method and reversions of series method.

Subject Name: Fundamentals Of Company Law **Year : I**
Subject Code : BYN1B **Semester : I**

Unit-1: Origin of Company-its Meaning and Definition-its Characteristic features- Difference between Company and Partnership & Sole Proprietorship Firms- Illegal association-Classification of companies –Definition of Public limited and Private limited Company-Distinguish between Public limited and Private limited company-Association not for profit(Sec 25 Company)

Unit-2: Promoter-Mode of incorporating a Company-Condition to be complied for its registration – Conclusivenesss of Certificate of Incorporation-Effect of its Registration-Memorandum of Association and its clauses-Articles of Association-Certificate of Commencement of Business-Prospectus-Types of Share capital-Definition of Member-Directors, their Power and Duties-Types of Company Meetings.

Reference Book:

1. N.D.Kapoor - Company Law and Secretarial Practice.

COURSE OUTCOME

CO1: Explain the concepts of characteristics features of company.
CO2: Understand the concepts of memorandum and articles of association.
CO3: Appraise certificate of incorporation.
CO4: Describe prospectus and types of share capital.

Subject Name: Analytical Geometry **Year : I**
Subject Code : TAM2B **Semester : II**

Unit - 1: Chord of contact - polar and pole - conjugate points and conjugate lines - chord with (x_1,y_1) as its midpoint - diameters - conjugate diameters of an ellipse - semi diameters - conjugate diameters of hyperbola. Chapter - 7 Sections 7.1 to 7.3, Chapter – 8 Sections 8.1 to 8.5

Unit - 2: Co- normal points, co-normal points as the intersections of the conic and a certain R. H. concyclic points - Polar coordinates, general polar equation of straight line - polar equation of a circle on A_1A_2 as diameter , equation of a straight line, circle, conic – equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola. Chapter 9:Sections 9.1 to 9.3, Chapter -10 Sections 10.1 to 10.8.

Unit - 3: Introduction - System of Planes - Length of the perpendicular - orthogonal projection. Chapter 2 Section 2.1 to 2.10.

Unit - 4: Representation of line - angle between a line and a plane - co-planar lines - shortest distance 2 skew lines - Length of the perpendicular - Intersection of three planes.
Chapter -3 Section 3.1 to 3.8.

Unit - 5: Equation of a sphere ; general equation ; section of a sphere by a plane - equation of the circle; tangent plane; radical plane; coaxial system of spheres; orthogonal spheres.
Chapter-6 Sections 6.1 to 6.9

Text Books:

1. Analytical Geometry 2D by P. Durai Pandian-Muhil Publishers for Unit 1 and 2
2. Analytical Solid Geometry 3D by Shanthi Narayanan and Dr.P.K. Mittal for Unit 3-5.

Reference Books:

1. Analytical Geometry 2D by T.K. Manikavachakam Pillai and S.Narayanan.
2. Analytical Geometry 3D by T.K. Manikavachakam Pillai and S.Narayanan.

COURSE OUTCOME

CO1: Solve the problems using the equation of chord, diameter of sphere and conjugate diameters of hyperbola.
CO2: Evaluate equation of asymptotes of hyperbola and co-normal points
CO3: Understand the equation of the system of planes and the length of perpendicular to the plane.
CO4: Determine equation of sphere and its intersection with the plane.
CO5: Calculate equation of the circle, tangent plane, radical plane, coaxial system of spheres and orthogonal spheres.

Subject Name: Differential Calculus **Year : I**
Subject Code : TAM2A **Semester : II**

Unit - 1: Successive differentiation - n^{th} derivative – standard results - trigonometrical - transformation - formation of equations using derivatives - Leibnitz's theorem and its applications. Chapter 3: Section 1.1 to 1.6.2.1 and 2.2

Unit - 2: Total differential of a function - special cases- implicit functions - partial derivatives of a function of two functions - Maxima and Minima of functions of 2 variables - Lagrange's method of undetermined multipliers. Chapter 8: Section 1.3 to 1.5 and 1.7, Section 4.4.1 and 5

Unit - 3: Envelopes - method of finding envelopes - Curvature - circle, radius and centre of curvature - Cartesian formula for radius of curvature - coordinates of the centre of curvature - evolute and involute - radius of curvature and centre of curvature in polar coordinates - p-r equation. Chapter 10: Section 1.1 to 1.4and Section 2.1 to 2.7.

Unit - 4: P-r equations– angle between the radius vector and the tangent - slope of the tangent in the polar coordinates - the angle of intersection of two curves in polar coordinates - polar sub tangent and polar sub normal - the length of arc in polar coordinates. Chapter 9 Section 4.1 to 4.6

Unit - 5: Asymptotes parallel to the axes - special cases - another method for finding asymptotes -asymptotes by inspection - intersection of a curve with an asymptote.

Text Book:

1. Calculus Vol-1 by T.K. Manikavachakam Pillai and S.Narayanan- S. Viswanathan publishers – 2006.

Reference Books:

1. Calculus by Thomas and Fenny, Peasrson Publications.
2. Calculus by Stewart.

COURSE OUTCOME

CO1: Understand the concepts of transformation of equation using derivatives, Leibnitz's theorem and its application.
CO2: Describe the concepts of total differential and partial derivative functions and Lagrange's method.
CO3: Find the radius of curvature for the curve.
CO4: Understand the concepts of Polar coordinates, polar sub-tangent and sub-normal.
CO5: Determine asymptotes for a curve.

Subject Name:Calculus of Finite Differences and Numerical Analysis-II **Year : I**
Subject Code : SBAMG **Semester : II**

Numerical Differentiation: Derivatives using Newton's forward and backward difference formulae, Derivatives using Sterling's formula, Derivative using divided difference formula, Maxima and Minima using the above formulae.

Numerical Integration: General quadrature formula, Trapezoidal rule, Simpson's one-third rule, Simpson's three- eighth rule, Weddle's rule, Euler-Maclaurin Summation formula, Sterling's formula for n!

Difference equations: Linear homogeneous and non-homogeneous difference equation with constant coefficients, particular integrals for a^ux^m,x^m, sinkx, coskx.

Numerical solution of ordinary difference equations(I order only)

Taylor's series method, Picard's method, Euler's method, Modified Euler's method, Runge-kutta method fourth order only, Predictor-corrector method-Milne's method and Adams-Bashforth method.

Reference Books:

1. Calculus of finite differences and Numerical analysis by Gupta-Malik, Krishna Prakastan Mandir, Meerut.
2. Numerical methods in Science and Engineering by M.K.Venkataraman, National publishing house, Chennai.
3. Numerical Analysis by B.D.Gupta, Konark publishing.

COURSE OUTCOME

CO1: Summarize the values of the first derivative of continuous function and to apply the Newton's forward and backward formula and finding maxima and minima of functions.
CO2: Explain the concepts of Simpson's rule, Weddle's rule and estimate their errors.
CO3: Understand linear homogenous and non-homogenous difference equation with constant co-efficient and particular integrals.
CO4: Calculate numerical solution of first order ordinary differential equations
CO5: Determine the solutions for ordinary differential equations.

Subject Name: Basics In Principles Of Management **Year : I**
Subject Code: BYN2B **Semester : II**

Unit-I: Introduction to Management-its Meaning and function-contribution by Henry Fayol - Planning and its nature and process-Decision Making-Organizing and its Nature-Delegation and Decentralization-Organization Structure.

Unit-2: Staffing-Direction-Motivation-Needs Theory-Communication and Communication process-Leadership-Co-ordination its Nature-Controlling-Control Techniques.

Reference Book:

1. Dr.C.B.Gupta – Business Management.

COURSE OUTCOME

CO1: Describe the Introduction to management.
CO2: Understand the planning and its nature and process.
CO3: Paraphrase the Communication and communication process.
CO4: Illustrate the leadership, co-ordination and its nature.

Subject Name: Integral Calculus **Year : II**
Subject Code : TAM3A **Semester : III**

Unit -1: Reduction formulae - Types $\int x^n e^{ax}\, dx, \int x^n \cos ax\, dx, \int x^n \sin ax\, dx, \int cos^n\, xdx,$ $\int sin^n xdx, \int sin^m xcos^n xdx, \int tan^n xdx, \int cot^n xdx, \int sec^n xdx, \int cosec^n xdx, \int x^n (logx)^m dx.$ Bernoulli's formula. Chapter - 1 Section 13, 13.1 to 13.10, 14, 15.1

Unit - 2: Multiple Integrals - definition of the double integrals - evaluation of the double integrals - double integrals in polar coordinates - triple integrals - applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces - change of variables – Jocobians. Chapter-5 Section 1, 2.1, 2.2, 3.1, 4, 6.1, 6.2, 6.3, 7. Chapter-6 Section1.1, 1.2, 2.1 to 2.4.

Unit - 3: Beta and Gamma functions - indefinite integral - definitions - convergence ofΓ(n) - recurrence formula of Γ functions - properties of ß - functions -relation between ß and Γ functions. Chapter 7 Section 1.1 to 1.4, 2.1 to 2.3, 3, 4, 5.

Unit - 4: Introduction, Gradient, divergence, curl, directional derivative, unit normal to a surface.Solenoidal and irrotational. Laplacian Differential Operator.
Chapter 2 Section 2.3 - 2.8

Unit - 5: Line, surface and volume integrals ; Theorems of Gauss, Stokes and Green. (without proof)- Problems . Chapter 3 Section 3.1 to 3.8 and Chapter 4 Section 4.1 - 4.8

Text Books:

1. Calculus Vol-2 by S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 2007 for Unit I –III.
2. Vector Analysis by P.Duraipandiyan and Lakshmi Duraipandiyan. Emerald Publishers for Unit IV –V.

Reference Book:

1. Vector Algebra and Analysis by S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers.

COURSE OUTCOME

CO1: Describe the concepts of Reduction formula, Bernoulli's formula and Fourier series to solve problems.
CO2: Evaluate area of curved surface, double and triple integral, change of variables and Jacobians methods.
CO3: Summarize the concepts of beta and gamma functions and derive their properties to apply them in evaluating integrals.
CO4: Solve gradient, divergence, curl, directional derivatives and unit normal to the surface.
CO5: Apply theorems of Gauss, Green's, and stoke' to solve problems.

Subject Name: Differential Equations **Year : II**
Subject Code : TAM3B **Semester : III**

Unit - 1: Homogeneous equations,Exact equations, Integratingfactor, Linear equations, Reduction of order. Chapter 2 Sections 7-11

Unit - 2: Second order linear differential equations introduction, General solution of homogeneous equations,The use of known solution to find another. Homogeneous equation with constant coefficients –Method of undetermined coefficients; Method of variation of parameters. Chapter 3 Sections 14-19

Unit - 3: System of first order equations - Linear systems. Homogeneous linear systems with constant coefficients.(Omit non-homogeneous system of equations). Chapter 7 Section 37 , 38

Unit - 4: Formation of P.D.E by eliminating arbitrary constants and arbitrary functions; complete integral; Singular integral; general integral; Lagrange's equations $P_p+Q_q=R$.
Chapter 0 Section 0.4 and 0.5

Unit - 5: Charpit's method and Special types of first order equations.
Chapter 0 Sections 0.11, 0.11.1.

Text Book:

1. Introduction to Partial differential equations 2nd Edition (2009) by K. Sankara Rao, PHI Learning Private Ltd. Unit 4 and 5.

Reference Books:

1. Differential equations by Simmons
2. Partial Differential equations by Sneddon.

COURSE OUTCOME

CO1: Explain the concepts of homogenous equation, finding solutions of exact equations, linear homogenous equations and Reduction of order.
CO2: Compute the problems in second linear homogeneous differential equations, method of undetermined coefficients and method of variation of parameters.
CO3: Evaluate the system of first order homogeneous linear differential equations with constant coefficients.
CO4: Understand the concepts in the formation of P.D.E by eliminating the arbitatry constants and functions, solving problems in P.D.E and Lagrange's equations.
CO5: Solve the partial differential equations using Charpit's method.

Subject Name: Mathematical Statistics-I **Year : II**
Subjectcode : SBAOA **Semester : III**

Unit - 1: Statistics – Definition – functions – applications – complete enumeration – sampling methods – measures of central tendency – measures of dispersion – skew ness-kurtosis.

Unit - 2: Sample space – Events, Definition of probability (Classical, Statistical & Axiomatic) – Addition and multiplication laws of probability – Independence – Conditional probability – Bayes theorem – simple problems.

Unit -3: Random Variables (Discrete and continuous), Distribution function – Expected values & moments – Moment generating function – probability generating function – Examples. Characteristic function – Uniqueness and inversion theorem(Statements and applications only) – Cumulants, Chebychev's inequality – Simple problems.

Unit - 4: Concepts of bivariate distribution – Correlation : Rank correlation coefficient – Concepts of partial and multiple correlation coefficients – Regression : Method of Least squares for fitting Linear, Quadratic and exponential curves – simple problems.

Unit - 5: Standard distributions – Binomial, Hyper geometric, Poisson, Normal and Uniform distributions – Geometric, Exponential, Gamma and Beta distributions, Inter-relationship among distributions.

Reference Books:

1. Hogg R.V & Craig A.T : Introduction to Mathematical Statistics, Mcmillan
2. Mood A.M. & Graybill F.A & Boes D.G : Introduction to theory of Stastics, Mcgraw Hill.

COURSE OUTCOME

CO1: Understand the concept of measures of central tendency and skewness.
CO2: Summarize the concepts of Sample space and random variable.
CO3: Compute the problems in random variables.
CO4: Explain the concept of bivariate distribution and solve the problems based on it.
CO5: Illustrate the problems in standard distributions.

Subject Name: Transform Techniques **Year : II**
Subject Code : TAM4A **Semester : IV**

Unit - 1: Introduction - Properties of Laplace transform - Laplace transform of elementary functions - Problems using properties - Laplace transform of special function, unit step function and Dirac delta function - Laplace transform of derivatives and integrals - Evaluation of integral using Laplace Transform - Initial Value Theorem - Final Value Theorem and problems - Laplace Transform of periodic function. Chapter 2 Sections 2.1 to 2.20

Unit - 2: Introduction, properties of inverse Laplace transform problems(usual types) ; Convolution Theorem – Inverse Laplace Transform using Convolution theorem.
Chapter 3 Section 3.1 to 3.11

Unit - 3: Introduction, Expansions of periodic function of period 2π ; expansion of even and odd functions; half range cosine and sine series - Fourier series of change of interval.
Chapter 1, Section 1.1 to 1.11

Unit - 4: Introduction of Fourier transform - Properties of Fourier Transforms – InverseFourier transform – Problems, Fourier sine and cosine transforms and their inverseFourier transform – Problems, Convolution theorem,Parseval's identity and problems using Parseval'sidentity.
Chapter 4 Section 4.1 to 4.12

Unit - 5: Applications of Laplace transform to solution of first and second order linear differential equations (constant coefficients) and simultaneous linear ordinary differential equations - Applications of Laplace transform to partial differential equations. Application of Laplace and Fourier transform to Initial and Boundary Value Problem
Chapter 5, Sections 5.1, 5.3, 5.7 to 5.11

Text Book:

1. Fourier Series and Integral Transforms – Dr. S. Sreenath, S. Ranganathan, Dr.M.V. S.S.N. Prasad and Dr. V. Ramesh Babu, S.Chand and Company Ltd.

Reference Book:

1. Engineering Mathematics Vol-3: M.K. Venkataraman (National Publishing Co.)

COURSE OUTCOME

CO1: Evaluate Laplace transform of elementary function, initial and final value theorem, Laplace transform of periodic functions and solve the problems based on it .
CO2: Understand the properties of inverse Laplace transform using convolution theorem.
CO3: Explain the concepts of expansion of periodic function of period 2π, and solve the problems in Fourier series and half range cosines and sine series.
CO4: Evaluate the Inverse Fourier transforms problem, Fourier Sine and cosine transform and their inverse.
CO5: Describe the concepts of Laplace transform to partial differential equation, initial and boundary value problems.

Subject Name: Statics **Year : II**
Subject Code : TAM4B **Semester : IV**

Unit - 1: Netwon's laws of motion - resultant of two forces on a particle - Equilibrium of a particle - Limiting equilibrium of a particle on an inclined plane.
Chapter 2 Section 2.1, 2.2, Chapter 3 Section 3.1 and 3.2

Unit - 2: Forces on a rigid body - moment of a force - general motion of a rigid body - equivalent systems of forces - parallel forces - forces along the sides of a triangle - couples
Chapter 4 Section 4.1 to 4.6

Unit - 3: Resultant of several coplanar forces - equation of the line of action of the resultant - Equilibrium of a rigid body under three coplanar forces - Reduction of coplanar forces into a force and a couple - problems involving frictional forces.
Chapter 4 Section 4.7 to 4.9, Chapter 5, Section 5.1,5.2.

Unit - 4: Centre of mass - finding mass centre - a hanging body in equilibrium - stability of equilibrium - stability using differentiation.
Chapter 6 - Section 6.1 to 6.3, Chapter 7 Section 7.1, 7.2

Unit - 5: Virtual work - hanging strings - equilibrium of a uniform homogeneous string - suspension bridge . Chapter 8 Section 8.1, Chapter 9 Section 9.1 , 9.2

Text Book:

1. Mechanics – P.Duraipandiyan, laxmi Duraipandiyan, Muthamizh Jayapragasham, S. Chand Co Ltd, 2008.

Reference Book:

1. Dynamics – K. Viswanatha Naik and M.S. Kasi, Emerald Publishers.

COURSE OUTCOME

CO1: Understand the concepts of Newton's law of motion and limiting equilibrium of particle on an inclined plane.
CO2: Learn the concepts on the general motion of a rigid body, equivalent systems of forces and parallel forces and solve problems based on it.
CO3: Illustrate the equilibrium of rigid body under three coplanar forces and problems involving frictional forces.
CO4: Summarize the concepts of finding mass centre, hanging body in equilibrium and stability using differentiation.
CO5: Understand the concepts of equilibrium of uniform homogenous strings and suspension bridge and solve problems based on it.

Subject Name: Mathematical Statistics-II **Year : II**
Subject Code : SBAOB **Semester : IV**

Unit - 1: Sampling Theory – Sampling distributions - concept of standard error – sampling distribution based on Normal distribution : t, chi-square and F distribution.

Unit -2: Point estimation - concepts of unbiasedness, consistency, efficiency and sufficiency - Cramer Rao inequality - methods of estimation : Maximum likelihood, moments and minimum chi-square and their properties (Statement only).

Unit -3: Test of Significance- standard error – large sample tests. Exact tests based on Normal, t, chi-square and F distributions with respect to population mean/means, proportion/proportions, variances and correlation co-efficient. Theory of attributes – tests of independence of attributes based on contingency tables – goodness of fit tests based on Chi-square.

Unit -4: Analysis of variance: one way, two-way classification – Concepts and problems, interval estimation – confidence intervals for population mean/means, proportion/proportions and variances based on Normal, t, chi-square and F.

Unit -5: Tests of hypothesis : Type I and Type II errors – power of test – Neyman Pearson Lemma – Likelihood ratio tests – Concepts of most powerful test – (Statements and results only) Simple problems.

Reference Books:

1. Hogg R.V & Craig A.T : Introduction to Mathematical Statistics, Mcmillan
2. Mood A.M. & Graybill F.A & Boes D.G : Introduction to theory of Stastics, Mcgraw Hill.

COURSE OUTCOME

CO1: Explain the concepts of sampling distribution and normal distribution and solving the problems based on it.
CO2: Solve the problems based on consistency, efficiency and sufficiency.
CO3: Understand how to test the significance of standard error based on contingency tables.
CO4: Evaluate the problems based on analysis of variance in one way and two way classification.
CO5: Summarize the concepts of test of hypothesis and solve the problem based on it.

Subject Name: Mathematical Statistics Practical **Year : II**
Subject Code : SBAO1 **Semester : IV**

1. Construction of univariate and bivariate frequency distributions with samples of size not exceeding 200.
2. Diagrammatic and Graphical Representation of data and frequency distribution.
3. Cumulative frequency distribution – Ogives – Lorenz curve.
4. Measure of location and dispersion (absolute and relative), Skewness and Kurtosis.
5. Numerical Problem involving derivation of marginal and conditional distributions and related measures of Moments.
6. Fitting of Binomial, Poisson and Normal distributions and tests of goodness of fit.
7. Curve fitting by the method of least squares.
   (i) y=ax+b ; (ii) y=ax^2+bx+c ; (iii) y=ae^bx ; (iv) y=ax^b
8. Computation of correlation coefficients and regression lines for raw and grouped data. Rank correlation coefficient.
9. Asymptotic and exact test of significance with regard to population mean, proportion, variance and coefficient of correlation.
10. Test for independence of attributes based on contingency table.
11. Confidence Interval based on Normal, t, Chi-square statistics.

COURSE OUTCOME

CO1: Understand the concepts in diagrammatic and graphical representation of data and frequency distribution.
CO2: Calculate the measures of dispersion, skewness and kurtosis.
CO3: Evaluate the fitting of binomial, Poisson and Normal distributions, and testing the goodness of fit.
CO4: Compute correlation and regression lines for raw and grouped data.
CO5: Analyze the test of significance for mean, proportion, variance based on normal, t, chi-square statistics.

Subject Name: Environmental Studies **Year : II**
Subject Code : ENV4A **Semester : IV**

Unit-1: Introduction to Environment Studies

- Scope and importance; concept of sustainability and sustainable development
- Multidisciplinary nature of environmental studies;

Unit-2: Ecosystem (2 lectures)

- What is an ecosystem? Structure and function of ecosystem;

  Energy flow in an ecosystem :

  Food chain, Food webs and ecological succession, case studies of the following ecosystem:
  a) Forest ecosystem
  b) Grass land ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystem (ponds, streams, lakes, rivers, ocean, estuaries)

Unit-3: Natural Resources: Renewable and Non-Renewable Resources (6 lectures)

- Land Resources and land-use change: land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forest, biodiversity and tribal populations.
- Water: Use and over - exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state).
- Energy Resources: Renewable and Non Renewable Energy sources,
  Use of alternate energy sources, growing energy needs, case studies.

Unit-4: Biodiversity and Conservation (8 lecturers)

- Levels of biological diversity: genetics, species and ecosystem diversity, biogeographic zones of India: Biodiversity patterns and global biodiversity hotspots.
- India as a mega-biodiversity nation, Endangered and endemic species of India.
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions:
- Conservations of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and Biodiversity services: Ecological, Economic, Social, ethical, aesthetic and informational value.

Unit-5: Environmental Pollution (8 lecturers)

- Environmental Pollution: Types, causes, effects and controls: Air, Water, Soil and Noise pollution.
- Nuclear Hazards and human health risks.
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

Unit-6: Environmental Policies & Practices (8 lecturers)

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Environmental laws: Environmental Protection act , Air(Prevention & Control of Pollution)act; Water (Prevention & Control of Pollution)act; Wild life Protection Act; Forest Conservation Act. International agreements: Montreal and kyotoproptocols and Convention on Biological Diversity(CBD).
- Nature reserves, tribal populations and rights, and human wild life conflicts in India context.

Unit-7: Human Communities and The Environment (7 lecturers)

- Human population growth, impacts on environment human health and welfare.
- Resettlement and rehabilitation of projects affected persons; case studies.
- Disaster management: Floods, Earth quake, Cyclone and Landslides.
- Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in Environmental conservation.
- Environmental communication and public awareness, case studies (e.g. CNG vehicles in Delhi)

Unit-8: Field Work (6 lecturers)

- Visit to an area to document and environmental and assets: Rivers/forest/floral/fauna etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Studies of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystem-pond, river, Delhi Ridge etc.

Reference Books:

1. Gadgil .M & Guha .R . This Fissured Land: An Ecological History of India, Univ. of . California Press.
2. Glesson .B and Low .N. Global Erhics and Environment, London, Routledge.

COURSE OUTCOME

CO1: Discuss Scope and importance of EVS
CO2: Create Public Awareness on environmental issues
CO3: Explain Structure and functions of ecosystem
CO4: Enumerate Renewable and non-renewable natural resources
CO5: Describe Biodiversity, environmental pollution, environmental policies and practices**.**
CO6: Explain Link between human communities and the environment

Subject Name: Algebraic Structures **Year :III**
Subject Code : TAM5A **Semester:V**

Unit - 1: Introduction to groups. Subgroups, cyclic groups and properties of cyclic groups; Lagrange's Theorem; A counting principle. Chapter 2 Section 2.4 and 2.5

Unit - 2: Normal subgroups and Quotient group; Homomorphism; Automorphism. Chapter 2 Section 2.6 to 2.8.

Unit - 3: Cayley's Theorem; Permutation groups. Chapter 2 Section 2.9 and 2.10

Unit - 4: Definition and examples of ring - Some special classes of rings; homomorphism of rings; Ideals and quotient rings; More ideals and quotient rings Chapter 3 Section 3.1 to 3.5

Unit - 5: The field of quotient of an integral domain; Euclidean Rings; The particular Euclidean ring. Chapter 3 Section 3.6 to 3.8

Text Book:

1. Topics in algebra by I.N.Herstein, Wiley Eastern Ltd.

Reference Book:

1. Modern Algebra by Santiago.

COURSE OUTCOME

CO1: Understand the concepts of subgroups, cyclic groups, Lagrange's theorem and counting principle.
CO2: Explain the concepts of normal subgroups and quotient groups, homomorphism and automorphism.
CO3: Summarize the Cayley's theorem and permutation group.
CO4: Describe the concepts of homomorphism of rings, ideals and quotient rings.
CO5: Summarize the concepts of the field of quotient of an integral domain, Euclidean rings.

Subject Name: Real Analysis-I **Year : III**
Subject Code: TAM5B **Semester : V**

Unit - 1: Sets and elements; Operations on sets; functions; real valued functions; equivalence; countability ; real numbers; least upper bounds. Chapter 1 Section 1.1 to 1.7

Unit - 2: Definition of a sequence and subsequence; limit of a sequence; convergent sequences; divergent sequences; bounded sequences; monotone sequences. Chapter 2 Section 2.1 to 2.6

Unit - 3: Operations on convergent sequences; operations on divergent sequences; limit superior and limit inferior; Cauchy sequences. Chapter 2 Section 2.7 to 2.10

Unit - 4: Convergence and divergence; series with non-negative numbers; alternating series; conditional convergence and absolute convergence; tests for absolute convergence; series whose terms form a non-increasing sequence; the class l^2. Chapter 3 Section 3.1 to 3.4, 3.6, 3.7 and 3.10

Unit - 5: Limit of a function on a real line; Metric spaces; Limit in metric spaces. Function continuous at a point on the real line, reformulation, Function continuous on a metric space. Chapter 4:Section 4.1 to 4.3, Chapter 5 Section 5.1 -5.3

Text Book:

1. Methods of Real Analysis – Richard R. Goldberg.

Reference Book:

1. Principles of Mathematical Analysis by Walter Rudin.
2. Mathematical Analysis Tom. M. Apostol.

COURSE OUTCOME

CO1: Learn the concepts of operations on sets, functions, real valued functions, countability and least upper bounds.
CO2: Understand the limits of a sequence, convergent and divergent sequences, bounded and monotone sequence.
CO3: Apply the concepts of operations on convergent and divergent sequences, limit superior and inferior, Cauchy sequences to solve problems based on it.
CO4: Summarize the concepts of convergent and divergent series, alternating series, conditional and absolute convergence.
CO5: Analyze the concepts in metric spaces, limits in metric spaces and function continuous on a metric space.

Subject Name: Dynamics **Year : III**
Subject Code : TAM5C **Semester : V**

Unit - 1: Basic units - velocity - acceleration - coplanar motion - rectilinear motion under constant forces - acceleration and retardation - thrust on a plane - motion along a vertical line under gravity - line of quickest descent - motion along an inclined plane - motion of connected particles. Chapter 1 Sections 1.1 to 1.4, Chapter 10 Sections 10.1 to 10.6

Unit - 2: Work, Energy and power - work - conservative field of force - power - Rectilinear motion under varying Force simple harmonic motion (S.H.M.) - S.H.M. along a horizontal line - S.H.M. along a vertical line - motion under gravity in a resisting medium. Chapter 11 Section 11.1 to 11.3, Chapter 12 Section 12.1 to 12.4

Unit - 3: Forces on a projectile - projectile projected on an inclined plane - Enveloping parabola or bounding parabola - impact - impulse force - impact of sphere - impact of two smooth spheres - impact of a smooth sphere on a plane - oblique impact of two smooth spheres. Chapter 13 Sections 13.1 to 13.3, Chapter 14 Section 14.1, 14.5

Unit - 4: Circular motion - Conical pendulum - motion of a cyclist on a circular path - circular motion on a vertical plane - relative rest in a revolving cone - simple pendulum - central orbits - general orbits - central orbits - conic as centered orbit. Chapter 15 Section 15.1 to 15.6, Chapter 16 Section 16.1 to 16.3

Unit - 5: Moment of inertia - Two dimensional motion of a rigid body - equations of motion for two dimensional motion - theory of dimensions - definition of dimensions. Chapter 17 - Section 17.1, Chapter 18 - Section 18.1,18.2, Chapter 19 - Section 19.1

Text Book:

1. Mechanics by P.Duraipandian and Lakshmi Duraipandian. Muthamizh Jayapragasham, S. Chand Co Ltd, 2008.

Reference Book:

2. Dynamics – K. Viswanatha Naik and M.S. Kasi, Emerald Publishers.

COURSE OUTCOME

CO1: Understand the motion along the vertical line under gravity, inclined plane and connected particles.
CO2: Explain the concepts of rectilinear motion under force simple harmonic motion along horizontal line and vertical line.
CO3: Describe the concepts of enveloping parabola or bounding parabola ,direct and oblique impact of two smooth spheres.
CO4: Understand circular motion on a vertical plane, relative rest in revolving cone and simple pendulum.
CO5: Summarize the concepts of moment of inertia and equation of motion for two dimensional motions and apply the concepts to solve problems.

Subject Name: Discrete Mathematics **Year : III**
Subject Code : TAM5D **Semester : V**

Unit - 1: Set, some basic properties of integers Mathematical induction, divisibility of integers, representation of positive integers. Chapter 1 Sections 1.1 to 1.5

Unit - 2: Boolean algebra, two element Boolean algebra, Disjunctive normal form, Conjunctive normal form. Chapter 5 Section 5.1 to 5.4

Unit - 3: Application, simplication of circuits, Designing of switching circuits, Logical Gates and Combinatorial circuits. Chapter 5 Section 5.5 to 5.6

Unit - 4: Sequence and recurrence relation, Solving recurrence relations by iteration method, Modeling of counting problems by recurrence relations, Linear (difference equations) recurrence relations with constant coefficients, Generating functions, Sum and product of two generating functions, Useful generating functions, Combinatorial problems. Chapter 6 Section 6.1 to 6.6.

Unit - 5: Introduction, Walk, Path and cycles, Euler circuit. Chapter 7 Section 7.1 to 7.3

Text Book:

1. Introduction to second Edition, 2002 by M.K. Sen and B.C. Chakraborty, Books and allied Private Ltd. Kolkata.

Reference Books:

1. Elements of Discrete Mathematics, C.L. Liu, New York, Mcgraw-Hill, 1977.
2. Discrete Mathematics for computer scientists by John Truss – Addison Wesley.

COURSE OUTCOME

CO1: Understand sets, properties of integer, mathematical induction and representation of positive integers.
CO2: Explain the concepts of elements of Boolean algebra, disjunctive and conjunctive normal forms and solving the problems related to it.
CO3: Describe the concepts of simplification of circuits, designing of switching circuits, logical gates and combinatorial circuits.
CO4: Summarize the concepts of sequence and recurrence relation, sum and products of two genearting functions and combinatorial problems.
CO5: Paraphrase the concepts of walk, path and cycles and Euler's circuits.

Subject Name: Programminglanguage C With Practicals **Year : III**
Subject Code : TEM5A **Semester : V**

Unit -1: Introduction constants – variables - data types (fundamental and user defined) operators - precedence of operators - library functions - Input, output statements - escape sequences - formatted outputs - storage classes - compiler directives. Chapter 2 Section 2.1 to 2.8, Chapter-3 Section 3.1 to 3.7, 3.12, Chapter 4 Section 4.2-4.5

Unit -2: Decision making and branching simple if, if else, nested if, else if ladder and switch statement - conditional operator - go to statement decision making and looping : while, do while and for statement - nested for loops - continue and break statements. Chapter 5 Section 5.1 to 5.9, Chapter 6 Section 6.1 to 6.5

Unit -3: Arrays : one dimensional and 2 dimensional arrays - declarations - initialization of arrays - operation on strings - string handling functions. Chapter 7 Section7.1 to 7.4, Chapter 8 Section 8.1 to 8.8

Unit -4: Funcitons : Function definition and declaration - categories of functions – recursion - concept of pointers Function call by reference - call by value. Chapter 9 Section 9.1 to 9.13, Chapter 11 Section 11.1 to 11.5

Unit - 5: Files definition operations on files - file operation functions. Chapter 12 Section 12.1 to 12.

Text Book:

1. Programming in ANSI C 2nd edition by E.Balagurusamy, Tata Mcgraw Hill Publishing Company.

Reference Book:

1. Venugopal, programming in C

COURSE OUTCOME

CO1: Use operators and data types in C.
CO2: Explain Input/output operations.
CO3: Use functions and recursion.
CO4: Implement different operation on arrays.

Subject Name: Programming C Practical's **Year : III**
Subject Code : TEM51 **Semester : V**

Writing 'c' programs for the following
1. To convert centigrade to Fahrenheit.
2. To find the area ,circumference of a circle.
3. To convert days into months and days.
4.To solve a quadratic equation.
5. To find sum of n numbers.
6. To find the smallest and largest numbers.
7. To generate Pascal's triangle and Floyd's triangle.
8. To find the trace of a matrix.
9. To add and subtract two matrices.
10. To multiply two matrices.
11. To generate Fibonacci series using function.
12. To compute factorial of a given number , using functions.
13. To add complex numbers using functions.
14. To concatenate to strings using string handling functions.
15. To check whether the given string is a Palindrome or not using string handling functions.

COURSE OUTCOME

CO1: Describe basic programming concepts like algorithm, flowcharts.
CO2: Develop programs to compile and debug.
CO3: Understand program involving decision structures, loops and functions.

Subject Name: Value Education **Year : III**
Subject Code: VAE5Q **Semester : V**

Unit-1: Value education-its purpose and significance in the present world-Value system-The role of culture and civilization-holistic living-Balancing the outer and inner-Body, Mind and Intellectual level-duties and responsibilities.

Unit-2: Salient values for life-Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity, and inclusiveness, Self -esteem and Self-confidence , punctuality-Time, task and resources management – Problem solving and decision making skills-Interpersonal and Intra personal relationship-Team work-Positive and creative thinking.

Unit-3: Human Rights-Universal Declaration of Human Rights-Human Rights violations-National Integration-Peace and non-violence- Dr. APJ Kalam's tenpoints for enlightened citizenship-Social Values and Welfare of the citizen –The role of media in value building.

Unit-4: Environment and Ecological balance-interdependence of all beings-living and non-living. The binding of man and nature-Environment conservation and enrichment.

Unit-5: Social Evils-corruptions , Cyber- crime, Terrorism-Alcoholism, Drug addiction-Dowry-Domestic violence -untouchability-female infanticide-atrocities against women-how to tackle them.

Reference Books:

1. M.G.Chitakra : Education and human values, A.P.H.Publishing Corporation,New Delhi, 2003.
2. Sengupta .R. 2003. Ecology and Economics: An approach to sustainable development. OUP.

COURSE OUTCOME

CO1: Discuss Self-esteem, ego, anger manifestation, Indian ethos in ethics and individuals personality in the eyes of others
CO2: Describe Leadership, ethical business decisions, basic principles of professional ethics and mass media ethics.
CO3: Explain Effects of advertising, value of faith, social awareness and commitment and the steps for the protection of environment
CO4: Analyse Impact of globalization and consumer awareness, signs for an everlasting peace, evolution of human rights and the international law in operation
CO5: Discuss Intellectual activities and responsibility of citizen.

Subject Name: Linear Algebra **Year : III**
Subject Code : TAM6A **Semester : VI**

Unit- 1: Vector spaces, Elementary basic concepts; linear independence and bases. Chapter 4 - Section 4.1 and 4.2

Unit - 2: Dual spaces. Chapter 4 - Section 4.3

Unit - 3: Inner product spaces. Chapter 4 - Section 4.4

Unit - 4: Algebra of linear transformation; characteristic roots. Chapter 6 Section 6.1 and 6.2

Unit - 5: Matrices; canonical forms; triangular forms. Chapter 6 - Sections 6.3 and 6.4

Text Book:

1. Topics in algebra by I.N.Herstein, Wiley Eastern Ltd.

Reference book:

1. First Course in Algebra - John B. Fraleigh, Addison Wesley.

COURSE OUTCOME

CO1: Understand the concepts of vector space, elementary basic concepts, linear independence and basis
CO2: Analyse the concepts of dual space
CO3: Describe the concepts of inner product space
CO4: Explain the concepts of algebra of linear transformation and characteristics roots.
CO5: Summarize the concepts of matrices, canonical forms and triangular forms.

Subject Name: Real Analysis-II **Year : III**
Subject Code : TAM6B **Semester : VI**

Unit - 1: Open sets; closed sets; Discontinuous function onR^1. More about open sets; Connected sets. Chapter 5 - Section 5.4 to 5.6 , Chapter 6 - Section 6.1 and 6.2

Unit - 2: Bounded sets and totally bounded sets: Complete metric spaces; compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity. Chapter 6 - Section 6.3 to 6.8

Unit - 3: Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral; properties of Riemann integral. Chapter 7 - Section 7.1 to 7.4

Unit - 4: Derivatives: Rolle 's Theorem, Law of mean, Fundamental theorems of calculus. Chapter 7 - Section 7.5 to 7.8

Unit - 5: Taylor's theorem; Pointwise convergence of sequences of functions, uniform convergence of sequences of functions.Chapter 8 - Section 8.5 , Chapter 9 - Section 9.1 and 9.2

Text Book:

1. Methods of Real Analysis – Richard R. Goldberg.

Reference Books:

1. Principles of Mathematical Analysis by Walter Rudin.
2. Mathematical Analysis Tom. M. Apostol.

COURSE OUTCOME

CO1: Understand the concepts of open and closed sets, discontinuous functions and connected sets and solving problems based on it.
CO2: Summarize the concepts of bounded and totally bounded set, complete and compact metric space, continuity of inverse function and uniform continuity.
CO3: Learn the concepts of sets of measure zero, Riemann Integral , existence and properties of Riemann integral.
CO4: Explain the concepts of Rolle's theorem, law of Mean, and fundamental theorems of calculus and solve problems based on it.
CO5: Understand and apply the concepts of Taylor's theorem, pointwise convergence and uniform convergence of sequences to compute the problems.

Subject Name: Complex Analysis **Year : III**
Subject Code : TAM6C **Semester : VI**

Unit - 1: Functions of a complex variable - mappings, limits - theorems on limits continuity, derivatives, differentiation formulae - Cauchy-Riemann equations - sufficient conditions for differentiability - Cauchy - Riemann equations in polar form - analytic functions - harmonic function. Chapter 2 - Section 2.9 to 2.12, 2.14 to 2.20 and 2.22

Unit - 2: Linear functions - The transformation w=1/z - linear fractional transformations - an implicit form - exponential and logarithmic transformations - transformation w=sinz - Preservation of angles.Chapter 8 Section 8.68 to 8.71 and 8.73, 8.74 Chapter 9 Section 9.79

Unit - 3: Complex valued functions – contours - contour integrals - anti derivatives - Cauchy-Goursat theorem - Cauchy integral formula - derivatives of analytic function - Liouvillie's theorem and fundamental theorem of algebra - maximum moduli of functions.
Chapter 4 Section 4.30 to 4.42

Unit - 4: Convergence of sequence and series -Taylor's series - Laurent's series - zeroes of analytic functions. Chapter-5 Section 5.43 to 5.47

Unit -5: Residues - Residue theorems - three types of isolated singular points - Residues at poles - Zeroes and poles of order 'm' - Evaluation of improper integrals - Improper integrals involving sines and cosines - definite integrals involving sines and cosines - Argument principle and Rouche's theorem.Chapter 6 Section 6.53 to 6.57 and Chapter 7 Section 7.60 to 7.65

Text Book:

1. Complex variables and applications by James Ward Brown and Ruel V Churchill, Mcgraw Hill Inc.

Reference Books:

1. Complex Analysis – P.Durai Pandian

COURSE OUTCOME

CO1: Explain the concepts of theorems on limits, continuity, derivatives, differentiation and formulae, Cauchy Riemann equation, analytic and harmonic function.
CO2: Understand linear fractional transformation, exponential and logarithmic transformations.
CO3: Apply the concepts of Cauchy integral formula, Liouvillie's theorem and fundamental theorem of algebra to solve problems.
CO4: Interpret the concepts of convergence of sequences and series, Taylor's series and Laurent's series.
CO5: Summarize and apply the concepts of Residues and Poles to solve problems.

Subject Name: Graph Theory **Year : III**
Subject Code : TEM6B **Semester : VI**

Unit - 1: Graphs, sub graphs, degree of a vertex , isomorphism of graphs, independent sets and coverings , intersection graphs and line graphs, adjacency and incidence matrices, operations on graphs. Chapter 2 Section 2.0 - 2.9

Unit - 2: Degree sequences and graphic sequences – simple problems. Connectedness, walks, trails, paths, components, bridge , block, connectivity – simple problems. Chapter 3: Section 3.0-3.2, Chapter 4 Section 4.0 -4.4

Unit - 3: Eulerian and Hamiltonian graphs**.** Chapter 5: Section 5.0-5.2

Unit - 4: Trees – simple problems. Planarity:Definition and properties , Characterization of planar graphs. Chapter 6: Section 6.0-6.2, Chapter 8: Section 8.0-8.2

Unit - 5: Diagraphs and matrices, tournaments, some application connector problem
Chapter 10 Sections 10.0-10.4, Chapter 11 Sections 11.0-11.1

Text Book:

1. Invitation to Graph Theory by S.Arumugam and S.Ramachandran,New Gamma Publishing House, Palayamkottai

Reference Books:

1. A first book at graph theory by John Clark and Derek Allan Holton, Allied publishers.

COURSE OUTCOME

CO1: Understand the concepts of isomorphism of graphs, independent sets, coverings, adjacency and incidence of matrices.
CO2: Describe the connectedness, Walk, trials, paths, components, bridge, block and connectivity
CO3: Interpret the concepts of Eulerian and Hamiltonian graphs.
CO4: Summarize the concepts of trees and evaluate problems based on it.
CO5: Explain the digraphs and matrices, tournaments.

Subject Name: Operations Research **Year : III**
Subject Code : TEM6A **Semester : VI**

Unit - 1: Linear programming: Formulation – graphical solution, Simplex method, Big - M method, Duality – primal – dual relation.Chapter 6: Section 6.1- 6.13, 6.20 - 6.31

Unit - 2: Transportation problem: Mathematical Formulation, Basic Feasible solution, North West Corner rule, Least Cost Method, Vogel's approximation, Optimal solution, Unbalanced Transportation problems, Degeneracy in Transportation Problems.Assignment Problem: Mathematical Formulation, Comparison with Transportation Model,HungarianMethod, Unbalanced Assignment problems. Chapter 9 Section 9.1-9.12, Chapter 8: Sections 8.1-8.5

Unit - 3: Sequencing problem: n jobs on 2 machines – n jobs on 3 machines – two jobs on m machines – n jobs on m machines.Game theory: Two – person zero sum game with saddle point – without saddle point - dominance - solving 2xn or mx2 game by graphical method.
Chapter 10 Sections 10.1-10.6, Chapter 12 Section 12.1-12.15

Unit - 4: Queuing theory: Basic concepts. Steady state analysis of M/M/1 and M/M/S models with finite and infinite capacities. Chapter 5: Section 5.1 – 5.18

Unit -5: Network: Project Network diagram -CPM and PERT computations. (Crashing excluded) Chapter 13 Sections 13.1-13.10

Text Book:

1. Operations Research, by R.K.Gupta, Krishna Prakashan India(p), Meerut Publications.

Reference Books:

1. Gupta P.K. and Hira D.S., Problems in Operations Research,S.Chand & Co.
2. Taha H.A, Operatios Research, Macmillan pub.Company, New York.

COURSE OUTCOME

CO1: Calculate the formulation of LPP, graphical methods and simplex method.
CO2: Evaluate the mathematical formulation of transportation and assignment problems.
CO3: Illustrate Two person Zero-sumgame with saddle points and without saddle points and dominance method.
CO4: Understand the concepts of Queuing theory.
CO5: Summarize the concepts of project network diagrams based on CPM, PERT computation and calculate the problems related to it.