

11O101 ENGINEERING MATHEMATICS-I

(Common to all Branches)

3 1 0 3.5

Unit I

Matrices

Characteristic equation - eigen values and eigen vectors of a real matrix - properties of eigen values - Cayley–Hamilton theorem- Reduction of a real matrix to a diagonal form- Orthogonal matrices- Quadratic form -Reduction of a quadratic form to a canonical form by orthogonal transformation-application to engineering problems.

9 Hours

Unit II

Series and Differential Calculus

Series- Convergences and divergence- Comparison test– Ratio test - Curvature in Cartesian Coordinates- Centre and radius of curvature - Circle of curvature – Evolutes –Envelopes – application to engineering problems.

9 Hours

Unit III

Differential Equation of First Order

Linear differential equation of first order-exact-integrating factor- Euler’s equation-Bernoulli’s-modeling-application to engineering problems.

9 Hours

Unit IV

Differential Equations of Higher Order

Linear differential equations of second and higher order with constant and variable coefficients - Cauchy’s and Legendre’s linear differential equations - method of variation of parameters –application of engineering problems.

9 Hours

Unit V

Laplace Transforms

Laplace Transform- conditions for existence(statement only) -Transforms of standard functions – properties (statement only) - Transforms of derivatives and integrals - Initial and Final value theorems (statement only) - Periodic functions - Inverse transforms - Convolution theorems(statement only) - Applications of Laplace transforms for solving the ordinary differential equations up to second order with constant coefficients-application to engineering problems.

9 Hours

Total: 45+15 Hours

Text Books

1. Grewal B S, *Higher Engineering Mathematics*, Fortieth Edition, Khanna Publications , New Delhi 2007.
2. Kreyszig E, *Advanced Engineering Mathematics*, 8th Edition, John Wiley and Sons, Inc, Singapore, 2008.

Reference Book(s)

1. Ramana B.V, *Higher Engineering Mathematics*, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2007.
2. Bali N.P and Manish Goyal, *Text book of Engineering Mathematics*, 3rd Edition, Laxmi Publications (P) Ltd., 2008.
3. Ray Wylie C and Louis Barrett C, *Advanced Engineering Mathematics*, Tata McGraw-Hill Publishing Company Ltd, 2003.
4. Glyn James, *Advanced Engineering Mathematics*, 3rd Edition, Wiley India, 2007
5. Greenberg M.D, *Advanced Engineering Mathematics*, Second Edition, Pearson Education, Inc. 2002.

110201 ENGINEERING MATHEMATICS II

(Common to all branches)

3 1 0 3.5

Unit I

Functions of Several Variables

Functions of two variables - Partial derivatives - Total differential - Derivative of implicit functions - Maxima and minima - Constrained Maxima and Minima by Lagrangian Multiplier method - Jacobians- application to engineering problems. **9 Hours**

Unit II

Multiple Integrals

Double integration in cartesian and polar co-ordinates - Change of order of integration - change of variables- Area and volume by multiple integrals- application to engineering problems. **9 Hours**

Unit III

Vector Calculus

Gradient - divergence - curl- line - surface and volume integrals - Green's - Gauss divergence and Stokes' theorems (statement only) - application to engineering problems. **9**

Hours

Unit IV

Analytic Functions

Analytic functions- Necessary condition of analytic function-Sufficient condition of analytic function(statement only)- properties - Determination of analytic function using Milne Thomson's method, conformal mappings - Mappings of $w = z + a$, az , $1/z$, e^z - bilinear transformation - application to engineering problems. **9**

Hours

Unit V

Complex Integration

Cauchy's fundamental theorem (statement only)- and application of Cauchy's integral formula(statement only) – Taylor's and Laurent's series- classification of singularities - Cauchy's residue theorem (statement only) – Contour integration - circular and semi circular contours (excluding poles on the real axis)- application to engineering problems **9**

Hours

Total: 45+15

Hours

Textbooks

1. Grewal B. S, *Higher Engineering Mathematics*, Fortieth Edition, Khanna Publications, New Delhi, 2007.
2. Kreyszig E, *Advanced Engineering Mathematics*, John Wiley & Sons, Inc, Singapore, 2008

References

1. Ramana B.V, *Higher Engineering Mathematics*, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2007.
2. Bali N.P and Manish Goyal, *Text book of Engineering Mathematics*, 3rd Edition, Laxmi Publications(P)Ltd., 2008.
3. Glyn James. “ *Advanced Engineering Mathematics*, 3rd Edition, Wiley India, 2007
4. George B. Thomas, Jr. and Ross L.Finney *Calculus and Analytic Geometry*, Addison- Wesley Publishing Company, 1998.
5. Ray Wylie C and Barrett L.C, *Advanced Engineering Mathematics*, Tata McGraw Hill Publications, 2003.

11O301 ENGINEERING MATHEMATICS III
(Common to all branches Except CSE and Bio-Tech)

3 1 0 3.5

UNIT -I

Fourier Series

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range cosine and sine series – Parseval's Identity - Harmonic Analysis- Application to engineering problems. 9 Hours

UNIT –II

Fourier Transform

Fourier transform pair – Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem - Parseval's Identity-Finite Fourier Transform- Application to engineering problems. 9 Hours

UNIT – III

Z -Transform and Difference Equations

Z-transform - Elementary properties – Inverse Z-transform – Convolution theorem -Formation of difference equations – Solution of difference equations using Z- transform - Application to engineering problems.

9 Hours

UNIT-IV

Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solution of standard types of first order partial differential equations (excluding reducible to standard forms) – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients. 9 Hours

UNIT –V

Boundary value problems

Classification of second order quasi linear partial differential equations – Fourier series solutions of one dimensional wave equation – One dimensional heat equation (Insulated ends excluded) – Steady state solution of two-dimensional heat equation (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates . 9 Hours

Total: 45+15=60 Hours

Text Books

- 1 Grewal B. S, *Higher Engineering Mathematics*, 40th Edition, Khanna Publications, New Delhi, 2007.
- 2 Kreyszig E, *Advanced Engineering Mathematics* , 8th Edition , John Wiley & Sons, Inc.,Singapore (2008).

References

1. Ramana B.V, *Higher Engineering Mathematics*, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2007.
2. Bali N.P and Manish Goyal, *Text book of Engineering Mathematics*, 3rd Edition, Laxmi Publications(P)Ltd., 2008.
3. Ray Wylie C and Louis Barrett C, *Advanced Engineering Mathematics*, Tata McGraw-Hill Publishing Company Ltd, 2003.
4. Glyn James. “ *Advanced Engineering Mathematics*, 3rd Edition, Wiley India, 2007

Unit I**Solutions of System of Equations and Eigen Value Problems**

Gauss elimination and Gauss Jordan methods- Crout's method -Gauss-Seidel method -Solution of tri - diagonal equations -Power method for finding dominant eigen value.

9 Hours**Unit II****Interpolation and Curve Fitting**

Difference table -Newton Forward and Backward interpolation- Newton's divided difference interpolation formula - Lagrange's interpolation formula – Fitting of curves by the method of Least squares: Straight line, Parabolic curves and the conversions of equations of the curves in the form of straight lines.

9 Hours**Unit III****Differentiation and Integration**

Numerical differentiation: Newton – Gregory forward and backward interpolation. Numerical integration: Trapezoidal rule and Simpson's 1/3 and 3/8 rules - Two and Three point Gaussian quadrature formulae. Double integrals: Trapezoidal rule and Simpson's rules.

9 Hours**Unit IV****Testing of Hypothesis**

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using normal t, Chi-square and F distributions.

9 Hours**Unit V****Design of Experiments and Quality Control**

Completely randomized design - randomized block design - Latin square design - process control - control charts of measurements and attributes - tolerance limits.

9 Hours**Total: 45+15=60 Hours****Text Books**

1. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. Johnson R.A, *Miller and Freund's Probability and Statistics for Engineers*, Seventh Edition, Prentice Hall of India, New Delhi, 2005.

References

1. Jain M.K, Iyengar S.R.K, Jain R.K, *Numerical Methods For Scientific & Engineering Computation*, New Age International (P) Ltd , New Delhi , 2005.
2. Gerald C. F and Wheatley P.O, *Applied Numerical Analysis*, Seventh Edition, Pearson Education, New Delhi, 2004.
3. Burden R. L and Douglas Fairs J, *Numerical Analysis Theory and Applications*, Cengagl Learning, 2005.
4. Gupta S.C and Kapur J. N, *Fundamentals of Mathematical Statistics*, S.Chand and Co., Ninth Edition, New Delhi, 2008.
5. Walpole R.E, Myers R.H, Myers R.S.L and Ye K, *Probability and Statistics for Engineers and Scientists*, Seventh Edition, Pearsons Education, Delhi, 2002.

11Z301 NUMERICAL AND STATISTICAL METHODS

3 1 0 3.5

Unit I

Solution of Algebraic and Transcendental Equations

Newton Raphson method - Method of false position - Graffe's root squaring method - Bairstow's method. Solution of system of linear equations : Gauss elimination method - crout's method and Gauss-seidel method . Eigen value of a matrix by power method.

9 Hours

Unit II

Finite Differences and Interpolation

Interpolation : Difference table - Newton's forward and backward interpolation - Newton's divided difference interpolation formula-Lagrange's interpolation formula.

9 Hours

Unit III

Numerical Differentiation and Integration

Numerical differentiation using Newton's forward and backward interpolation. Numerical integration-Two and Three point Gaussian quadrature formulae .Trapezoidal rule and Simpson's 1/3 and 3/8 rules-Double integrals using Trapezoidal rule and Simpson's rules

9 Hours

Unit IV

Initial Value Problems for Ordinary Differential Equations

Single step Methods: Taylor's series method for solving first and second order equations-Euler's and Modified Euler's method -Fourth order Runge- Kutta method for solving first order equations-Multistep Methods: Milne's and Adams- Bashforth predictor and corrector methods.

9 Hours

Unit V

Testing of Hypothesis

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using normal, t, Chi-square and F distributions- Tests for independence of attributes and Goodness of fit.

9 Hours

Total: 45+15 Hours

MAT LAB: Invited Lectures on Mat lab and its applications on Numerical methods.

Text Books

1. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. Johnson R.A, *Miller and Freund's Probability and Statistics for Engineers*, Seventh Edition, Prentice Hall of India, New Delhi, 2005.

References

1. Jain M.K, Iyengar S.R.K , Jain R.K, *Numerical Methods For Scientific & Engineering Computation*, New Age International (P) Ltd , New Delhi , 2005.
2. Gerald C.F and Wheatley P. O, *Applied Numerical Analysis*, Seventh Edition, Pearson Education, New Delhi, 2004.
3. Burden R. L and Douglas Fairs J, *Numerical Analysis Theory and Applications*, Cengagl Learning, 2005.
4. Gupta S.C and Kapur J.N, *Fundamentals of Mathematical Statistics*, S.Chand and Co., Ninth Edition, New Delhi, 2008.

11M401 / 11C401 / 11A401 /12K401 NUMERICAL METHODS

3 1 0 3.5

Unit I

Solution of Equations and Eigen Value Problems

Solution of Algebraic and Transcendental equations by the method of False position – Newton- Raphson method- Solution of system of linear equations : Gauss- elimination method and Gauss-Jordan method - Iterative method: Gauss – Seidel method- Inverse of a matrix by Gauss-Jordan method. Eigen value of a matrix by power method.

9 Hours

Unit II

Interpolation and Curve Fitting

Newton 's Forward and Backward interpolation. Newton's Divided difference interpolation formula – Lagrange's interpolation formula – Fitting of curves by the method of Least squares: Straight line,Parabolic curves and the conversion of equations of the curves in the form of straight lines.

9 Hours

Unit III

Numerical Differentiation and Integration

Derivatives from difference table – Numerical differentiation using Newton 's forward and backward interpolation formulae - Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules - Romberg's method - Two and three point Gaussian quadrature formulae - Double integrals using Trapezoidal and Simpson's rules.

9 Hours

Unit IV

Initial Value Problems for Ordinary Differential Equations

Single step Methods : Taylor Series method for solving first and second order equations - Euler's and Modified Euler's methods - Fourth order Runge-Kutta method for solving first order equations - Multistep methods –Milne's and Adam's predictor and corrector methods.

9 Hours

Unit V

Boundary Value Problems

Finite difference solution for the second order ordinary differential equations- Finite difference solution for one dimensional heat equation by implicit and explicit methods - one dimensional wave equation and two dimensional Laplace's and Poisson's equations.

9 Hours

Total: 45+15 Hours

MAT LAB: Invited Lectures on Mat lab and its applications on Numerical methods.

Text books

1. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. Sastry S.S, *Introductory Methods of Numerical Analysis*, Fifth Edition, PHI Learning Pvt. Ltd, 2012.

References

1. Burden R. L, and Faries T.D, *Numerical Analysis*, Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.
2. Sankara Rao K, *Numerical Methods for Scientists and Engineers*, Third Edition, Prentice Hall of India, 2007.
3. Gerald C.F, and Wheatley P.O, *Applied Numerical Analysis*, Sixth Edition, Pearson Education Asia, New Delhi.2006.
4. Chapra S. C and Canale R. P, *Numerical Methods for Engineers*, Fifth Edition, Tata McGraw Hill, New Delhi, 2007.

11N401 NUMERICAL METHODS AND LINEAR PROGRAMMING

3 1 0 3.5

Unit I

Solution of Algebraic and Transcendental Equations

Newton Raphson method , Method of false position , Graffe's root squaring method , Bairstow's method. Solution of system of linear equations : Gauss elimination method , crout's method and Gauss-seidel method , Eigen value of a matrix by power method.

9 Hours

Unit II

Finite Differences and Interpolation

Interpolation: Difference table , Newton's forward and backward interpolation , Newton's divided difference interpolation formula, Lagrange's interpolation formula.

9 Hours

Unit III

Numerical Differentiation and Integration

Numerical differentiation using Newton's forward and backward interpolation. Numerical integration- Two and Three point Gaussian quadrature formulae , Trapezoidal rule and Simpson's 1/3 and 3/8 rules- Double integrals using Trapezoidal rule and Simpson's rules.

9 Hours

Unit IV

Initial Value Problems for Ordinary Differential Equations

Single step Methods: Taylor's series method for solving first and second order equations, Euler's and Modified Euler's method ,Fourth order Runge- Kutta method for solving first order equations-Multistep Methods: Milne's and Adams- Bashforth predictor and corrector methods.

9 Hours

Unit V

Linear Programming

Modelling, Graphical method , Definitions, statement of basic theorems and properties , Simplex method .

9 Hours

Total: 45+15 Hours

MAT LAB: Invited Lectures on Mat lab and its applications on Numerical methods.

Text Books

1. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. Taha H.A, *Operations Research- An Introduction*, 8th Edition, Prentice Hall of India Ltd, New Delhi, 2008.

References

1. Gerald C.F and Wheatley P.O, *Applied Numerical Analysis*, Seventh Edition, Pearson Education, New Delhi, 2004.
2. Burden R.L and Fairs J.R, *Numerical Analysis Theory and Applications*, Cengagl Learning, 2005.
3. Gupta and Hira, *Problems in Operations Research*, S.Chand & Co, New Delhi, 1991.
4. Jain M.K, Iyengar S.R.K and Jain R.K *Numerical Methods For Scientific and Engineering Computation* New Age International (P) Ltd , New Delhi , 2005.

11E401 NUMERICAL METHODS AND OPERATIONS RESEARCH

3 1 0 3.5

Unit I

Solution of Algebraic and Transcendental Equations

Newton Raphson method , Method of false position , Graffe's root squaring method , Bairstow's method. Solution of system of linear equations : Gauss elimination method , crout's method and Gauss-seidel method , Eigen value of a matrix by power method.

9 Hours

Unit II

Finite Differences and Interpolation

Interpolation: Difference table , Newton's forward and backward interpolation , Newton's divided difference interpolation formula, Lagrange's interpolation formula.

9 Hours

Unit III

Numerical Differentiation and Integration

Numerical differentiation using Newton's forward and backward interpolation. Numerical integration- Two and Three point Gaussian quadrature formulae , Trapezoidal rule and Simpson's 1/3 and 3/8 rules- Double integrals using Trapezoidal rule and Simpson's rules.

9 Hours

Unit IV

Initial Value Problems for Ordinary Differential Equations

Single step Methods: Taylor's series method for solving first and second order equations, Euler's and Modified Euler's method ,Fourth order Runge- Kutta method for solving first order equations-Multistep Methods: Milne's and Adams- Bashforth predictor and corrector methods.

9 Hours

Unit V

Linear Programming

Modelling, Graphical method , Definitions, statement of basic theorems and properties , Simplex method .

9 Hours

Total: 45+15 Hours

MAT LAB: Invited Lectures on Mat lab and its applications on Numerical methods.

Text Books

3. Grewal B. S, *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
4. Taha H.A, *Operations Research- An Introduction*, 8th Edition, Prentice Hall of India Ltd, New Delhi, 2008.

References

5. Gerald C.F and Wheatley P.O, *Applied Numerical Analysis*, Seventh Edition, Pearson Education, New Delhi, 2004.
6. Burden R.L and Fairs J.R, *Numerical Analysis Theory and Applications*, Cengagl Learning, 2005.
7. Gupta and Hira, *Problems in Operations Research*, S.Chand & Co, New Delhi, 1991.
8. Jain M.K, Iyengar S.R.K and Jain R.K *Numerical Methods For Scientific and Engineering Computation* New Age International (P) Ltd , New Delhi , 2005.

11 I 401 PROBABILITY AND STATISTICS

Unit I

Probability and Random Variable

Axioms of probability - Conditional probability - Total probability - Baye's theorem - Random variable - Probability mass function - Probability density functions - Properties- Moments - Moment generating functions and their properties. **9 Hours**

Unit II

Standard Distributions

Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties –Problems- Functions of a random variable. **9 Hours**

Unit III

Two Dimensional Random Variables

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem (Without proof). **9 Hours**

Unit IV

Testing of Hypothesis

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using normal,t, Chi-square and F distributions- Tests for independence of attributes and Goodness of fit. **9 Hours**

Unit V

Design of Experiments

Analysis of variance – One way classification –Two way classification –Latin square design.

9 Hours

Total: 45+15=60 Hours

Text books

1. Johnson R.A., *Miller & Freund's ,Probability and Statistics for Engineers* , Pearson Education, Delhi, 2009 .
2. Walpole R.E , Myers R.H, Myers R.S.L and Ye K, *Probability and Statistics for Engineers and Scientists* , Pearsons Education, Delhi , 2002.

References

1. Lipschutz S and Schiller J, Schaum's outline Series, *Introduction to Probability and Statistics*, McGraw Hill Publications, New Delhi, 1998.
2. Gupta S.C and Kapur J. N, *Fundamentals of Mathematical Statistics* , Sultan Chand, NewDelhi 1996.
3. Ross. S , *A first Course in Probability* , Pearson Education, Delhi 2002.

11 L 401 PROBABILITY AND RANDOM PROCESSES

3 1 0 3.5

Unit I

Probability and Random Variables

Axioms of probability - Conditional probability - Total probability – Baye's theorem - Random variable - Probability mass function - Probability density functions- Properties –Moments - Moment generating functions and their properties

9 Hours

Unit II

Standard Distributions

Binomial- Poisson- Geometric- Uniform – Exponential - Gamma and Normal distributions and their properties. Functions of a random variable.

9

Hours

Unit III

Two Dimensional Random Variables

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem (without proof).

9 Hours

Unit IV

Classification of Random Processes

Definition and examples - first order, second order, strictly stationary, wide sense stationary and Ergodic processes - Markov process - Poisson and Normal processes - Sine wave process.

9 Hours

Unit V

Correlation and Spectral Densities

Auto correlation - Cross correlation - Properties – Power spectral density – Cross spectral density - Properties – Wiener-Khintchine relation – Relationship between cross power spectrum and cross correlation function - Linear time invariant system - System transfer function –Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

9 Hours

Total: 45+15 Hours

Text books

1. Peyton J R and Peebles Z, *Probability, Random Variables and Random Signal Principles*, Tata McGraw Hill Publications, New Delhi, 2002.
2. Stark H and Woods J.W, *Probability and Random Processes with Applications to Signal Processing*, Pearson Education, Delhi, 2002.

References

1. Gupta S.C and Kapur J. N, *Fundamentals of Mathematical Statistics*, Sultan Chand and Co., New Delhi, 2002.
2. Och M.K, *Applied Probability and Stochastic Process*, John Wiley & Sons, New York.
3. Athanasios Papoulis, UnniKrishna Pillai. S, *Probability, Random Variables and Stochastic Processes*, Tata McGraw Hill Publications, New Delhi, 2002
4. Johnson R.A, *Miller & Freund's Probability and Statistics for Engineers*, Seventh Edition, Pearson Education, Delhi, 2009.

Unit I**Probability and Random Variables**

Axioms of probability - Conditional probability - Total probability - Baye's theorem - Random variable - Probability mass function - Probability density function - Properties- Moments - Moment generating functions and their properties.

9 Hours**Unit II****Standard Distributions**

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions and their properties - Functions of a random variable-Applications of these distributions in Textile and Apparel Engineering.

9 Hours**Unit III****Two Dimensional Random Variables**

Joint distributions - Marginal and conditional distributions – Covariance - Transformation of random variables - Central limit theorem- Correlation and Regression analysis in Textile Manufacturing.

9 Hours**Unit IV****Testing of Hypothesis**

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions - Tests for independence of attributes and Goodness of fit - Application of these in Textile and Apparel Engineering.

9 Hours**Unit V****Design of Experiments**

Analysis of variance – One way classification – CRD - Two way classification – RBD - Latin square-Box-Hunter, Box- Behnkan, Taguchi designs- process control, control charts of measurements and attributes, tolerance limits- Application of these in Textile and Apparel Engineering.

9 Hours**Total: 45+15 Hours****Text Books**

1. Johnson R. A., *Miller & Freund's Probability and Statistics for Engineers*, Seventh Edition, Pearson Education, Delhi, 2009.
2. Walpole R.E, Myers R.H, Myers R.S.L. and Ye K., *Probability and Statistics for Engineers and Scientists*, Seventh Edition, Pearsons Education, Delhi, 2002.

References

1. Gupta S. C. and Kapur J.N., *Fundamentals of Mathematical Statistics*, Sultan Chand, Ninth Edition, New Delhi, 1996.
2. Leaf G. A.V, *Practical Statistics for Textile Industry*, Vol.1 & Vol.2, Textile Institute, 1984.
3. Ross S, *A first Course in Probability*, Fifth Edition, Pearson Education, Delhi 2002.

11Z401 DISCRETE MATHEMATICS

3 1 0 3.5

Unit I

Propositional Calculus

Propositions- Logical connectives-Compound propositions-Conditional and biconditional propositions- Truth tables – Tautologies and Contradictions – Logical and equivalences and implications- DeMorgan's Laws-Normal forms-Principal conjunctive and disjunctive normal forms –Rules of inference-Arguments-Validity of arguments. **9 Hours**

Unit II

Predicate Calculus

Predicates-Statement Function – Variables-free and bound variables- Quantifiers-Universe of discourse-Logical equivalences and implications for quantified statements- Theory of inference- The rules of universal specification and generalization-Validity of arguments. **9 Hours**

Unit III

Set Theory and Functions

Set Operations-properties-Power set-Relations-Graph and matrix of a relation- Partial Ordering- Equivalence relations-Partitions- Functions –Types of Functions- composition of relation and functions- inverse functions. **9 Hours**

Unit IV

Combinatorics

Basics of Counting – Counting arguments- Pigeonhole Principle- Permutations and Combinations- Recursion and recurrence relations-Generating Functions- Mathematical Induction- Inclusion – Exclusion **9 Hours**

Unit V

Graph Theory

Introduction to Graphs-Graph operations- Graph and Matrices-Graph Isomorphism-Connected Graphs- Euler Graphs- Hamilton paths and circuits- Shortest path problem. **9 Hours**

Total: 45+15Hours

Text Books

1. Rosen K.H *Discrete Mathematics and its Applications*, Tata McGraw Hill Publications, New Delhi. 7th Edition, 2011
2. Alan Doerr and Kenneth Levasseur, *Applied Discrete Structures for Computer Science*, Galgotia Publications Pvt. Ltd. Delhi. 2010.

Reference Books

1. Trembly J P and Manohar R, *Discrete Mathematical Structures with Applications to computer Science*, Tata McGraw Hill Publications Co. Ltd., New Delhi 2003.
2. Ralph P Girmaldi and Ramana B.V. *Discrete and Combinatorial Mathematics: An Applied Introduction*, Fifth Edition, Pearson Education Asia, Delhi, 2007.
3. Kolman Busby Ross, *Discrete Mathematical Structures*, Prentice-Hall India, New Delhi, Fifth Edition, 2007.
4. Edgar G. Goodaire and Michael M. Parmenter, *Discrete Mathematics with Graph Theory*, Prentice-Hall, New Delhi, Third Edition, 2008.

Unit I**Solution of Equations and Eigen Value Problems**

Solution of Algebraic and Transcendental equations by the method of False position – Newton- Raphson method- Solution of system of linear equations : Gauss- elimination method and Gauss-Jordan method - Iterative method: Gauss – Seidel method- Inverse of a matrix by Gauss-Jordan method. Eigen value of a matrix by power method. **9 Hours**

Unit II**Interpolation and Curve Fitting**

Newton 's Forward and Backward interpolation. Newton's Divided difference interpolation formula – Lagrange's interpolation formula – Fitting of curves by the method of Least squares: Straight line, Parabolic curves and the conversion of equations of the curves in the form of straight lines. **9 Hours**

Unit III**Numerical Differentiation and Integration**

Derivatives from difference table – Numerical differentiation using Newton 's forward and backward interpolation formulae - Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules - Romberg's method - Two and three point Gaussian quadrature formulae - Double integrals using Trapezoidal and Simpson's rules. **9 Hours**

Unit IV**Initial Value Problems for Ordinary Differential Equations**

Single step Methods : Taylor Series method for solving first and second order equations - Euler's and Modified Euler's methods - Fourth order Runge-Kutta method for solving first order equations - Multistep methods –Milne's and Adam's predictor and corrector methods. **9 Hours**

Unit V**Boundary Value Problems**

Finite difference solution for the second order ordinary differential equations- Finite difference solution for one dimensional heat equation by implicit and explicit methods - one dimensional wave equation and two dimensional Laplace's and Poisson's equations. **9 Hours**

Total: 45+15 Hours**MAT LAB: Invited Lectures on Mat lab and its applications on Numerical methods.****Text books**

1. Grewal B. S., *Numerical Methods in Engineering and Science with Programms in C & C++*, Ninth Edition, Khanna Publications, 2010.
2. .Sastry S.S, *Introductory Methods of Numerical Analysis*, Fifth Edition, PHI Learning Pvt. Ltd, 2012.

References

1. Burden R. L, and Faries T.D, *Numerical Analysis*, Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.
2. Sankara Rao K. , *Numerical Methods for Scientists and Engineers*, Third Edition, Prentice Hall of India, 2007.
3. Gerald C.F, and Wheatley P.O, *Applied Numerical Analysis*, Sixth Edition, Pearson Education Asia, New Delhi.2006.
4. Chapra S. C. and Canale R. P, *Numerical Methods for Engineers*, Fifth Edition, Tata McGraw Hill, New Delhi, 2007.