GOVERNMENT DEGREE COLLEGE FOR WOMEN (AUTONOMOUS)

BEGUMPET, HYDERABAD-16

Affiliated To Osmania University, Re-Accredited With 'B^{+}' Grade by NAAC

DEPARTMENT OF MATHEMATICS

SYLLABUS (2018-19)

COURSE OBJECTIVE, COURSE OUTCOMES AND SYLLABUS
SEMESTER-I

COURSE CODE: MAT101

COURSE OBJECTIVE:

The main aim of this course is to introduce the students to the concepts of differential and integral calculus to train to apply their skills in solving some of the problems of calculus in higher education and research.

COURSE OUTCOMES (COs):

After completion of this course, the student will be able to

CO1: Gain the understanding of partial differentiation.

CO2: Deliberate in depth functions of two variables.

CO3: Verify whether a given function is continuous or not at a given point by an understanding of the neighbourhood of a point in (a,b).

CO4: Find the limit of a function of two variables.

CO5: Apply and solve homogeneous functions.

CO 6: Differentiate composite functions and implicit functions.

CO7: Compute radius of curvature and length of arc as a function. CO 8: Determine the area of the surface of the frustum of a cone.

UNIT- I

Partial Differentiation: Introduction - Functions of two variables - Neighborhood of a point (a, b) - Continuity of a Function of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two Variables - Homogeneous Functions.

UNIT- II

Theorem on Total Differentials - Composite Functions - Differentiation of Composite Functions - Implicit Functions - Equality of fXY (a, b) and fyz(a, b) - Taylor's theorem for a function of two Variables - Maxima and Minima of functions of two variables – Lagrange's Method of undetermined multipliers.

UNIT- III

Curvature and Evolutes: Introduction - Definition of Curvature - Radius of Curvature - Length of Arc as a Function, Derivative of arc - Radius of Curvature - Cartesian Equations - Newtonian Method - Centre of Curvature - Chord of Curvature. Evolutes: Evolutes and Involutes - Properties of the evolute. Envelopes: One Parameter Family of Curves - Consider the family of straight lines - Definition - Determination of Envelope.

UNIT- IV

Lengths of Plane Curves: Introduction - Expression for the lengths of curves y = f (x) - Expressions for the length of arcs x = f (y); x = f (t), y = ϕ(t); r = f(θ) Volumes and Surfaces of Revolution: Introduction - Expression for the volume obtained by revolving about either axis - Expression for the volume obtained by revolving about any line - Area of the surface of the frustum of a cone - Expression for the surface of revolution – Pappu's Theorems - Surface of revolution.

PRESCRIBED TEXTBOOK :

• Shanti Narayan, P.K. Mittal Differential Calculus, S.CHAND, NEW DELHI 5 • Shanti Narayan Integral Calculus, S.CHAND, NEW DELHI

REFERENCE BOOKS:

• William Anthony Granville, Percey F Smith and William Raymond Longley; Elements of the differential and integral calculus

• Joseph Edwards , Differential calculus for beginners

• Smith and Minton, Calculus

• Elis Pine, How to Enjoy Calculus

• Hari Kishan, Differential Calculus

SEMESTER-II

COURSE CODE: MAT101

DIFFERENTIAL EQUATIONS

COURSE OBJECTIVE:

The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

COURSE OUTCOMES (COs):

After completion of this course, the student will be able to

CO1: Gain the complete understanding of linear differential equations of first order and first degree.

CO2: Deliberate in depth differential equations of first order and first degree. CO3: Verify whether a given differential equation is exact or not.
CO4: Identify the appropriate integrating factors to make a non-exact differentiable equation to exact.

CO5: Apply and solve first order differential equations

CO6: Equipped with the various tools to solve few types differential equations that arise in several branches of science.

UNIT- I

Differential Equations of first order and first degree: Introduction - Equations in which variables are separable - Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form - Linear Differential Equations - Differential Equations Reducible to Linear Form - Exact differential equations - Integrating Factors - Change in variables - Total Differential Equations - Simultaneous Total Differential Equations - Equations of the form dx/P = dy/Q = dz/R .

UNIT- II

Differential Equations first order but not of first degree: Equations Solvable for p - Equations Solvable for y - Equations Solvable for x - Equations that do not contain x (or y)- Equations Homogeneous in x and y - Equations of the First Degree in x and y - Clairaut's equation. Applications of First Order Differential Equations : Growth and Decay - Dynamics of Tumour Growth - Radioactivity and Carbon Dating - Compound Interest - Orthogonal Trajectories.

UNIT- III

Higher order Linear Differential Equations: Solution of homogeneouslinear differential equations with constant coefficients - Solution of non-homogeneous differential equations P (D)y = Q(x) with constant coefficients by means of polynomial operators when Q(x) = be ^{ax}, b sin ax, b cos ax, bx^{k}, V e ^{ax}- Method of undetermined coefficients.

UNIT- IV

Method of variation of parameters - Linear differential equations with non constant coefficients - The Cauchy - Euler Equation - Legendre's Linear Equations - Miscellaneous Differential Equations. Partial Differential Equations: Formation and solution- Equations easily integrable - Linear equations of first order.

PRESCRIBED TEXT BOOK :

• Zafar Ahsan, Differential Equations and Their Applications

REFERENCE BOOKS:

. Frank Ayres Jr, Theory and Problems of Differential Equations.

• Ford, L.R, Differential Equations

• Daniel Murray, Differential Equations.

• S. Balachandra Rao, Differential Equations with Applications and Programs.

• Stuart P Hastings, J Bryce McLead; Classical Methods in Ordinary Differential Equations.

SEMESTER III

COURSE CODE: MAT301

REAL ANALYSIS

COURSE OBJECTIVE:

The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Deliberate in details real number systems

CO 3: Give examples of sequences and series.

CO 4: Understand the underlying vital basic concepts of real analysis such as epsilon delta definition of limit of a sequence and convergence of a sequence.

CO 4: Determine the continuity and uniform continuity of a function at a point. CO 5: Compute limits of given functions
CO 6: Explain the properties of continuous functions

CO 7: Prove and apply the mean value theorems

CO 8: Elaborate the geometrical representations of mean value theorems CO 9: Apply Taylor's and Maclaurian's theorems
CO 10: Differentiate the Darboux and Riemann integrals

CO 11: Gain the significance of the Fundamental theorem of Integral calculus in integration.

UNIT- I

Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences. Monotone Sequences and Cauchy Sequences –Subsequences-Lim sup and Lim inf-Series-Alternating Series and Integral Tests .

UNIT- II

Continuity: Continuous Functions -Properties of Continuous Functions - Uniform Continuity - Limits of Functions

UNIT- III

Differentiation: Basic Properties of the Derivative - The Mean Value Theorem - L'Hospital Rule - Taylor's Theorem and Maclaurin's theorem.

UNIT- IV

Integration : The Riemann Integral - Properties of Riemann Integral- Fundamental Theorem of Calculus.

PRESCRIBED TEXTBOOK :

• Kenneth A Ross ,Elementary Analysis-The Theory of Calculus.

REFERENCE BOOKS:

• S.C. Malik and Savita Arora, Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International (P) Limited, New Delhi, 1994.

• William F. Trench, Introduction to Real Analysis

• Lee Larson , Introduction to Real Analysis I

• Shanti Narayan and Mittal, Mathematical Analysis

• Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; Elementary Real analysis

• Sudhir R., Ghorpade, Balmohan V., Limaye; A Course in Calculus and Real Analysis 9 1.4

SEMESTER III

SEC-II

THEORY OF EQUATIONS

COURSE OBJECTIVE:

Students learn the relation between roots and coefficients of a polynomial equation, Descartes's rule of signs in finding the number of positive and negative roots if any of a polynomial equation besides some other concepts of Numerical Analysis.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.
CO 2: Deliberate in details of theory of equations.

CO 3: Compute maxima and minima values of polynomials.

CO 4: Determine the number of roots of an equation.

CO 5: Use DesCartes Rule of signs for positive and negative roots. CO 6: Establish relation between the roots and coefficients of a given polynomial. CO 7: Evaluate the cube roots units.
CO 8: Give examples of roots of symmetric functions.

UNIT- I

Graphic representation of a polynomial-Maxima and minima values of polynomials Theorems relating to the real roots of equations-Existence of a root in the general equation -Imaginary rootsTheorem determining the number of roots of an equation Equal roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots.

UNIT- II

Relations between the roots and coefficients-Theorem-Applications of the theorem Depression of an equation when a relation exists between two of its roots-The cube roots of unity Symmetric functions of the roots-examples.

SEMESTER-IV

COURSE CODE: MAT401

ALGEBRA

COURSE OBJECTIVE:

The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.

COURSE OUTCOMES:

On successful completion of the course students will be able to

CO1: Appreciate its interdisciplinary nature.
CO 2: Recognize algebraic structures that arise in matrix algebra, linear algebra. CO 3: Apply the skills learnt in understanding various such subjects. CO 4: Give examples of various groups and subgroups under various binary operations. CO 5: Identify generators of cyclic groups.
CO 6: Operate permutation groups.

CO 7: Understand and apply concepts of cosets in permutation grous and in other topics of algebra.

CO 8: Prove and apply Lagrange's theorem.

CO 9: Identify and operate on normal subgroups and factor groups.

CO 10: Use homomorphism, isomorphism and automorphism in proving theorems and solving problems.

CO 11: Establish properties of ideals, concepts of principal, prime and maximal ideals.

CO 12: Determine factor rings and ring homomorphism.

UNIT- I

Groups: Definition and Examples of Groups- Elementary Properties of Groups- Finite Groups - Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups. Cyclic Groups: Properties of Cyclic Groups - Classification of Subgroups Cyclic Groups.

UNIT- II

Permutation Groups: Definition and Notation -Cycle Notation-Properties of Permutations -A Check Digit Scheme Based on D5. Isomorphisms ; Motivation Definition and Examples -Cayley's Theorem Properties of Isomorphisms - Automorphisms-Cosets and Lagrange's Theorem Properties of Cosets 138 -

Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball.

UNIT- III

Normal Subgroups and Factor Groups: Normal Subgroups-FactorGroups Applications of Factor Groups -Group Homomorphisms - Definition and Examples - Properties of Homomorphisms -The First Isomorphism Theorem. Introduction to Rings: Motivation and Definition -Examples of Rings - Properties of Rings - Subrings. Integral Domains: Definition and Examples - Fields –Characteristics of a Ring.

UNIT- IV

Ideals and Factor Rings: Ideals -Factor Rings -Prime Ideals and Maximal Ideals. Ring Homomorphisms: Definition and Examples-Properties of Ring-Homomorphisms.

PRESCRIBED TEXTBOOK :

• Joseph A Gallian, Contemporary Abstract algebra (9th edition)

REFERENCE BOOKS:

• Herstein, I.N, Topics in Algebra

• Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R,Basic Abstract Algebra • Fraleigh, J.B, A First Course in Abstract Algebra.

• Robert B. Ash, Basic Abstract Algebra

• I Martin Isaacs, Finite Group Theory

• Joseph J Rotman, Advanced Modern Algebra

SEMESTER IV

SEC-IV

NUMBER THEORY

COURSE OBJECTIVE:

Students will be exposed to some of the jewels like Fermat's theorem, Euler's theorem in number theory.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Deliberate in details of Number theory.

CO 3: Prove the Goldbach conjecture.

CO 4: Explain the properties of congruences.

CO 5: Write binary and decimal representations of integers.

CO 6: Establish the number theoretic functions.

CO 7: Apply Euler's generalization of Fermat's theorem.

CO 8: Use Euler's Phi function

CO 9: Give examples of Sum and Number of Divisors.

UNIT- I

The Goldbach conjecture - Basic properties of congruences- Binary and Decimal Representation of integers - Number Theoretic Functions; The Sum and Number of divisors- The Mobius Inversion Formula- The Greatest integer function.

UNIT- II

Euler's generalization of Fermat's Theorem: Euler's Phi function- Euler's theorem SomeProperties of the Euler's Phi function.

PRESCRIBED TEXTBOOK :

• David M Burton,Elementary Number Theory (7e)

REFERENCE BOOKS:

• Thomas Koshy, Elementary Number Theory and its Applications • Kenneth H Rosen, Elementary Number Theory 35 1.12

SEMESTER-V
COURSE CODE: MAT501

LINEAR ALGEBRA

COURSE OBJECTIVE:

The students are exposed to various concepts like vector spaces , bases , dimension, eigen values etc.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Deliberate in detailed vector spaces.

CO 3: Give examples of vector spaces and subspaces.

CO 4: Understand the underlying vital basic concepts of vector space such as pivot columns and pivot positions

CO 4: Determine the dimensions of Null space, Row space and Column space of a given matrix.

CO 5: Compute Ranks of Null space, Row space and Column space of a given matrix. CO 6: Evaluate the eigenvalues and eigenvectors.

CO 7: Prove and apply the concepts of eigenvalues and eigenvectors in other areas of mathematics.

CO 8: Establish the complex eigenvalues and eigenvectors.
CO 9: Apply Linear algebra concepts to differential equations.

CO 10: Write the characteristic equation for a given matrix.

CO 11: Differentiate between Linear dependence and linear independence of sets. UNIT- I

Vector Spaces: Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space.

UNIT- II

Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation. UNIT- III

Diagonalization -Eigenvectors and Linear Transformations-Complex Eigenvalues Applications To Differential Equations.

UNIT-IV

Orthogonality and Least Squares : Inner Product, Length, and Orthogonality - Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

PRESCRIBED TEXTBOOK :

• David C Lay,Linear Algebra and its Applications

REFERENCE BOOKS:

• S Lang, Introduction to Linear Algebra

• Gilbert Strang , Linear Algebra and its Applications • Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; Linear Algebra

• Kuldeep Singh; Linear Algebra

• Sheldon Axler; Linear Algebra Done Right

SEMESTER V

INTEGRAL CALCULUS

COURSE OBJECTIVE:

Techniques of multiple integrals will be taught.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Know about its applications in finding areas and volumes of some solids. CO 2: Evaluate double integrals integrals.
CO 3: Compute double integrals over a rectangle.

CO 4: Apply double integrals over general regions in a plane.

CO 5: Change the order of integration.

CO 6: Solve triple integrals.

CO 7: Change variables in triple integrals.

UNIT- I

Areas and Volumes: Double Integrals-Double Integrals over a Rectangle-Double Integrals over General Regions in the Plane-Changing the order of Integration.

UNIT- II

Triple Integrals: The Integrals over a Box- Elementary Regions in Space-Triple Integrals in General

UNIT- III

Change of Variables: Coordinate Transformations-Change of Variables in Triple Integrals.

PRESCRIBED TEXTBOOK :

• Susan Jane Colley,Vector Calculus(4e)

REFERENCE BOOKS:

• Smith and Minton, Calculus

• Shanti Narayan and Mittal , Integral calculus

• Ulrich L. Rohde , G. C. Jain , Ajay K. Poddar and A. K. Ghosh; Introduction to Integral Calculus.

SEMESTER V

COURSE CODE: 500/SECE

MATHEMATICAL MODELLING COURSE

OBJECTIVE:

This topic aims to provide the student with some basic modelling skills that will have application to a wide variety of problems.

COURSE OUTCOMES:

The focus is on those mathematical techniques that are applicable to models involving differential equations, and describe rates of change. Student realizes some beautiful problems can be modeIled by using differential equations. The students also learn how to use the mathematical technique in solving differential equations.

After the completion of the course students will be in a position to

CO 1: Appreciate beauty and applicability of the course.

CO 2: Learn how to use the mathematical technique in solving differential equations.

CO 3: The focus is on those mathematical techniques that are applicable to models involving differential equations, and describe rates of change.

CO 4: Realizes some beautiful problems can be modeled by using differential equations.

CO 5: Formulate Heat and Mass Transport Models.

CO 6: Understand mathematical modelling of exponential decay and radioactivity. CO 7: Apply models of single populations.

CO 8: Use Boundary value problems.

CO 9: Write heat conduction equation.

UNIT-I

Linear Models -Non Linear Models - Modeling with Systems of First order Differential Equations.

UNIT- II

Linear Models: Initial- Value Problems- Spring/ Mass Systems;Undamped Motion Spring/Mass Systems;Free Damped Motion- Spring/ Mass Systems; Driven Motion Series Circuit Analogue- Linear Models: Boundary Value Problems.

PRESCRIBED TEXTBOOK :

- **1. B.Barnes and G.R.Fulford, Mathematical Modelling with Case Studies 3rd Edition, 2009, CRC press**

REFERENCE BOOKS:

- **1. Shepley L. Ross, "Differential Equations".**
- **2. I. Sneddon , Elements of Partial Differential Equations**
- **3.Zafar Ahsan, "Differential Equations and their Applications"**

SEMESTER VI

COURSE CODE: MAT601

NUMERICAL ANALYSIS

COURSE OBJECTIVE:

Students will be made to understand some methods of numerical analysis. COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Students realize the importance of the subject in solving some problems of algebra and calculus.

CO 2: Appreciate beauty and applicability of the course.

CO 3: Deliberate in details of numerical analysis.

CO 4: Find errors in numerical calculations.

CO 5: Solve equations in one variable .

CO 6: Apply bisection, iteration, false position, Newton's and Muller's methods. CO 7: Use Newton's formula for interpolation.

CO 8: Apply Gauss's, Stirling's, Bessel's , Lagrange's and Newton's formulae for forward, backward and central interpolation.

CO 9: Learn numerical differentiation and numerical integration. UNIT- I

Errors in Numerical Calculations - Solutions of Equations in One Variable: The Bisection Method - The Iteration Method - The Method of False Position- Newton's Method - Muller's Method - solution of Systems of Nonlinear Equations.

UNIT- II

Interpolation and Polynomial Approximation: Interpolation-Finite Differences Differences of Polynomials - Newton's formula for Interpolation - Gauss's central differences formulae - Stirling's and Bessel's formula - Lagrange's Interpolation Polynomial - Divided Differences - Newton's General Interpolation formula - Inverse Interpolation.

UNIT- III

Curve Fitting: Least Square Curve Fitting: Fitting a Straight Line-Nonlinear Curve Fitting. Numerical Differentiation and Integration: Numerical Differentiation –

Numerical Integration: Trapezoidal Rule-Simpson's 1/3rd-Rule and Simpson's 3/8th Rule - Boole's and Weddle's Rule - Newton's Cotes Integration Formulae.

UNIT- IV

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Picard's Method - Euler's Methods - Runge Kutta Methods.

PRESCRIBED TEXT BOOK :

- **S.S.Sastry,Introductory Methods of Numerical Analysis, PHI**

REFERENCE BOOKS:

- **Richard L. Burden and J. Douglas Faires,Numerical Analysis (9e)**
- **M K Jain, S R K Iyengar and R K Jain, Numerical Methods for Scientific and Engineering computation**
- **B.Bradie , A Friendly introduction to Numerical Analysis 1.7**

SEMESTER VI

COURSE CODE: MAT601

VECTOR CALCULUS

COURSE OBJECTIVE:

Concepts like gradient, divergence, curl and their physical relevance will be taught. COURSE OUTCOMES:

Students realize the way vector calculus is used to address some of the problems of physics.

After the completion of the course students will be in a position to

CO 1: Students realize the way vector calculus is used to address some of the problems of physics.

CO 2: Appreciate beauty and applicability of the course.

CO 3: Establish the work done against a force.

CO 4: Evaluate line integrals.

CO 5: Write binary and decimal representations of integers.

CO 6: Determine conservative vector fields.

CO 7: Find surface integrals.

CO 8: Compute volume integrals.

CO 9: Understand the concepts of gradient, divergence, curl and establish relations among them.
CO 10: Apply Taylor's series .

CO 11: Use gradient of a scalar field.

CO 12: Determine conservative fields and potentials.

UNIT- I

Line Integrals: Introductory Example - Work done against a Force-Evaluation of Line Integrals Conservative Vector Fields. Surface Integrals: Introductory Example : Flow Through a Pipe. Evaluation of Surface Integrals.

UNIT- II

Volume Integrals: Evaluation of Volume integrals Gradient, Divergence and Curl: Partial differentiation and Taylor series-Partial differentiation. Taylor series in more than one variable-Gradient of a scalar field-Gradients, conservative fields and potentials-Physical applications of the gradient.

UNIT- III

Divergence of a vector field -Physical interpretation of divergence-Laplacian of a scalar fieldCurl of a vector field-Physical interpretation of curl-Relation between curl and rotation-Curl and conservative vector fields.

PRESCRIBED TEXTBOOK :

• P.C. Matthews, Vector Calculus

REFERENCE BOOKS:

• G.B. Thomas and R.L. Finney, Calculus

• H. Anton, I. Bivens and S. Davis ; Calculus

• Smith and Minton, Calculus

SEMESTER VI

COURSE CODE: 600/SEC/E

GRAPH THEORY

COURSE OBJECTIVE:

The students will be exposed to some basic ideas of graph theory.

COURSE OUTCOMES:

CO 1: Students will be able to appreciate the subject learnt.

CO 2: Define some basic concepts of graph theory.

CO 3: Determine isomorphism.
CO 4: Understand and draw paths and circuits.

CO 5: Apply Hamiltonian cycles.

CO 6: Establish shortest path algorithms.

UNIT-I

Graphs: A Gentle Introduction - Definitions and Basic Properties - Isomorphism. UNIT- II

Paths and Circuits: Eulerian Circuits - Hamiltonian Cycles -The Adjacency Matrix Shortest Path Algorithms.

PRESCRIBED TEXTBOOK :

• Edgar Goodaire and Michael M. Parmenter,Discrete Mathematics with Graph Theory (2e)

REFERENCE BOOKS:

• Rudolf Lidl and Gunter Pilz, Applied Abstract Algebra

• S Pirzada , Introduction to Graph Theeory.

SEMESTER VI

GE1

QUANTITATIVE APTITUDE

COURSE OBJECTIVE:

The students will be aware of competitive aptitude.

COURSE OUTCOMES:

CO 1: Students will be able to appreciate the subject learnt.

CO 2: Find least common multiple (LCM), Highest common factor(HCF) and greatest common divisor (GCD) of given numbers.

CO 3: Evaluate square roots and cube roots.

CO 4: Compute percentages.

CO 5: Determine profit and loss.

CO 6: Calculate simple interest and compound interest.
CO 7: Solve problems based on ratio and proportion.

UNIT-I

Least common multiple (LCM), Highest common factor (HCF), Greatest common divisor (GCD), Square root, Cube root.

UNIT- II

Percentages, Profit and Loss, Simple Interest, Compound Interest, Ratio and Proportion.

PRESCRIBED TEXTBOOK :

- **Quantitative Aptitude by R.S.Agarwal.**

REFERENCE BOOKS:

- **Exam expert Quantitative Aptitude by Willey.**

SEMESTER VI

COURSE CODE: 600/ GE/E

VERBAL AND LOGICAL REASONING

COURSE OBJECTIVE:

Students will be aware of competitive aptitude.

COURSE OUTCOMES:

After the completion of the course students will be in a position to

CO 1: Apply the verbal and logical reasoning concepts to solve problems on aptitude. CO 2: Appreciate the verbal and logical reasoning techniques.
CO 3: Establish easy and shortcut methods.

CO 4: Understand coding and decoding.

CO 5: Solve time and work & time and distance problems.

CO 6: Determine the solutions of permutation and combination problems. CO 7: Interpret the data.

UNIT-I

Sequences and series, coding and decoding, time and work, time and distance, data interpretation.

UNIT-II

Probability, permutation and combination - sitting arrangement, calendar problems. PRESCRIBED TEXT BOOK :

Quantitative Aptitude by R.S. Agarwal

REFERENCE BOOKS:

Exam expert Quantitative Aptitude by Willey