DEPARTMENT OF MATHEMATICS

S.No.	Course Code	Course Title	Course Outcomes (CO)
1.	BS104	Paper I Differential Calculus	On completion of this course, the students will be able to: **CO1:**By the time students completes the course they realize wide ranging Applications of thesubject. **CO2:**Successive differentiation. **CO3:**Expansions of Functions- Mean value theorems **CO4:**Partial differentiation - Homogeneous functions **CO5:** Indeterminate forms - Curvature andEvolutes **CO6:**Maxima and Minima of functions of two variables. **CO7:**Lagrange's Method of multipliers –Asymptotes-Envelopes. .
2.	BS204	**Paper II DifferentialEquations**	After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science. **CO1:**The main aim of this course is to introduce the students to the techniques of solving differential equations **CO2**: Differential Equations of first order and first degree: **CO3:** Exact differential equations **CO4:** Differential Equations Reducible to Linear Form. **CO5:** Higher order linear differential equations: Solution of Homogeneous linear differential equations with constant coefficients - . **CO6:** Method of undetermined coefficients. **CO7:** Linear differential equations with non constant coefficients – The Cauchy - EulerEquation. **CO8:** Formation and solution- Equations easily integrable – Linear equations of firstorder.

3.	**BS 304**	**Paper – III** **Real Analysis**	After the completion of the course students will be in a position to appreciate beauty and applicability of the course. **CO1:**: Limits of Sequences- A Discussion about Proofs **CO2:**Limit Theorems for Sequences. **CO3:**Monotone Sequences and Cauchy Sequences -Subsequence's. **CO4:**Alternating Series and Integral Tests. **CO5:** Continuous Functions **CO6:**Properties of Continuous Functions **CO7:**Basic Properties of the Derivative - The Mean Value Theorem **CO8:** Fundamental Theorem of Calculus.
4.	**BS401**	**Paper IV** **Algebra**	On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects. **CO1:**Definition and Examples of Groups **CO2:**Elementary Properties of Groups-. **CO3:**Terminology and Notation -Subgroup Tests – Examples of Subgroups

			CO4: Properties of Cyclic Groups - Classification of Subgroups Cyclic Groups. **CO5:** Definition and Notation -Cycle Notation- Properties of Permutations **CO6:**Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem **CO7:** NormalSubgroups-FactorGroups **CO8:**Definition and Examples - Fields –Characteristics of a Ring.
5.	**BS 501**	**Paper V Linear Algebra**	After completion this course students appreciate its interdisciplinary nature. **CO1:**Vector Spaces and Subspaces **CO2:**Null Spaces, Column Spaces, and Linear Transformations. **CO3:**Linearly Independent Sets; Bases -Coordinate Systems – The Dimension of a Vector Space. **CO4:**Rank-Change of Basis – Eigen values and Eigenvectors **CO5:**The Characteristic Equation **CO6:**Diagonalization-EigenvectorsandLinearTransformations **CO7:** ComplexEigen values-Applicationsto DifferentialEquations. **CO8:** Inner Product, Length, and Orthogonality. - Orthogonal Sets - Orthogonal Projections -
6.	**BS:601/A**	**DSE-1F/A Numerical Analysis**	Students realize the importance of the subject in solving some Problems of algebra and calculus. . **CO1:** Errors in Numerical Calculations- Solutions of Equations in One Variable: **CO2:** solution of Systems of Nonlinear Equations.. **CO3:** Interpolation - Finite Differences - Differences of Polynomials – Newton's formula for Interpolation - **CO4:** Divided Differences -Newton's General Interpolation formula- Inverse Interpolation. **CO5:**Least Square Curve Fitting: Fitting a Straight Line **CO6:** Numerical Differentiation and Integration: **CO7:**Numerical Solutions of Ordinary Differential Equations:. **CO8:** Euler's Methods - Runge Kutta Methods.
7.	**BS:601/C**	**DSE - 1F/C**	Students understand the beautiful interplay between algebra and

		Analytical Solid Geometry	geometry. **CO1:**Definition-The Sphere Through Four Given Points **CO2:** Equation of a Tangent Plane-Angle of Intersection of Two Spheres -. **CO3:** Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex **CO4**-Intersection of a Line with a Cone. **CO5:**The Right Circular Cone-The Cylinder-. **CO6:** The Right Circular Cylinder **CO7:**General Equation of the Second Degree-Intersection of Line with a Conicoid - Plane of contact-Enveloping Cone and Cylinder. **CO8:** Plane of contact-Enveloping Cone and Cylinder
8.	**BS:606**	**DSE-1F/B Vector Calculus**	Students realize the way vector calculus is used to addresses some of the problems of physics. **CO1:**Work done against a Force-Evaluation of Line Integrals **CO2:** Integrals Conservative Vector Fields-Surface Integrals **CO3:** Evaluation of Volume integrals Gradient, Divergence and Curl **CO4**: Partial differentiation and Taylor series **CO5:**Gradient of a scalar field-Gradients **CO6** Conservative fields **CO7:**Divergence of a vector field - Curl of a vector field Relation between curl and rotation- **CO8:** Relation between curl and rotation-
9.	**BS: 301**	**SEC – 1 Theory of Equations**	On completion of this course the students will be able to; **CO1:** By using the concepts the students are expected to solve Some of the polynomial equations. **CO2:** Graphic representation of a polynomial. **CO3:** Existence of a root in the general equation. **CO4:**Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots. **CO5:**Relations between the roots and coefficients **CO6:**The cube roots of unity Symmetric functions of theroots.
10.	**BS: 401**	**SEC-2 Transportation and Game**	On the completion of this course, the students will be able to; **CO1**: Students come to know about the applications of Operations Research.

		theory	**CO2:**A Streamlined Simplex Method for the Transportation Problem. **CO3:**The Assignment Problem. **CO4:**The Formulation of Two-Person, Zero-Sum Games- Graphical Solution Procedure **CO5:** Solving by Linear Programming - Extensions.
11.	**BS:401**	**SEC-2D Number Theory**	Student uses the knowledge acquired solving some divisor problems. **CO1**: The Goldbach conjecture - Basic properties of congruence **CO2:** Binary and Decimal Representation - of integers **CO3:**Number Theoretic Functions; The Sum and Number of divisors. **CO4:** Euler's generalization of Fermat's Theorem **CO5:** Euler's Phi function- Euler's theorem Some Properties
	BS: 501	**SEC-3 Mathematical Modelling**	On the completion of this course, the students will be able to **CO1**: Student realizes some problems can be modelled by using Differential equations. **CO2:**Linear Models-Nonlinear Models-Modeling with Systems of First-Order DEs. **CO3:**Initial-Value Problems. **CO4:**Driven Motion-Series Circuit Analogue. **CO5:** Boundary-Value Problems.
12.	**BS: 601**	**SEC-4 Game Theory**	On the completion of this course, the students will be able to; **CO1**: Come to know about nice applications of Operations Research **CO2** A Gentle Introduction - Definitions and Basic Properties - Isomorphism. **CO3:**Paths and Circuits. **CO4:**Eulerian Circuits - Hamiltonian Cycles. **CO5:** The Adjacency Matrix Shortest Path Algorithms.

13.	**BS 502**	**GE-1 Lattice Theory**	Students apply their knowledge to solve some problems on switching circuits. **CO1:**Properties and Examples of Lattices. **CO2:** Minimal Forms of Boolean Polynomials. **CO3:** ApplicationsofLattices. **CO4:**ApplicationsofSwitchingCircuits– **CO5:**MoreApplications of BooleanAlgebras.
14.	**BS602**	**GE-2 Elements of Number Theory**	Students apply their knowledge problems on check digits, modular designs. **CO1:**Prime and Composite Numbers. **CO2:** Fermat Numbers- GCD. **CO3:** The Euclidean Algorithm. **CO4:**The Chinese Remainder Theorem **CO5:**General Linear Systems
15.	**BS:502(A)**	**Generic Elective- V(A) Basic Mathematics**	Students learn the techniques which have been applied successfully to an increasingly wide variety of complex problems in business **CO1:** Student realizes how the quantitative analysis will be an aid to decision-making process. **CO2:**Cartesian Coordinates system- Polar Coordinates- DistanceFormulaSection Formula -Centroid of a Triangle Area of a Triangle. **CO3:**Definitions of the Terms - Different Forms of the Equations of a Straight Line - Distance of a point from a Straight Line - Angle between two Lines and Condition of Parallelism and Perpendicularity of Lines **CO4:**Point of intersection of Two Lines – Condition of Concurrency of Three Given Straight Lines - Position of a Point with respect to a given Line. **CO5:**Definitions and Notations - Operations on Matrices Determinant of a Square Matrix - Non Singular matrix and Singular Matrix - Sarrus Diagram for Expansion of Determinant of a matrix 3*X*3 - Properties of Determinants **CO6:** Rank of a Matrix – Application of Rank concept – Minor and Cofactor – Adjoint of a Square matrix -Inverse of a

			Square Matrix – Matrix Equation – Methods to Solve Linear System of Equations – Solution to the linear system of Equations – Types of Solutions - Cramer”s rule - Matrix Inversion method