B.A./B.Sc. I (SEMESTER-I) PAPER-I Differential Calculus & Integral Calculus

Programme: Certificate Class: B.A./B.Sc.	Year: First	Semester: First
Course Code: B030101T	Subject: Mathematics	
	Course Title: Differential Calculus & Integral Calculus	

Course outcomes:

CO1: The programme outcome is to give foundation knowledge for the students to understand basics of mathematics including applied aspect for developing enhanced quantitative skills and pursuing higher mathematics and research as well.

CO2: By the time students complete the course they will have wide ranging application of the subject and have the knowledge of real valued functions such as sequence and series. They will also be able to know about convergence of sequence and series. Also, they have knowledge about curvature, envelope and evolutes and trace curve in polar, Cartesian as well as parametric curves.

CO3: The main objective of the course is to equip the student with necessary analytic and technical skills. By applying the principles of integral he learns to solve a variety of practical problems in science and engineering.

CO4: The student is equipped with standard concepts and tools at an intermediate to advance level that will serve him well towards taking more advance level course in mathematics.

Credits: 4	Core Compulsory / Elective
Max. Marks: 25+75	

B.A./B.Sc. I (SEMESTER-I) Paper-II Practical

Programme: Certificate Class: B.A./B.Sc.	Year: First	Semester: First
Course Code: B030102P	Subject: Mathematics	
	Course Title: Practical	

Course outcomes:

CO1: The main objective of the course is to equip the student to plot the different graph and solve the different types of equations by plotting the graph using different computer software such as Mathematica /MATLAB /Maple /Scilab/Maxima etc.

CO2. After completion of this course student would be able to know the convergence of sequences through plotting, verify Bolzano-Weierstrass theorem through plotting the sequence, Cauchy's root test by plotting n^{th} roots and Ratio test by plotting the ratio of nth and $(n + 1)^{th}$ term.

CO3. Student would be able to plot Complex numbers and their representations, Operations like addition, substraction, Multiplication, Division, Modulus and Graphical representation of polar form.

CO4: Student would be able to perform following task of matrix as Addition, Multiplication, Inverse, Transpose, Determinant, Rank, Eigenvectors, Eigenvalues, Characteristic equation and verification of the Cayley-Hamilton theorem, Solving the systems of linear equations.

B.A./B.Sc. I (SEMESTER-II) PAPER-I Matrices and Differential Equations & Geometry

Programme: Certificate Class: B.A./B.Sc.	Year: First	Semester: Second
Course Code: B030201T	Subject: Mathematics	
	Course Title: Matrices and Differential Equations & Geometry	

Course outcomes:

CO1: The subjects of the course are designed in such a way that they focus on developing mathematical skills in algebra, calculus and analysis and give in depth knowledge of geometry, calculus, algebra and other theories.

CO2: The student will be able to find the rank, eigen values of matrices and study the linear homogeneous and non-homogeneous equations. The course in differential equation intends to develop problem solving skills for solving various types of differential equation and geometrical meaning of differential equation.

CO3: The subjects learn and visualize the fundamental ideas about coordinate geometry and learn to describe some of the surface by using analytical geometry.

CO4: On successful completion of the course students have gained knowledge about regular geometrical figures and their properties. They have the foundation for higher course in Geometry.

Credits: 6	Core Compulsory / Elective

B.A./B.Sc.II (SEMESTER-III) PAPER-I Algebra & Mathematical Methods

Programme: Diploma Class: B.A./B.Sc.	Year: Second	Semester: Third
	Subject: Mathematics	
Course Code: B030301T	Course Title: Algebra & Mathematical Methods	

Course outcomes:

CO1: Group theory is one of the building blocks of modern algebra. Objective of this course is to introduce students to basic concepts of Group, Ring theory and their properties.

CO2: A student learning this course gets a concept of Group, Ring, Integral Domain and their properties. This course will lead the student to basic course in advanced mathematics and Algebra.

CO3: The course gives emphasis to enhance students' knowledge of functions of two variables, Laplace Transforms, Fourier Series.

CO4: On successful completion of the course students should have knowledge about higher different mathematical methods and will help him in going for higher studies and research.

| Credits: 6 | | Core Compulsory / Elective |

B.A./B.Sc. II (SEMESTER-IV) PAPER-I Differential Equations & Mechanics

Programme: Diploma Class: B.A./B.Sc.	Year: Second	Semester: Fourth
	Subject: Mathematics	
Course Code: B030401T	Course Title: Differential Equations & Mechanics	

Course outcomes:

CO1: The objective of this course is to familiarize the students with various methods of solving differential equations, partial differential equations of first order and second order and to have qualitative applications.

CO2: A student doing this course is able to solve differential equations and is able to model problems in nature using ordinary differential equations. After completing this course, a student will be able to take more courses on wave equation, heat equation, diffusion equation, gas dynamics, non linear evolution equation etc. These entire courses are important in engineering and industrial applications for solving boundary value problem.

CO3: The object of the paper is to give students knowledge of basic mechanics such as simple harmonic motion, motion under other laws and forces.

CO4: The student, after completing the course can go for higher problems in mechanic such as hydrodynamics, this will be helpful in getting employment in industry.

| Credits: 6 | | Core Compulsory / Elective |

B.A./B.Sc. III (SEMESTER-V) PAPER-I Group and Ring Theory & Linear Algebra

Programme: Degree Class: B.A./B.Sc.	Year: Third	Semester: Fifth
	Subject: Mathematics	
Course Code: B030501T	Course Title: Group and Ring Theory & Linear Algebra	

Course outcomes:

CO1: Liner algebra is a basic course in almost all branches of science. The objective of this course is to introduce a student to the basics of linear algebra and some of its applications.

CO2: Students will be able to know the concepts of group, ring and other related properties which will prepare the students to take up further applications in the relevant fields.

CO3: The student will use this knowledge in computer science, finance mathematics, industrial mathematics and bio mathematics. After completion of this course students appreciate its interdisciplinary nature.

| Credits: 5 | | Core Compulsory / Elective |

B.A./B.Sc. III (SEMESTER-V) PAPER-II (i) Number Theory & Game Theory

Programme: Degree	Year: Third	Semester: Sixth
Class: B.A./B.Sc.		

	Subject: Mathematics
Course Code: B030502T	Course Title: Number Theory & Game Theory

Course outcomes:

CO1: Upon successful completion, students will have the knowledge and skills to solve problems in elementary number theory and also apply elementary number theory to cryptography.

CO2: This course provides an introduction to Game Theory. Game Theory is a mathematical framework which makes possible the analysis of the decision making process of interdependent subjects. It is aimed at explaining and predicting how individuals behave in a specific strategic situation, and therefore help improve decision making.

CO3: A situation is strategic if the outcome of a decision problem depends on the choices of more than one person. Most decision problems in real life are strategic.

CO4: To illustrate the concepts, real-world examples, case studies, and classroom experiments might be used.

B.A./B.Sc. III (SEMESTER-VI) PAPER-I METRIC SPACES & COMPLEX ANALYSIS

Programme: Degree	Year: Third	Semester: Sixth
Class: B.A./B.Sc.		

	Subject: Mathematics
Course Code: B030601T	Course Title: METRIC SPACES & COMPLEX ANALYSIS

Course outcomes:

CO1: The course is aimed at exposing the students to foundations of analysis which will be useful in understanding various physical phenomena and gives the student the foundation in mathematics.

CO2: After completion of this course the student will have rigorous and deeper understanding of fundamental concepts in Mathematics. This will be helpful to the student in understanding pure mathematics and in research.

CO3: Students will be able to know the concepts of metric space, basic concepts and developments of complex analysis which will prepare the students to take up further applications in the relevant fields.

B.A./B.Sc. III (SEMESTER-VI) PAPER-II Numerical Analysis & Operation Research

Programme: Degree	Year: Third	Semester: Sixth
Class: B.A./B.Sc.		

	Subject: Mathematics
Course Code: B030602T	Course Title: Numerical Analysis & Operations Research

Course outcomes:

CO1: The aim of this course is to teach the student the application of various numerical technique for variety of problems occurring in daily life. At the end of the course the student will be able to understand the basic concept of Numerical Analysis and to solve algebraic and differential equation.

CO2: The main outcome will be that students will be able to handle problems and finding approximated solution. Later he can opt for advance course in Numerical Analysis in higher Mathematics.

CO3: The student will be able to solve various problems based on convex sets and linear programming. After successful completion of this paper will enable the students to apply the basic concepts of transportation problems and its related problems to apply in further concepts and application of operations research.

B.A./B.Sc. III (SEMESTER-VI) PAPER-III Practical

Programme: Degree Class: B.A./B.Sc.	Year: Third	Semester: Sixth	
		Subject: Mathematics	
Course Code: B030603P		Course Title: Practical	

Course outcomes:

The main objective of the course is to equip the student to solve the transcendental and algebraic equations, system of linear equations, ordinary differential equations, Interpolation, Numerical Integration, Method of finding Eigenvalue by Power method (up to 4 × 4), Fitting a Polynomial Function (up to third degree).