DEPARTMENT OF MATHEMATICS (UG)

PROGRAMME OUTCOMES

- Formulate and analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions.
- Use mathematical and statistical techniques to solve well-defined problems and present their mathematical work, both in oral and written format, to various audiences (students, mathematicians and non-mathematicians).
- Read, understand and construct correct mathematical and statistical proofs

to make use of the library and electronic data-bases to locate information on mathematical problems.

- Explain the importance of mathematics and its techniques to solve real life problems and provide the limitations of such techniques and the validity of the result.
- Propose new mathematical and statistical questions and suggest possible software packages and / or computer programming to find solutions to these questions.
- Continue to acquire mathematical and statistical knowledge and skills suitable to professional activities and demonstrate highest standards of ethical issues in mathematics.
- To develop a positive attitude towards mathematics as an interesting and valuable subject of study.
- To enhance the interest in the subject among the students and motivate them to pursue research programs.

Course Outcomes:

Semester 1	
Course	Outcomes
Differential Equations	CO 1: To identify the type of given differential equation and select and apply the appropriate analytical technique for finding the solution of first order and selected higher order ordinary differential equations. CO 2: To create and analyze mathematical models using first order differential equations to solve application problems such as circuits, mixture problems, population modeling, orthogonal trajectories and slope fields. CO 3: Locate and use information to solve first and second order differential equations.

	CO 4: Must be in a position to have an intuition and computational ability / understanding of differential equations by solving a variety of application problems arising from different areas, Example: Biology, Ecology ….. etc. CO 5: The ability to integrate knowledge and ideas of differential equations in a coherent and meaningful manner for solving real world problems. CO 6: To determine fundamental solutions and independence using the wronskian. CO 7: To create and analyze mathematical models using higher order differential equations to solve application problems such as harmonic oscillator and circuits. CO 8: To solve higher order linear differential equations using reduction of order, undetermined coefficients, or variation of parameters.

Semester 2	
Course	Outcomes
Three- Dimensional Analytical Solid Geometry	CO 1: To develop their inductive and deductive reasoning skills and to apply these skills in the advanced study of Geometric relationships. CO 2: To express the problems geometrically and to get the solution. CO 3: To explore the basic concepts and methods of Euclidean Geometry while deepening their understanding about plane and Solid Geometry. CO 4: To classify three dimensional figures namely plane, Right line, sphere, cone, cylinder according to their properties. CO 5: To acquaint the knowledge of right circular cones and reciprocal cones.

Semester 3	
Course	Outcomes
Abstract Algebra	CO 1: To understand the abstract definition of a group, and be familiar with the basic types of examples, including numbers, symmetry groups and groups of permutations and matrices. CO 2: To understand what subgroups are, and be familiar with the proof of Lagrange's Theorem. CO 3: Ability to determine whether a subset of a Group is a Subgroup of that Group. CO 4: Verifies whether a function between Groups is a Homomorphism and obtain the kernel and Image of any Homomorphism. CO5: Decides whether a given group is cyclic and to find the Generator for a subgroup of a finite cyclic Group of a given order. CO6: To understand the definition of various types of Ring Theory and be familiar with a number of examples, including numbers, polynomials and matrices.

Semester 4	
Course	Outcomes
Real Analysis	CO 1: To apply mathematical concepts and principles to perform numerical and symbolic computations. Define and recognise the basic topological properties of R. To have the knowledge of the series of real numbers and convergence CO 2: To use appropriate technique to investigate and solve the problems of sequences and infinite series. CO 3: To write clear and precise proofs. Co 4: To communicate effectively in both written and oral form. CO 5: To demonstrate the ability to read and learn mathematics and / or statistics independently.

Semester 5	
Course	Outcomes
Linear Algebra	CO 1: To understand and use the basic concepts of linear algebra and matrices, including linear transformations, eigenvectors and the characteristics polynomial. CO 2: Ability to apply Row-Reduction and Echelon forms using pivots, pivot columns, pivot position. CO3: Computing linear combinations, their span and how they are related to each other geometrically. CO 4: To understand the basic theory of inner products and apply it to questions of orthogonality and / or diagonalizability.

Semester 6	
Course	Outcomes
Numerical Analysis	CO 1 To become familiar with MATLAB and other convenient numerical software such as Microsoft Excel and simple programming. CO 2: To obtain numerical solutions to problems of mathematics. CO 3: To describe and understand the several errors and approximation in numerical methods. CO 4: To understand several available solutions in Iteration methods. CO 5: To explain and understand the several available methods to solve the simultaneous equations. CO 6: To study curve fitting and interpolating.

Semester 6	
Course	Outcomes
Integral Transformation	CO 2: Ability to solve a problem of time domain function by converting it into frequency domain function using laplace and inverse laplace transforms. CO 1: To determine the solution for differential equation without finding the arbitrary constants by reducing a linear differential equation to an algebraic equation. CO 3: To simplify calculations in system modeling, where large number of differential equations are used. CO 4: Demonstrate their understating of the shifting theorems, fourier integral theorems, Inverse Fourier Sine and Cosine transform and apply it in solving boundary value problems. CO 5: He / she will be able to relate both Fourier and laplace transform using both, they can solve boundary value problems.

Semester 6	
Course	Outcomes
Advanced Numerical Analysis	CO 1: To investigate and provide accurate solutions to real life problems. CO 2: Attains a numerical solution for problems where an analytical solution does not exist by the numerical method. CO 3: To develop actual computer codes to solve real problems by numerical analytical techniques. CO 4: To design and analyse the technique to give approximate but not accurate solution to difficult problems. CO 5: To Create, analyse, and implement algorithms for obtaining numerical solutions to problems involving continuous variable. CO 6: Strives to enable students to understand analytical development, technical principles related to numerical linear algebra. CO 7: To discuss the major approximation involved in non-linear numerical analysis.