Mathematics (UG)

Programme outcomes

PO1: It is to give foundation knowledge for the students to understand basics of mathematics including applied aspect for the same.
PO2: It is to develop enhanced quantitative skills and pursuing higher mathematics and research as well.
PO3: Students will become employable; they will be eligible for career opportunities in Industry, or will be able to opt for entrepreneurship.

PO4: Students will possess basic subject knowledge required for higher studies, professional and applied courses like Management Studies, Law etc.

PO5: Scientific temper in general and mathematical temper in particular will be developed in students.
PO6: Imbibe effective scientific and/or technical communication in both oral and writing.
PO7: Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

Programme Specific Outcomes

PSO1: A student should be able to recall basic facts about mathematics and should be able to display knowledge of conventions such as notations, terminology.
PSO2: A student should get adequate exposure to global and local concerns that explore them many aspects of mathematical sciences.
PSO3: Student is equipped with mathematical modeling ability, critical mathematical thinking, and problem-solving skills etc.
PSO4: Student should be able to apply their skills and knowledge in various fields of studies including, science, engineering, commerce and management etc.
PSO5: Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them. Inculcate mathematical reasoning.
PSO6: Nurture problem solving skills, thinking, creativity through assignments, project work.

Course outcomes

Course B 226: Linear Algebra and Matrices

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: To learn to find Eigen values and Eigen vectors of a matrix which is used in the study of vibrations, chemical reactions and geometry.
CO3: To learn Inner Product spaces and Gram-Schmidt process of orthogonalization.
CO4: solve a system of linear equations by row-reducing its augmented form. Perform the matrix operations of addition, multiplication and transposition and express a system of simultaneous linear equations in matrix form. determine whether or not a given matrix is invertible and if it is, find its inverse.
The student will use this knowledge in computer science, finance mathematics
CO5:, industrial mathematics and bio mathematics. After completion of this Course students appreciate its interdisciplinary nature.

Course B 227: Differential equations and Integral Transforms

CO1: Identify, analyze and subsequently solve physical situations whose behavior can be described by ordinary differential equations, Understand the order, degree and various standard forms of differential equations.
CO2: Determine solutions to first order linear differential equations, explain an integrating factor, which may reduce the given differential equation into an exact one and eventually provide its solutions
CO3: Familiarize the orthogonal trajectory of the system of curves on a given surface, determine solutions to first order exact differential equations, determine solutions to second order linear homogeneous differential equations with constant coefficients, understand the basic knowledge of complimentary function and particular integral.
CO4: Determine solutions to second order linear non-homogeneous differential equations with constant coefficients, Evaluate and apply linear differential equations of second order (and higher), Obtain power series solutions of differential equations

CO5: Develop the ability to apply differential equations to significant applied and/or theoretical problems, Investigate the qualitative behavior of solutions of systems of differential equations, Identify and obtain the solution of Clairaut's equation, Be familiar with the modeling assumptions and derivations that lead to PDEs.
CO6: Describe the origin of partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals , Familiarize with the various techniques of finding the solution of the differential equation, Acquire the idea of Lagrange's method for solving the first order linear partial differential equations , Recognize the major classification of PDEs and the qualitative differences between the classes of equations , Be competent in solving linear PDEs using classical solution methods
CO7: ¬ Have understanding regarding different kind of integral transforms. Understand Fourier transform and its properties and will be able to solve the examples based on it. Have deep understanding of Laplace Transformation and its real life application. Solve initial value problem and boundary value problem using Laplace Transform. Derive Fourier series representation of Periodic functions.

Course B 228: <u>Mechanics</u>

CO1: The object of the paper is to give students knowledge of basic mechanics such as simple harmonic motion, motion under other laws and forces.
CO2: 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.
CO3: Familiarize with subject matter, which has been the single centre, to which were drawn mathematicians, physicists, astronomers, and engineers together.
CO4: Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body.
CO5: Determine the centre of gravity of some materialistic systems and discuss the equilibrium of a uniform cable hanging freely under its own weight.
CO6: Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles.
CO7: Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton.

Course B 326: <u>Analysis</u>

CO1: Understand basic properties of real number system such as least upper bound property and Order property.
CO2: Realize importance of bounded, convergent, Cauchy and monotonic sequences of real numbers, find their limit superior and limit inferior.
CO3: Apply various tests to determine convergence and absolute convergence of a series of real numbers.
CO4: Learn about Riemann inerrability of bounded functions and algebra of R-integrable functions.
CO6: Determine various applications of the fundamental theorem of integral calculus. Relate concepts of uniform continuity, differentiation, integration and uniform convergence.
CO7: 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.
CO8: 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.

Course B 327: Linear Programming Problem

CO1: The student will be able to solve various problems based on convex sets and linear programming.
CO2: Learn to solve system of linear equation.
CO3: Learn to solve Diophantine equation.
CO4: Learn to find roots of polynomial over rational.
CO5: Learn to find graphs, roots and primes integer using maxima software.
CO6: Analyze and solve linear programming models of real life situations.
CO7: Provide graphical solutions of linear programming problems with two variables, and illustrate the concept of convex set and extreme points.
CO8: Understand the theory of the simplex method.
CO9: Know about the relationships between the primal and dual problems, and to understand sensitivity analysis.
CO10: Learn about the applications to transportation, assignment and two-person zero-sum game problems.

Course B 328: Numerical Methods and Computer Fundamentals

CO1: Obtain numerical solutions of algebraic and transcendental equations.
CO2: Find numerical solutions of system of linear equations and check the accuracy of the solutions.

CO3: Learn about various interpolating and extrapolating methods.
CO4: Solve initial and boundary value problems in differential equations using numerical methods.
CO5: Apply various numerical methods in real life problems.
CO6: 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.
CO7: Bridge the fundamental concepts of computers with the present level of knowledge of the students.
CO8: Understand binary, hexadecimal and octal number systems and their arithmetic.
CO9: Understand how logic circuits and Boolean algebra forms as the basics of digital computer.
CO10: Understand operating system
CO11: Understand computer software and programming and computer networks.