**BACHELOR OF SCIENCE (MATHEMATICS)**

**SEMESTER – I**

**CORE I- CLASSICAL ALGEBRA (21UMA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Gain knowledge about binomial, exponential, and logarithmic series.

**CO2**: Examine the consistency of linear equations and the application of Cayley Hamilton theorems.

**CO3**: Know the application of relations between the roots and coefficients of an equation.

**CO4**: Analyse the method of solving reciprocal equations and diminishing the roots of an equation.

**CO5**: Examine the existence of roots in an equation and determine the roots by using Newton's and Horner’s methods.

**CORE II: CALCULUS (21UMA02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Gain knowledge about curvature and envelopes.

**CO2**: Gain knowledge about integration and its application.

**CO3**: Determine the double and triple integration and its application.

**CO4**: Know the gamma integration and its properties.

**CO5**: Determine the multiple integrals using beta and gamma functions.

**ALLIED-I COURSE I-PHYSICS (21PHA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Realise the behaviour and properties of solids.

**CO2**: Contrast an overview of the fundamental principles of waves and oscillation.

**CO3**: Gain knowledge on thermodynamic laws.

**CO4**: Understand the fundamental law of gravitation.

**CO5**: Effectively formulate the electrical circuit problem into a mathematical problem using circuits, laws, and theorems.

**SEMESTER II**

**CORE III – ANALYTICAL GEOMETRY OF 2D AND 3D (21UMA03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To gain knowledge about conic 2D

**CO2**: Understand the concepts of coplanar lines and skew lines and the shortest distance between them.

**CO3**: To gain knowledge about and identify the characteristics of a sphere.

**CO4**: Enhance the fundamental concepts of cone and cylinder.

**CO5**: To develop the concept of coincidences.

**CORE IV: TRIGONOMETRY AND VECTOR ANALYSIS (21UMA04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Recall the basic concept and understand the expansions of trigonometric functions.

**CO2**: Acquire knowledge of hyperbolic functions and the logarithm of complex numbers.

**CO3**: Gain knowledge on the concepts of divergence, curl, and integration of vector point functions.

**CO4**: Analyse and work with the problems related to line integrals, surface integrals, and volume integrals.

**CO5**: Solve the problems related to Gauss's and Green’s theorems.

**ALLIED-I COURSE II – PHYSICS (21PHA02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Know the vector atom model, coupling schemes, and Pauli’s exclusion principle.

**CO2**: Acquire knowledge of the structure of the nucleus and nuclear models.

**CO3**: Gain knowledge on bonding in crystals and simple crystal structures.

**CO4**: Expand knowledge on the theory of energy bands in crystals and basic logic gates.

**CO5**: Understand the basic principles of LASER, MASER, and their uses.

**SEMESTER III**

**CORE –V NUMBER THEORY (21UMA05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To understand the basic properties of integers

**CO2**: Formally understand and prove various theorems.

**CO3**: Applying theoretical results acquired to solve different problems

**CO4**: The concept of continued fractions

**CO5**: To understand the method to apply the pollard rho factoring method.

**CORE VI – DIFFERENTIAL EQUATIONS (21UMA06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Students will be able to classify the differential equations with respect to order and identify

**CO2**: Students will be able to solve the second-order differential equations.

**CO3**: Determine linear differential equations with constant coefficients.

**CO4**: Students will be able to understand the basic properties of standard PDEs.

**CO5**: To solve the problems in Clairaut’s form.

**SEMESTER IV**

**CORE VII – LAPLACE TRANSFORM AND FOURIER SERIES (21UMA07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Have a sound knowledge of Laplace transform and its properties.

**CO2**: Have sufficient exposure to get the solution to certain linear differential equations using the Laplace transform and the inverse transform.

**CO3**: Have an idea of periodic functions and come to know how to expand the given function as a series of sines and cosines, which are simple periodic functions.

**CO4**: Have an idea of the Fourier transform and its properties.

**CO5**: Determine the partial differential equation and independent variables.

**CORE VIII – NUMERICAL METHODS (21UMA08)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Use numerical methods to solve the algebraic and transcendental equations by using bisection, Newton's method, and some iterative methods.

**CO2**: Have sufficient exposure to constructing different tables and using Newton’s forward formula.

**CO3**: Have learned to construct a divided difference table and to use Stirling’s, Bessels's, and Lagrange’s interpolation formulas.

**CO4**: Have understood numerical differentiation, trapezoidal geometry, and Simpson’s rule.

**CO5**: Have learned the methods like matrix inversion, Gaussian, and the Gauss-Sedal method.

**SEMESTER V- MODERN ALGEBRA (21UMA09)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the concepts of various subgroups and their applications.

**CO2**: Acquire knowledge about the concepts of homomorphisms, isomorphisms, and automorphisms.

**CO3**: Gain knowledge about the concepts of rings and quotient rings.

**CO4**: Analyse the concept of fields and euclidean rings.

**CO5**: Analyse and demonstrate the properties of polynomial rings.

**CORE X – REAL ANALYSIS (21UMA10)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Find the linear dependence and independence dimensions of spaces.

**CO2**: Know the concepts of null spaces, ranges, and matrix representations of a linear transformation.

**CO3**: Solve a system of linear equations by using rank.

**CO4**: Understand the inner product spaces.

**CO5**: Compute the orthogonal projection of a vector.

**CORE XI – OPERATION RESEARCH (21UMA11)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Formulate simple reasoning and learning optimisation problems.

**CO2**: Analyse a problem and select a suitable strategy.

**CO3**: Apply an appropriate method to obtain the solution to a problem.

**CO4**: Manipulate the basic mathematical structures underlying these methods.

**CO5**: Evaluate analytically the limitations of these methods.

**CORE XII-MECHANICS (21UMA12)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To recollect the basic concept of forces and understand Varignon's theorem.

**CO2**: To understand the laws of friction and equilibrium of a particle on a rough, inclined plane under a force

**CO3**: To understand that the path of a projection is a parabola and to apply the concept of a projectile.

**CO4**: To understand the impulse and impulsive force and to gain knowledge about the collision of elastic bodies.

**CO5**: To understand the geometrical representation of simple harmonic motion and solve the problems with the second pendulum.

**SBEC III-C PROGRAMMING (21UMAS03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the structure of the C programme, its keywords, declaration of variables, and defining symbolic constants.

**CO2**: Use arithmetic operators, logical operators,  relational operators,  increment and decrement operators, and conditional operators while writing a C programme.

**CO3**: Know the decision-making using IF , ELSE, and jumps in loops using GOTO,FOR DO, and SWITCH statements.

**CO4**: Define one-dimensional arrays, two-dimensional arrays, and to declare string variables.

**CO5**: Understands the need for user-defined functions, return values and their types, calling functions, and categories of functions.

**SEMESTER VI**

**CORE XIII: LINEAR ALGEBRA (21UMA13)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the basic concepts of sequence and series.

**CO2**: Understand and prove various theorems.

**CO3**: Understand the method to solve simple problems by applying concepts of analysis.

**CO4**: Understand the elementary matrix and linear equations.

**CO5**: Understand the inner product space and norms.

**CORE XIV: REAL ANALYSIS –II (21UMA14)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the concept of connectedness, completeness, and compactness of metric spaces.

**CO2**: Understand the basic concepts of Riemann integration and solving simple problems.

**CO3**: Solving problems by using theorems on derivatives

**CO4**: Understand Rolle’s Theorem and its application.

**CO5**: Understand the basic concepts of uniform convergence and its application.

**CORE XV: COMPLEX ANALYSIS (21UMA15)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Know the concepts of limits, continuity, and analytic functions.

**CO2**: Solve complex integrals.

**CO3**: Discuss convergence of sequence and series, Taylor series, and Laurent series.

**CO4**: Find different singularities and residues.

**CO5**: Understand various linear transformations and conformal mappings.

**CORE XVI:  GRAPH THEORY (21UMA16)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Formally understand and prove theorems and lemmas.

**CO2**: Apply theoretical knowledge acquired to solve realistic problems in real life.

**CO3**: Apply the principles and concepts of graph theory in practical situations and improve your proof-writing skills.

**CO4**: To understand the concepts of Euler graphs and Hamilton graphs.

**CO5**: To understand the concepts of directed graphs, directed paths, and Euler digraphs.