KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited by NAAC with 'A+' Grade (4th Cycle)

College of Excellence (UGC)

Coimbatore – 641 029

DEPARTMENT OF MATHEMATICS

COURSE OUTCOMES (CO)

B.SC. MATHEMATICS

For the students admitted
in the
Academic Year 2021-2022

Programme Code: 02		B.Sc Mathematics		
Course Code: 21UMA101		Core Paper 1 - Classical Algebra		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	4	60	4

Course Objectives

1. To get the knowledge of convergence and divergence of a series.
2. To find the summation of series.
3. To understand the nature of the roots of an algebraic equation.

Course Outcomes (CO)

K1 to K5	CO1	Finding the roots of a polynomial function.
	CO2	Classifying convergence and divergence of a series.
	CO3	Applying the Binomial theorem, Exponential theorem, logarithmic theorem to find summation of series.
	CO4	Analyzing the nature of the roots of the equation.
	CO5	Evaluating the problem by using Horner's method.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA102		Core Paper 2 –CALCULUS		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	5	75	4

Course Objectives

1. To give basic knowledge about Mathematical concepts in calculus.
2. To evaluate double and triple integrals.
3. To learn different methods of integration, Beta and Gamma integrals which form the basis for higher studies.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the formulas in differentiation and integration.
	CO2	Interpret the definite integral geometrically as the area under a curve.
	CO3	Apply the concept of definite integral to solve various kinds of problems.
	CO4	Analyze the values of the derivative at a point algebraically.
	CO5	Evaluating the integrals using the computational tool MATLAB.

Programme Code : 02		B.Sc Mathematics		
Course Code : 21UMA1I1		Allied Paper 1-STATISTICS – I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	7	105	5

Course Objectives

1. To enable the students to acquire the knowledge of statistics.
2. To remember the properties of various statistical functions.
3. To understand the concepts of some statistical distributions.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concepts of probability and random variables
	CO2	Understanding the properties of some distributions.
	CO3	Solving mean, median, mode, moments and moment generating functions of Binomial, Poission and Normal distributions.
	CO4	Analyzing how correlation is used to identify the relationships between variables and how regression analysis is used to predict outcomes.
	CO5	Determining the relationship between Binomial, Poisson and Normal distributions

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA203		Core Paper 3 - Differential Equations And Laplace Transforms		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	4	60	4

Course Objectives

1. To solve second-order linear differential equations with constant and variable coefficient.
2. To get the ability of solving first and second order ordinary differential equations and first order partial differential equations.
3. To get the knowledge about Laplace and inverse Laplace transforms.

Course Outcomes (CO)

K1 to K5	CO1	Recalling the concept of first order linear differential equations.
	CO2	Understanding the concept of first order higher degree ordinary differential equations
	CO3	Solving Linear partial differential equations by using the Lagrange's method.
	CO4	Analyzing the concepts of Laplace transforms and inverse Laplace transforms to solve ODE with constant coefficients.
	CO5	Evaluating the general and complete solutions of first order PDE's

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA204		Core Paper 4 - Trigonometry, Vector Calculus And Fourier Series		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	5	75	4

Course Objectives

1. To enable the students to get basic knowledge of trigonometry
2. To bring in the knowledge of vector calculus and its applications in theorems
3. To understand the expansions of Fourier series.

Course Outcomes (CO)

K1 to K5	CO1	Defining the hyperbolic and inverse hyperbolic functions.
	CO2	Illustrating the Fourier co-efficient for Periodic functions.
	CO3	Applying the differential operator to find Gradient, Divergence and Curl
	CO4	Examining the multiple integrals by applying Gauss divergence theorem, Stoke's theorem and Green's theorem.
	CO5	Evaluating the double and triple integral.

Programme Code : 02		B.Sc Mathematics		
Course Code : 21UMA2I2		Allied Paper 2-STATISTICS – II		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	7	105	5

Course Objectives

1. To enable the students to give inference on statistical population based on sample statistics.
2. To Understand the concepts of various estimators.
3. To study the concepts of analysis of variance.

Course Outcomes (CO)

K1 to K5	CO1	Finding the derivations of t, χ^2 and F distributions.
	CO2	Explaining the procedure for Testing of hypothesis and sampling of attributes.
	CO3	Applying the concepts of various distributions in real time situations.
	CO4	Analyzing one - way and two – way Classifications and design of experiments.
	CO5	Interpreting the analysis of data using various test using MATLAB.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA305		Core Paper 5 - Analytical Geometry		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	III	4	60	4

Course Objectives

1. To gain knowledge about coordinate geometry and also about geometrical aspects.
2. To know the concepts of cone and cylinder.
3. To determine coordinate axes and coordinate planes in the dimensional space.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the equation of a line that passes through a given point which is parallel or perpendicular to a given line.
	CO2	Understanding the results based on the properties of a sphere.
	CO3	Identifying conic sections.
	CO4	Analyzing the concepts of geometry.
	CO5	Evaluating geometric problems using MATLAB

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA306		Core Paper 6 –Statics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	III	3	45	4

Course Objectives

1. To enablethe knowledge of Forces and Moments.
2. To understand the notionsof Friction.
3. To solve problems under friction and equilibrium of strings**.**

Course Outcomes (CO)

K1 to K5	CO1	Remembering the notions of friction and equilibrium of strings and deploy them in solving the problems.
	CO2	Understanding the concepts of forces and moments.
	CO3	Applying the concepts of forces in finding the resultant of any number of forces and the resultant of force and moments.
	CO4	Analyzing the basics of coplanar forces and equilibrium of forces acting on a rigid body and solving the problems.
	CO5	Estimating the coefficient of friction and normal reaction of a body on a rough inclined plane under equilibrium condition.

SEMESTER-III

PART-IV SBS I – GENERAL AWARENESS

Total Hours : 30 **Total Credits: 3**

Course Objectives

1. To acquire knowledge in relation to various competitive examinations.
2. To encourage the students to newspaper reading and journals.
3. To familiarise the students with online examinations which are being adopted in competitive examinations.

Course Outcomes (CO)

K1 to K5	CO1	Knowledge about literature, Reasoning, Science and Technology and Youth Red Cross.
	CO2	Remembering important data on general knowledge.
	CO3	Make use of the data for competitive examinations
	CO4	Analyse social phenomena
	CO5	Comprehend a glimpse and overview of civil service exams.

Programme Code : 02		**B.Sc Mathematics**		
Course Code: 21UMA407		Core Paper 7 - Number Theory		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	IV	3	45	3

Course Objectives

1. To expose the basics of number theory to the students.
2. To enable the students to learn the usage of prime numbers and factors.
3. To solve linear congruences.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concepts of divisibility, congruence, GCD and prime numbers.
	CO2	Explaining various divisibility tests.
	CO3	Identifying G.C.D and L.C.M using prime factors.
	CO4	Analyzing the nature of numbers.
	CO5	Evaluating the greatest integer function, Euler function and the solution of the congruence equations.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA408		Core Paper 8 –Dynamics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	IV	4	60	4

Course Objectives

1. To enable the students to know the laws, principles and understand the concepts of motion of a particle and projectiles.
2. To provide the knowledge about the field of kinematics and impact between spheres.
3. To gain knowledge about simple harmonic motion and central orbits.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concepts of motion of a particle and projectile in different angles.
	CO2	Understanding the notions of impact between two smooth spheres in different ways.
	CO3	Applying the concept of simple harmonic motions in composition of two bodies in different directions.
	CO4	Distinguishing between the pedal equations of well known curves and solving two fold problems in central orbits.
	CO5	Determining the force and the central orbits of the curves in two fold problems.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA4S2		Skill Based Subject 2–Vedic Mathematics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	IV	2	30	3

Course Objectives

1. To make the students to calculate faster.
2. To equip the students with skills to meet competitive examinations.
3. To train the students to solve complex problems efficiently.

Course Outcomes (CO)

K1 to K5	CO1	To understand various techniques in Vedic Mathematics
	CO2	To remember the steps involved in each technique
	CO3	To solve general equations
	CO4	To analyze the different methods available for effective calculation
	CO5	Exploring the Vedic sutras in arithmetic.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA509		Core paper 9 - Real Analysis-I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	V	5	75	3

Course Objectives

1. To know about the basic notions of the real numbers system, set theory, relations and functions .
2. To enable to have knowledge about the basic topological properties and theorems based on point set topology.
3. To Study about the covering theorems, compactness, metric spaces and continuity of a function.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basic properties in the field of real numbers.
	CO2	Understanding the concepts of continuity, convergent sequences and metric spaces.
	CO3	Applying the concept of point set topology in related theorems
	CO4	Analyzing the compactness and to classify the continuity of a function with its limits.
	CO5	Evaluating the limit of the function and limit of the sequences.

Programme Code: 02		B.Sc Mathematics		
Course Code: 21UMA510		Core Paper 10 - Complex Analysis – I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	V	6	90	4

Course Objectives

1. To recognize complex analysis as an essential part of mathematical background for engineers, physists and other scientists.
2. To introduce the students about the complex number system.
3. To Justify the need for a complex number system and explain how it is related to other existing number systems.

Course Outcomes (CO)

K1 to K5	CO1	Defining continuity, differentiability and analyticity of a complex valued function which helps the students to acquire deeper knowledge.
	CO2	Showing the condition(s) for a complex valued function to be analytic and/or harmonic.
	CO3	Developing the concept of sequences and series with respect to the complex numbers system.
	CO4	Analyzing complex integration, Cauchy's integral formulae and Cauchy's fundamental theorem and evaluation of complex integration.
	CO5	Determining the functions of complex variable in terms of continuity, differentiability and analyticity

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA511		Core Paper 11 - Modern Algebra I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	V	6	90	4

Course Objectives

1. To know the concepts of group theory and ring theory
2. To understand the concepts of Ideals and Quotient Rings
3. To enable the concepts of Cauchy's theorem for Abelian groups , Sylow's theorem for Abelian groups , Automorphisms , Inner automorphism and Cayley's theorem.

Course Outcomes (CO)

K1 to K5	CO1	Finding whether a given abstract structure is a group or a ring.
	CO2	Understanding the elementary concepts of rings and fields and compare the similarities and differences between these concepts and those of group theory.
	CO3	Applying the concepts of homomorphism and isomorphism for comparing the algebraic features of mathematical systems in groups, rings and fields
	CO4	Examining the results from group theory to study the properties of rings and fields and to possess the ability to work within their algebraic structures.
	CO5	Assessing the finite groups through sylow's theorem.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA512		Core paper 12 - Programming in C Theory		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	V	4	60	3

Course Objectives

1. To understand the C programming language.
2. To learn the concept of control statements, one dimensional, two dimensional and multi-dimensional arrays.
3. To solve the mathematical problems using C programs.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the importance and functioning of C programming.
	CO2	Understanding the use of decision making statement and loop structures.
	CO3	Applying the operators and functions to solve mathematical problems.
	CO4	Distinguish different types of arrays.
	CO5	Evaluating the solution for Mathematical problems using programs

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA5CL		Core Practical 1 - Programming in C Practical		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	V	2	30	2

Course Objectives

1. To provide practical experience for the students to understand the structure of a C program.
2. To enrich the knowledge in solving mathematical problems using C programs.
3. To train the students to construct C programs on their own.

Course Outcomes (CO)

K3 to K5	CO1	Applying the concepts of loops and control statements in C programs.
	CO2	Classify the various operators used to develop a solution for a mathematical problem
	CO3	Evaluating the mathematical and statistical problems using C programs.
	CO4	Classify the various operators used to develop a solution for a mathematical problem
	CO5	Evaluating the mathematical and statistical problems using C programs.

Extra Departmental Course (EDC)				
Course Code: 21UMA5X1		Fundamentals of Mathematics		
Batch	**Semester**	**Hours/Week**	**Total Hours**	**Credits**
2021-2024	V	2	30	3

Course Objectives

1. To understand the basic concepts in Mathematics and Statistics.
2. To study the concepts related with banking using various Mathematical concepts.
3. To understand the application of these mathematical concepts in the real life problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concepts of matrices and set theory.
	CO2	Understanding the concepts based on Time and Distance.
	CO3	Applying basic mathematical concepts in business problems.
	CO4	Analyzing the different measures of central tendency.
	CO5	Evaluating the correlation and its types.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA613		Core Paper 13 - Real Analysis-II		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	VI	6	90	4

Course Objectives

1. To understand the concept of functions, Connectedness, uniform continuity, fixed point and related theorems.
2. To find the Derivatives and related theorems and Functions of bounded variations and related theorems.
3. To enable to know about the Reimann- Stieltjes integrals and its properties.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concept of derivatives, bounded variation.
	CO2	Understanding the concepts of connectedness
	CO3	Applying the differentiability of real functions in related theorems.
	CO4	Analyzing the Riemann Integrals.
	CO5	Determining the continuous function in terms of bounded variation.

Programme Code : 02		B.Sc Mathematics		
Course Code:21UMA614		Core paper 14 - Complex Analysis – II		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	VI	6	90	4

Course Objectives

1. To learn about Taylor's Series and Laurent's series.
2. To understand the concept of singularities and residues.
3. To study the concept of definite integrals.

Course Outcomes (CO)

K1 to K5	CO1	Recalling the fundamental theorem of algebra in complex number system.
	CO2	Illustrating the Taylor's and Laurent's expansions of simple functions.
	CO3	Applying Laurent's series for isolated singularities and determine residues.
	CO4	Analyzing the concepts of residues and residue theorem to compute real definite integrals using contours.
	CO5	Interpreting integrals along a path in the complex plane using Cauchy's theorem.

Programme Code : 02		B.Sc Mathematics		
Course Code: 21UMA615		Core Paper 15 - Modern Algebra II		
Batch 2021-2024	**Semester** VI	**Hours / Week** 6	**Total Hours** 90	**Credits** 4

Course Objectives

1. To know the concepts of Hermitian and Skew-Hermitian Matrices , Orthogonal and Unitary Matrices ,Characteristic Roots and Characteristic Vectors of a Square Matrix.
2. To enable the concepts of linear independence, basis and dimension of a vector spaces.
3. To understand the concept of linear transformation and matrices which will enrich the knowledge of logical thinking.

Course Outcomes (CO)

K1 to K5	CO1	Recalling the basic concepts of matrices, rank of a Matrix
	CO2	Understanding the basic ideas of vector spaces and the concepts of linear span, linear independence, basis, dimension and to apply these concepts to vector spaces, subspaces and inner product spaces.
	CO3	Applying the principles of matrix algebra to linear transformations and compute their rank.
	CO4	Examining whether the given set of vector is linearly independent or linearly dependent .
	CO5	Evaluating the Eigen values and Eigen vectors of a matrix

Programme Code : 02	B. Sc Mathematics
Course code: 21UMA6Z1	Project
Batch 2021-2024	Credits :5

Course Objectives

1. To study the basic concepts related to the Project work.
2. To identify the field of research.
3. To know the concept of writing a dissertation in an effective way.

Course Outcomes (CO)

K3 toK5	CO1	Choosing the area of research
	CO2	Classifying their findings or the data collected
	CO3	Applying the relative notions in the respective areas and finding the results.
	CO4	Analyzing results with the existing results.
	CO5	Interpreting the results with suitable examples.

Programme Code : 02		B.Sc Mathematics		
Course Code:21UMA6SL		Skill Based Subject 3Fundamentals of LaTeX-Practical		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	VI	3	45	3

Course Objectives

1. LaTeX is a typewriting system that is extremely useful for typing and formatting scientific documents.
2. Typing Mathematical equations is very intuitive and easy in LaTeX.
3. This practical subject is Job and Skill oriented for the students.

Course Outcomes (CO)

K3 to K5	CO1	Constructing the letters, dissertation, curriculum vitae and other documents using LaTeX.
	CO2	Analyzing the LaTeX software for the preparation of question papers and tables.
	CO3	Choosing LaTeX for typing Mathematical equation, case statements and Matrices.
	CO4	Construct molecular orbital diagrams for Homo and Hetro diatomic molecules by using MO diagram package in LaTeX software
	CO5	Recommending R software to merge the coding of R with the LaTeX documents

Programme Code : 02	B.Sc Mathematics		
Major Elective Paper - Operations Research			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	6	75	5

Course Objectives

1. To introduce certain OR techniques such as LPP, Transportation problems, Assignment problems and network techniques.
2. To help the students to develop logical reasoning.
3. To apply mathematical tools to managerial and real life problems.

Course Outcomes (CO)

K1 to K5	CO1	Analyzing the concept of linear programming problem using Simplex Method.
	CO2	Understanding the rules of artificial variables and summarizing the concept of replacement problems.
	CO3	Applying the notions of linear programming in solving transportation problems and Assignment Problem.
	CO4	Analyzing the concept of CPM & PERT
	CO5	Determining the solution for various real time decision making problems.

Programme Code: 02	B.Sc Mathematics		
Major Elective Paper- NUMERICAL METHODS			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	5	75	5

Course Objectives

1. To solve algebraic and transcendental equations for finding roots usingnumerical methods.
2. To solve simultaneous linear algebraic equations using various numerical methods
3. To know about finite differences and its uses to interpolate the values for equal and unequal intervals.

Course Outcomes (CO)

K1 to K5	CO1	Remembering various numerical methods for finding the solution of algebraic and transcendental equations.
	CO2	Demonstrating various numerical algorithms for solving simultaneous linear algebraic equations.
	CO3	Applying finite difference methods for interpolation.
	CO4	Analyzing the ordinary differential equations by using numerical methods.
	CO5	Evaluating the solutions of the algebraic and transcendental equations using MATLAB.

Programme Code : 02	B.Sc Mathematics		
Major Elective Paper- LINEAR ALGEBRA			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	5	75	5

Course Objectives

1. Represent mathematical information and communicate mathematical reasoning symbolically and verbally.
2. Apply mathematical methods involving arithmetic, algebra, geometry, and graphs to solve problems.
3. Interpret and analyze numerical data, mathematical concepts, and identify patterns to formulate and validate reasoning

Course Outcomes(CO)

K1 to K5	CO1	Remember to write the system of linear equations in terms of matrix equations
	CO2	Understanding the systems of linear equations and matrix equations to determine linear dependency or independency.
	CO3	Solve problems that can be modeled by systems of linear equations.
	CO4	Examining the solution set of a system of linear equations
	CO5	Assessing bilinear symmetric forms.

Programme Code : 02	B.Sc Mathematics		
Major Elective Paper-ASTRONOMY			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	5	75	5

Course Objectives

1. To acquire the knowledge about the celestial objects and planets.
2. Develop skills to design observing projects with research telescopes and projects drawing upon data in the literature and in archives.
3. To be familiar with the appearance of a range of common astronomical objects, such as asteroids, comets, satellites, planets, stars, and galaxies.

Course Outcomes(CO)

K1 to K5	CO1	Defining about the observed properties of physical systems that comprise the known universe
	CO2	Demonstrate their ability to read, understand, and critically analyze the astronomical/physical concepts
	CO3	Applying their physics and mathematical skills to problems in the areas of planetary science.
	CO4	Analyzing for valid scientific conclusions and communicate those conclusions in a clear and articulate manner.
	CO5	Demonstrating eclipse of moon

Programme Code : 02	B.Sc Mathematics		
Major Elective Paper **FUZZY MATHEMATICS**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	5	75	5

Course Objectives

1. To know the basic definitions of fuzzy set theory.
2. To know the fundamentals of fuzzy Algebra.
3. To know the applications of fuzzy Technology.

Course Outcomes(CO)

K1 to K5	CO1	Remembering the basic concepts of Boolean algebra.
	CO2	Understanding the concepts of fuzzy sets.
	CO3	Identifying the concepts of Algebra of fuzzy relations and logic connectives.
	CO4	Analyzing fuzzy subgroup and Preimage of subgroupoid.
	CO5	Evaluating the fuzzy invariant for subgroup.

Programme Code : 02	B.Sc Mathematics		
Major Elective Paper **COMBINATORICS**			
Batch	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	5	75	5

Course Objectives

1. To learn about recurrence relation.
2. To have knowledge about permutation.
3. To be familiar with assignment problems.

Course Outcomes(CO)

K1 to K5	CO1	Remembering the basic concepts of Fibonacci sequence.
	CO2	Understanding the concepts of Permutation and Fibonacci type relation.
	CO3	Identifying the concepts of counting simple electrical networks.
	CO4	Analyzing inclusion and Exclusion principle.
	CO5	Evaluating Fibonacci relation using generating function.

Programme Code: 03		B.Sc Physics		
Course Code:21UMA1A1		Allied Paper 1 - Mathematics I		
Batch	**Semester**	**Hrs/Week**	**Total Hours**	**Credits**
2021-2024	I	7	105	5

Course Objectives

1.To provide the basic knowledge of Trigonometry and Matrices.
2.To get the ability of solving first and second order ordinary differential equations and first order partial differential equations
3.To give basic knowledge about Mathematical concepts in Calculus.

Course Outcomes (CO)

K1 to K5	CO1	Defining hyperbolic and inverse hyperbolic functions.
	CO2	Understanding the concept of Characteristic equations to find Eigen Values and Eigen Vector.
	CO3	Applying finite difference methods for interpolation.
	CO4	Analyzing the Laplace and inverse Laplace transforms and solve Ordinary differential equations.
	CO5	Evaluating the Eigen Values and Eigen Vectors of a Matrix

Programme Code:03		B.Sc Physics		
Course Code:21UMA2A1		Allied Paper 2 - Mathematics II		
Batch 2021-2024	**Semester** II	**Hrs/Week** 7	**Total Hours** 105	**Credits** 5

Course Objectives

1. To provide the basic knowledge of Probability.
2. To get the ability to solve Partial differential equations.
3. To Understand basic knowledge in Vector Calculus.

Course Outcomes (CO)

K1 to K5	CO1	Defining the multiple integrals using Green's Theorem.
	CO2	Illustrating the Fourier Coefficient for periodic Functions.
	CO3	Solving Partial Differential Equation by using the Lagrange's Method.
	CO4	Examining the concept of probability.
	CO5	Evaluating the General solution of Bessel's equations

Programme Code:04		B.Sc Chemistry		
Course Code:21UMA1A2		Allied Paper 1 - Mathematics I		
Batch 2021-2024	**Semester** I	**Hrs/Week** **7**	**Total Hours** 105	**Credits** 5

Course Objectives

1.To provide the basic knowledge of Trigonometry.
2.To get the ability of solving first and second order ordinary differential equations and first order partial differential equations
3.To know about finite differences and its uses to interpolate the values for equal and unequal intervals.

Course Outcomes (CO)

K1 to K5	CO1	Defining hyperbolic and inverse hyperbolic functions.
	CO2	Understanding the concept of first order higher degree ordinary differential equations.
	CO3	Applying finite difference methods for interpolation.
	CO4	Analyzing the Laplace and inverse Laplace transforms to solve the Ordinary differential equations.
	CO5	Evaluating the characteristic roots and characteristic vectors of a matrix.

Course Code:21UMA2A2		Allied Paper 2 - Mathematics II		
Batch	**Semester**	**Hrs/Week**	**Total Hours**	**Credits**
2021-2024	II	**7**	105	5

Course Objectives

1. To give basic knowledge about Mathematical concepts in Calculus.
2. To understand the concepts of Evaluating Double and Triple integrals.
3. To get the ability of solving Partial differential equations .

Course Outcomes (CO)

K1 to K5	CO1	Remembering the formulas in Differentiation and Integration.
	CO2	Illustrating the Fourier Coefficient for periodic Functions.
	CO3	Solving Partial Differential Equation by using the Lagrange's Method.
	CO4	Analyzing the differential operator to find Gradient, Divergence and Curl
	CO5	Evaluating the Fourier series with different intervals.

Programme Code : 09		B.Sc Computer Science		
Course Code: 21UCS1A1		Allied 1 - DISCRETE MATHEMATICS AND STATISTICS		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	6	90	5

Course Objectives

1. To understand the concepts of discrete structures, formal languages.
2. To use finite state machines to model computer operations.
3. To solve real time problems using various statistical techniques.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the fundamental ideas and notation of discrete mathematics with examples.
	CO2	Understanding the concept of measures of central tendency, measures of dispersion, Correlation, regression, probability distributions, hypothesis testing.
	CO3	Applying problem solving techniques to solve real world problems.
	CO4	Analyzing the experimental and observational data and draw appropriate conclusions.
	CO5	Interpreting the coefficient of correlation and regression

Programme Code: 11		B.Sc Computer Technology		
Course Code: 21UCT1A1		Allied 1-Discrete Mathematics and Statistics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	6	90	5

Course Objectives

1. To understand the concepts and principles of mathematical logic, formal languages
2. To classify Measures of central tendency and dispersion
3. To know the purpose of correlation and regression

Course Outcomes (CO)

K1 toK5	CO1	Remembering about the fundamental ideas and notation of discrete mathematics with examples
	CO2	Understanding the concepts of measures of central tendency and dispersion
	CO3	Applying Logic and Boolean algebra concepts in circuit construction
	CO4	Analyzing grammar in shortest path construction
	CO5	Evaluating the regression coefficient among the variables

Programme Code: 10		BCA		
Course Code: 21UCA3A3		**OPERATIONS RESEARCH**		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	III	6	90	5

Course Objectives

1. Toidentify and develop operational research models from the verbal description of the real system.

2. To understand the mathematical tools that are needed to solve optimization problems.

3. To develop a report that describes the model and the solving technique.

Course Outcomes (CO)

K1 to K5	CO1	Showing that the real time problems can be solved by using operations research techniques.
	CO2	Demonstrating the idea of finding the shortest path using transportation problem.
	CO3	Appling the concept of inventory control and replacement techniques in business.
	CO4	Examining the concept of traffic intensity in real life problems.
	CO5	Evaluating the real life problems using the concept of queuing theory

Programme Code : 08		B.Sc Biotechnology		
Course Code: 21UBT3A3		Fundamentals of Mathematics		
Batch 2021-2024	**Semester** III	**Hours / Week** 5	**Total Hours** 75	**Credits** 4

Course Objectives

1.To understand the fundamental knowledge on mathematics in biology.

2. To provide the necessary basic concepts of numerical methods and the problem solving techniques in scientific problems using Numerical methods.

3. To expose that the differential and integral equations are powerful tools in solving problems in biology and medicine.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic concepts in mathematics.
	CO2	Demonstrating various numerical algorithms for solving simultaneous linear algebraic equations.
	CO3	Applying the concepts of Differentiation and Integration in the field of Bio-technology.
	CO4	Analyzing the solutions of differential and integral equations by various numerical techniques.
	CO5	Evaluating numerical solutions for differentiation and integration using Numerical methods

Programme Code : 12		B.Sc Information Technology		
Course Code: 21UIT1A1		MATHEMATICALFOUNDATION OF COMPUTER SCIENCE		
Batch 2021-2024	**Semester** I	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To understand Matrices, Set theory, Mathematical logic, Relations and Graph theory.
2. To solve the problems of Eigen values and Eigen vector.
3. To solve the problems of statement calculus and predicate calculus

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concepts of matrices, set theory, mathematical logic, relations and graph theory
	CO2	Understanding the basic terminology of discrete mathematics
	CO3	Applying theory inference for statement calculus and predicate calculus
	CO4	Analyzing the results through the program outputs
	CO5	Evaluating the results of graphs in computer representation

Programme Code :16		BBA		
Course Code : 21UBB1A1		MATHEMATICS FOR MANAGEMENT – I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	6	90	5

Course Objectives

1. To Understand the concepts of Matrices, concepts related with banking and concepts of various statistical tools.
2. To study the concepts of statistics, Measures of dispersion and Analysis of time series. Also understand the applications of these concepts in real world problems.
3. To use mathematical knowledge to analyze and solve problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basic concepts of mathematics in business analysis
	CO2	Understanding the problem-solving methods
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing mathematical techniques and applications
	CO5	Evaluating correlation and regression coefficient among the variables

Programme Code : 17		BBA CA		
Course Code : 21UBA1A1		MATHEMATICS FOR MANAGEMENT – I		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	6	90	5

Course Objectives

1. To Understand the concepts of Matrices, concepts related with banking and concepts of various statistical tools.
2. To study the concepts of statistics, Measures of dispersion and Analysis of time series. Also understand the applications of these concepts in real world problems.
3. To use mathematical knowledge to analyze and solve problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basic concepts of mathematics in business analysis
	CO2	Understanding the problem-solving methods
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing mathematical techniques and applications
	CO5	Evaluating correlation and regression coefficient among the variables

Programme Code : 13		B.Com		
Course Code: 21UCM3A3		BUSINESS MATHEMATICS		
Batch	**Semester**	**Hours / Week**	**Total Hours**	Credits
2021-2024	III	6	90	5

Course Objectives

1. To give basic knowledge about Mathematical concepts
2. To solve the modern business problems using various mathematical techniques.
3. To solve the various real life business problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the application of mathematics in business analysis
	CO2	Understanding the concepts of mathematics in finance
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing the business conditions using Effective rate of Interest.
	CO5	Evaluating the solution for business problems using Graphical and Simplex method

Programme Code : 15		B.Com PA		
Course Code: 21UPA1A1		MATHEMATICS FOR BUSINESS		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	I	6	90	5

Course Objectives

1. On successful completion of this course, the student should have understood the basic concepts.
2. To use Mathematical Techniques to solve the modern business problems.
3. To enable the students to apply basic mathematical knowledge to solve the real life business problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basic concepts of mathematics in business analysis
	CO2	Understanding the concepts of mathematics in finance
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing the business conditions using Differentiation and Integration
	CO5	Evaluating the solution for business problems using Graphical and Simplex Method

Programme Code :14		B.Com CA		
Course Code: 21UCC1A1		BUSINESS MATHEMATICS		
Batch 2021-2024	**Semester** I	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To give basic knowledge about Mathematical concepts
2. To solve the modern business problems using various mathematical techniques
3. To enable the students to apply basic mathematical knowledge to solve the real life business problems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the basic concepts of mathematics in business analysis
	CO2	Understanding the concepts of mathematics in finance
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing the business conditions using Differentiation and Integration
	CO5	Evaluating Linear programming problem by using graphical and tabulation method.

Programme Code : 19		B.Com (Banking & Insurance)		
Course Code: 21UCB1A1		BUSINESS MATHEMATICS		
Batch 2021-2024	**Semester** I	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. On successful completion of this course, the student should have understood the basic concepts.
2. To use Mathematical Techniques to solve the modern business problems.
3. To enable the students to apply basic mathematical knowledge to solve the real life business problems.

Course Outcomes (CO)

K1 – K5	CO1	Remembering the basic concepts of mathematics in business analysis
	CO2	Understanding the concepts of mathematics in finance
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing the business conditions using Linear Programming problems.
	CO5	Evaluating the solution for business problems using Graphical and Simplex method

Programme Code : 11		B.Sc Computer Science		
Course Code: 21UCS2A2		ALLIED 2 - OPERATIONS RESEARCH		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	6	90	5

Course Objectives

1. To understand the various mathematical applications in industries and decision making for real time environment.
2. To gain the knowledge about the principles and applications of operations research.
3. To develop skills necessary to effectively analyze and synthesize the inter-relationships inherent in complex socio-economic productive systems.

Course Outcomes (CO)

K1 to K5	CO1	Remembering mathematical formulation of the problem.
	CO2	Understanding the notions of linear programming in solving transportation problems and Assignment Problems.
	CO3	Applying the fundamental concept of inventory control and Queuing theory.
	CO4	Analyzing CPM and PERT techniques, to plan, schedule, and control project activities.
	CO5	Determine new simple models to improve decision making and develop critical thinking.

Programme Code :12		B.Sc Information Technology		
Course Code: 21UIT2A2		COMPUTER ORIENTED NUMERICAL& STATISTICAL METHODS		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	6	90	5

Course Objectives

1. To have indepth knowledge of various advanced methods in numerical analysis and statistics.
2. To get numerical solutions of equations like transcendental and non linear differential equations when ordinary analytical methods fail.
3. To learn fundamentals and concepts of statistical methods, in particular, with reference to frequency distribution and measures of central tendency, measures of dispersion, Correlation and Regression.

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concept of numerical and statistical methods
	CO2	Understanding the concepts of numerical differentiation and integration
	CO3	Applying an appropriate numerical method for solving algebraic or transcendental equation
	CO4	Analyzing the concept of Measure of central tendency, Measures of dispersion , Correlation and Regression
	CO5	Evaluating the simultaneous linear algebraic equations, differentiation and integration via various numerical methods

Programme Code :08		B.Sc Biotechnology		
Course Code: 21UBT4A4		Bio-Statistics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	IV	5	75	4

Course Objectives

1. To provide the fundamental knowledge on statistics in biology.
2. Students can be able to know the level of significance after analysis of data and also applied in research work.
3. Acquire knowledge on sources for the biological data base and its storage and analysis

Course Outcomes (CO)

K1 to K5	CO1	Remembering the concept of sampling techniques.
	CO2	Understanding the significant of biostatistics on biological sciences and also applied in research work.
	CO3	Applying the bio-statistical formula to solve the biological related problems.
	CO4	Analyzing one way and two way classification.
	CO5	Evaluating the correlation and regression coefficients among the variables.

Programme Code : 08		B.ScBiotechnology		
Course Code: 21UBT4AL		Lab in Bio-Statistics		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	IV	2	30	2

Course Objectives

1. To provide practical experience for the students
2. Students can be able to know the level of significance after analysis of data and also applied in research work.
3. To analyze the data by using varied statistical methods.

Course Outcomes (CO)

K3 to K5	CO1	Apply the various operators and functions of C language in Programs
	CO2	Analyze the various data types and formatting features available in C language
	CO3	Determine the solution of mathematical problems using C Programs
	CO4	Analyzing thr various features available in R programming
	CO5	Evaluating the mathematical problems using R programming

Programme Code : 13		B.Com		
Course Code: 21UCM4A4		BUSINESS STATISTICS		
Batch 2021-2024	**Semester** IV	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To demonstrate understanding of basic concepts of probability and statistics embedded in their courses
2. Statistics in the social sciences involves the collection, analysis, interpretation, and Presentation of data to answer questions about the social world.
3. To Perform Correlation & Compute the equation of simple regression line from a sample data and the intercept of the equation

Course Outcomes (CO)

K1 to K5	CO1	Select appropriate Statistical techniques for summarizing and displaying business data.
	CO2	Understand the measures of central tendency, symmetrical and asymmetrical distribution
	CO3	Identify and carryout basic statistical analyses used in sociological inquiry.
	CO4	Analyze and draw inferences from business data using appropriate statistical methods.
	CO5	Evaluating the trend lines from business data using business forecasting models

Programme Code :14		B.Com CA		
Course Code: 21UCC2A2		BUSINESS STATISTICS		
Batch 2021-2024	**Semester** II	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To give basic knowledge about statistical concepts.
2. To solve the modern business problems using various statistical techniques
3. To estimate the mean and standard deviation of the marginal distribution of the response variable and use this information to inform a business decision

Course Outcomes (CO)

K1 to K5	CO1	Select appropriate Statistical techniques for summarizing and displaying business data
	CO2	Interpret correlation coefficients and Formulate regression line by identifying dependent and independent variables.
	CO3	Identify and carryout basic statistical analyses used in sociological inquiry.
	CO4	Analyze and draw inferences from business data using appropriate statistical methods.
	CO5	Evaluating the trend lines from business data using business forecasting models

Programme Code :16		BBA		
Course Code : 21UBB2A2		MATHEMATICS FOR MANAGEMENT – II		
Batch 2021-2024	**Semester** II	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To understand various mathematical applications in industries.
2. To know the mathematical tools that are needed to solve optimization Problems.
3. To understand the Decision making for real time environment.

Course Outcomes (CO)

K1 to K5	CO1	Remembering to use the variables for formulating mathematical models in management.
	CO2	Understanding the concept of Transportation and Assignment models
	CO3	Applying the fundamental concept of Queuing theory.
	CO4	Analyzing CPM and PERT techniques, to plan, schedule, and control project activities.
	CO5	Evaluating the solution for business problems using Graphical and Simplex method

Programme Code :17		BBA CA		
Course Code : 21UBA2A2		MATHEMATICS FOR MANAGEMENT – II		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	6	90	5

Course Objectives

1. To understand various mathematical applications in industries.
2. To know the mathematical tools that are needed to solve optimization Problems.
3. To understand the Decision making for real time environment.

Course Outcomes (CO)

K1 to K5	CO1	Remembering to use the variables for formulating mathematical models in management.
	CO2	Understanding the concept of Transportation and Assignment models
	CO3	Applying the fundamental concept of Queuing theory.
	CO4	Analyzing CPM and PERT techniques, to plan, schedule, and control project activities.
	CO5	Evaluating the solution for business problems using Graphical and Simplex method

Programme Code :11		Computer Technology		
Course Code : 21UCT2A2		Operations Research		
Batch	**Semester**	**Hours / Week**	**Total Hours**	**Credits**
2021-2024	II	6	90	5

Course Objectives

1. To understand the concept of Linear Programming Problem
2. To explain the various mathematical applications in industries
3. To show the optimization concepts in real time environment

Course Outcomes (CO)

K1 to K5	CO1	Remembering the replacement problem.
	CO2	Understanding the notions of Linear Programming in solving Transportation Problems and Assignment Problems.
	CO3	Applying the fundamental concept of inventory control and Queuing theory.
	CO4	Knowing the application of CPM & PERT
	CO5	Evaluating the real life problems using the concept of Queuing theory.

Programme : BCA		BCA		
Course Code: 21UCA2A2		COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS		
Batch 2021-2024	Semester II	Hours / Week 6	Total Hours 90	Credits 5

Course Objectives

1. To demonstrate the mathematical concepts underlying the numerical methods considered.
2. To understand the concepts in statistical techniques.
3. To motivate students an intrinsic interest in statistical thinking.

Course Outcomes (CO)

K1 to K5	CO1	Finding the unknown values in simultaneous linear equations using some methods in Numerical Techniques.
	CO2	Extending the idea of finding the integration of simple functions using Numerical Techniques.
	CO3	Choosing the concept of measures of central tendency and dispersion.
	CO4	Analyzing the concept of sampling and some of the Statistical Tests.
	CO5	Evaluating the statistical data by the concept of sampling techniques.

Program Code :19		B.Com (Banking & Insurance)		
Course Code: 21UCB2A2		BUSINESS STATISTICS		
Batch 2021-2024	**Semester** II	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To give basic knowledge about statistical concepts.
2. To solve the modern business problems using various statistical techniques
3. To Understand the Correlation and Regression problems.

Course Outcomes (CO)

K1 - K5	CO1	Select appropriate Statistical techniques for summarizing and displaying business data
	CO2	Understand and use the basic measure of central tendency.
	CO3	Identify and carryout basic statistical analyses used in sociological inquiry.
	CO4	Analyze and draw inferences from business data using appropriate statistical methods.
	CO5	Evaluating correlation and regression analysis among the variables.

Programme code : 21		B.Sc Psychology		
Course Code: 21UPS3A3		**ALLIED III: PSYCHOLOGICAL STATISTICS**		
Batch 2021-2024	Semester III	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To give basic knowledge about statistical concepts.
2. To solve the social problems using various statistical techniques.
3. To provide knowledge and skills to select and conduct appropriate statistical tests for psychological research.

Course Outcomes (CO)

K1 to K5	CO1	Remembering appropriate Statistical techniques for summarizing and displaying social science data.
	CO2	Understanding the concepts of measures of central tendency and formulate percentile by arranging the data from smallest to largest.
	CO3	Applying the statistical tools to solve sociological problems.
	CO4	Analyzing and interpret the variance form ANOVA output.
	CO5	Evaluating the correlation among the variables.

Program Code :**20**		B.Com (Accounting and Finance)		
Course Code: 21UAF3A3		BUSINESS MATHEMATICS		
Batch 2021-2024	**Semester** III	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1. To give basic knowledge about Mathematical concepts
2. To solve the modern business problems using various mathematical techniques.
3. To solve the various real life business problems.

Course Outcomes (CO)

K1 - K5	CO1	Remembering the application of mathematics in business analysis
	CO2	Understanding the concepts of mathematics in finance
	CO3	Applying basic mathematical calculations in business problems
	CO4	Analyzing the business conditions using Effective rate of Interest
	CO5	Evaluate the solution for business problems using Graphical and Simplex method

Programme Code: 15		B.Com PA		
Course Code: 21UPA2A2		STATISTICS FOR BUSINESS		
Batch 2021-2024	Semester II	Hours / Week 6	Total Hours 90	Credits 5

Course Objectives

1. To give basic knowledge about statistical concepts.
2. To solve the modern business problems using various statistical techniques
3. To estimate the mean and standard deviation of the marginal distribution of the response variable and use this information to inform a business decision

Course Outcomes (CO)

K1 to K5	CO1	Choosing a statistical method for solving practical problems.
	CO2	Understanding and use the basic measure of central tendency.
	CO3	Identifying different types of statistical data.
	CO4	Classifying the structure and characteristics of statistical data.
	CO5	Evaluating the trend lines from business data using business forecasting models

Program Code :21		B.Sc Psychology		
Course Code: 21UPS4A4		**ALLIED IV: RESEARCH METHODOLOGY**		
Batch 2021-2024	**Semester** IV	**Hours / Week** 5	**Total Hours** 75	**Credits** 5

Course Objectives

1.To give basic knowledge about research and its methodologies.
2. To identify the concepts and procedures of sampling, data collection, analysis and reporting.
3. To develop an understanding of various research designs and techniques.

Course Outcomes (CO)

K1 - K5	CO1	Selecting and defining appropriate research problem and parameters.
	CO2	Understanding the concepts of sampling, error and its degress of freedom.
	CO3	Identifying various sources of information for data collection.
	CO4	Analyzing to prepare key elements of a research report.
	CO5	Interpreting the results of the data using statistical techniques.

Program Code :20		B.Com (Accounting and Finance)		
Course Code: 21UAF4A4		BUSINESS STATISTICS		
Batch 2021-2024	**Semester** IV	**Hours / Week** 6	**Total Hours** 90	**Credits** 5

Course Objectives

1.To demonstrate understanding of basic concepts of probability and statistics embedded in their courses

2. Statistics in the social sciences involves the collection, analysis, interpretation, and Presentation of data to answer questions about the social world.

3. To Perform Correlation & Compute the equation of simple regression line from a sample data and the intercept of the equation

Course Outcomes (CO)

K1 - K5	CO1	Selecting appropriate Statistical techniques for summarizing and displaying business data.
	CO2	Understanding the measures of central tendency, symmetrical and asymmetrical distribution
	CO3	Identifying the appropriate statistical tool to solve sociological problems
	CO4	Analyzing and drawing inferences from business data using appropriate statistical methods.
	CO5	Evaluating the solution for business problems using Graphical and Simplex method