

**DEPARTMENT OF  
MATHEMATICS  
U.G.**

## **DEPARTMENT OF MATHEMATICS**

**Programme Code: M**

**Programme Name: B.Sc. Mathematics**

### **Programme Outcomes**

1. To use Mathematical knowledge to analyze and solve problems. **(National)**
2. To create Mathematical models, formulate precise statements and reason out logically. **(National)**
3. To derive solutions for the models developed for a better functioning of the real world systems. **(Global)**
4. To create or select an appropriate technique in research methods including analysis, interpretation of data and synthesis of the information to provide valid conclusions. **(Global)**
5. To use the modern tools and software for obtaining solutions to the desired accuracy. **(Global)**

### **Programme Specific Outcomes**

1. To be conscious of the environmental hazards and contribute to its minimization scientifically. **(Global)**
2. To apply ethical principles and commit to professional ethics, responsibilities and norms. **(Global)**
3. To recognize the need for individual and team work in an inter-disciplinary environment and participate effectively. **(Global)**
4. To present Mathematics clearly and precisely to an audience of peers, faculty and others. **(National)**
5. To analyse Operations Research techniques, proficiency, especially in the execution of any specific projects. **(National)**
6. Train intellectual minds to use mathematics to solve problems in day to day life. **(Global)**

## **Course Outcomes**

### **SEMESTER - I**

**Subject Code: 17M11**

**Course Name: CALCULUS (Global)**

Upon the Completion of this course, the students will be able to

1. Comprehend the concepts and methods of finding envelopes, curvature, evolutes and involutes
2. Understand the significance of maxima and minima for function of two variables.
3. Perceive the various properties like Beta and Gamma functions.

**Subject Code: 17M12**

**Course Name: THEORY OF EQUATIONS & NUMBER SYSTEM (Global)**

Upon the Completion of this course, the students will be able to

1. Describe the association between roots, coefficients and the sum of the power of the roots of an equation, Newton's Theorem.
2. Demonstrate ability to cover a topic in increase the roots, decrease the roots and removal of terms.
3. Understand the significance of Descarte's rule of signs, Rolle's Theorem and Theory of Numbers.

**Subject Code: 17NMM1**

**Course Name: MATHEMATICS FOR COMPETITIVE EXAMINATION (National)**

Upon the Completion of this course, the students will be able to

1. Gain the Knowledge of Calculating Simple Interest and Compound Interest.
2. Express the logarithms of a product as a sum of logarithms.
3. Understand how to calculate Time, Distance, Surface area and Volume.

## SEMESTER – II

**Subject Code: 17M21**

**Course Name: SEQUENCE AND SERIES (Global)**

Upon the completion of the course, the students will be able to

1. Describe the behaviour related to Sets, Function, Bounded, Algebra of limits and behaviour of Monotonic Sequence.
2. Analyse how to prove Cauchy's limit theorems, Kummer's Test and Root Test.
3. Gain the knowledge of some simple techniques for tests of convergence of series, alternating series, rearrangement of series and Fourier Series.

**Subject Code: 17M22**

**Course Name: DIFFERENTIAL EQUATIONS (Global)**

Upon the completion of the course, the students will be able to

1. Classify the Linear equation with constant coefficients and compute C.F and P.I
2. Evaluate the solution of exact equation, total differential equation and Lagrange's equation
3. Discuss the differential equation problem using Laplace transform and its inverse.

**Subject Code: 17NMM2**

**Course Name: MATHEMATICS FOR COMPETITIVE EXAMINATIONS-PAPER -II (National)**

Upon the completion of the course, the students will be able to

1. Depict the basic concepts of probability functions.
2. Gain the Knowledge of calculating True Discount, Banker's Discount, Height and Distance.
3. Demonstrate the Odd Man Out & Series.

## SEMESTER – III

**Subject Code: 17M31**

**Course Name: MODERN ALGEBRA (Global)**

Upon the completion of the course, the students will be able to

1. Understand the basic concepts of Groups and Subgroups.
2. Inculcate an insight into Cosets and Lagrange's Theorem.
3. Understand the concept of Normal Subgroups, Quotient Groups, Isomorphism, Homomorphism and Rings.

**Subject Code: 17ME3A**

**Course Name: OPERATIONS RESEARCH (Global)**

Upon the completion of the course, the students will be able to

1. Identify and develop operational research models from verbal description of the real system.
2. Understand the Mathematical tools to solve Optimization problem, Transportation & Assignment problem.
3. Comprehend the usage of game theory & simulation for solving business problem

**Subject Code: 17ME3B**

**Course Name: ASTRONOMY (Global)**

Upon the completion of the course, the students will be able to

1. Describe the science of cosmology and its correspondence to other fields of science
2. Identify and describe cosmology's current unanswered questions.
3. Explain how the scientific method and quantitative arguments are used in cosmology.

**Subject Code: 17SEM31**

**Course Name: APPLICATIONS OF DIFFERENTIAL EQUATIONS (Global)**

Upon the completion of the course, the students will be able to

1. Analyse and Evaluate the Orthogonal Trajectories, Growth & Decay.
2. Solve the continuous compound interest and brachistochrone problem.
3. Describe Tautochronous property of the cycloid, simple electric circuits and Simple harmonic motion.

#### **SEMESTER – IV**

**Subject Code: 17M41**

**Course Name: GRAPH THEORY (Global)**

Upon the completion of the course, the students will be able to

1. Depict the basic concepts of graph theory.
2. Illustrate Blocks, Connectivity, Eulerian, Hamiltonian graphs and Trees.
3. Gain knowledge of Matchings, planar and Colourability

**Subject Code: 17ME4A**

**Course Name: STATICS (Global)**

Upon the completion of the course, the students will be able to

1. Apply the basic principles of classical particles in mechanics to the analysis of particles subjected to forces.
2. Remember the notions of friction and equilibrium of strings and deploy them in solving the problems.
3. Analyze the basics of coplanar forces and equilibrium of forces acting on a rigid body and solving the problems.

**Subject Code: 17ME4B**

**Course Name: AUTOMATA THEORY AND FORMAL LANGUAGE (Global)**

Upon the completion of the course, the students will be able to

1. Remember the concepts of Mathematical Logic.
2. Explain the implication problems using truth table, replacement process and rules of inference.
3. Solve normal forms of given logical expression.

**Subject Code: 17SEM41**

**Course Name: ANALYTICAL GEOMETRY OF THREE DIMENSIONS (Global)**

Upon the completion of the course, the students will be able to

1. Understand the geometrical relationships between lines and planes and also planes and sphere.
2. Obtain the knowledge of angle bisectors and Distance between two planes.
3. Develop the acquaintance of the principles and techniques of Analytical geometry of three dimensions and to use them to solve problems.

### SEMESTER – V

**Subject Code: 17M51**

**Course Name: MODERN ANALYSIS (Global)**

Upon the completion of the course, the students will be able to

1. Understand the concepts of countable sets, uncountable sets, several standard concepts of metric spaces and their Properties.
2. Identify the continuity of a function defined on a metric spaces and homeomorphisms.
3. Introduce the concept of Connectedness, Compactness and Characterization for Compactness.

**Subject Code: 17M52**

**Course Name: STATISTICS-I (Global)**

Upon the completion of the course, the students will be able to

1. Understand the basic Statistical concepts and gain the knowledge on various aspects of curve fitting of curves and discuss reconstitute the concept of linear regression and correlation.
2. Comprehend the concept of attributes and to identify formulates and solves the problems and applies various types of index methods to data collection.
3. Use the terminology of probability and determine whether two events are mutually exclusive and are independent.

**Subject Code: 17M53**

**Course Name: DYNAMICS (Global)**

Upon the completion of the course, the students will be able to

1. Analyze the motion of projectiles in different angles.
2. Discuss the direct impact and Oblique impact of two spheres
3. Apply the concept of Simple harmonic motion and find the period and amplitude of S.H.M

**Subject Code: 17M5A**

**Course Name: LINEAR ALGEBRA (Global)**

Upon the completion of the course, the students will be able to

1. Generalize the concepts of a real vector space and subspace.
2. Investigate properties of vector spaces and subspaces using by linear transformations.
3. Express a system of linear equations in a matrix form.

**Subject Code: 17ME5B**

**Course Name: FUZZY SETS (Global)**

Upon the completion of the course, the students will be able to

1. Gain the knowledge of basic concepts of fuzzy sets and fuzzy logic
2. Analyze the operations on fuzzy sets.
3. Understand the fuzzy relations.

**Subject Code: 17AA51**

**Course Name: PROGRAMMING IN C (Global)**

Upon the completion of the course, the students will be able to

1. Revise the basic concepts of programming and understand about data types, input, and output statements and write simple programs.
2. Explain about decision making statements like if, if else, else if ladder, switch, goto etc.
3. Explain and Use the concept of one dimensional array, two dimensional array and operators in Programs.

**Subject Code: 17AA5P**

**Course Name: C PRACTICALS (National)**

Upon successful completion of Programming Language C- Practical students will be able to

1. Create different programs using if, if else, for , arrays, functions and pointers and prepare the students to write programs.
2. Apply the concept of structures and file handling to develop programs.

**Subject Code: 17SEM51**

**Course Name: VECTOR CALCULUS (Global)**

Upon the completion of the course, the students will be able to

1. Determine the differentiate Vector fields.
2. Understand how to find the solution of Problems in Divergence, curl and Solenoidal Vector.
3. Calculate an insight into the Stokes theorem.

**Subject Code: 17SEM52**

**Course Name: QUANTITATIVE APTITUDE (National)**

Upon the completion of the course, the students will be able to

1. Gain knowledge to solve the problems on Numbers and Ages.
2. Calculate the profit and Loss -Ratio.
3. Understand how to calculate the Time, Distance and Permmutations.



## SEMESTER – VI

**Subject Code: 17M61**

**Course Name: COMPLEX ANALYSIS (Global)**

Upon the completion of the course, the students will be able to

1. Define continuity, differentiability of a complex functions and be familiar with the Cauchy – Riemann equations.
2. Learn the role of bilinear transformation.
3. Classify the nature of singularities, poles and residues

**Subject Code: 17M62**

**Course Name: STATISTICS –II (Global)**

Upon the completion of the course, the students will be able to

1. Gain Statistical Knowledge to identify and Evaluate Problems.
2. Identify the Probability distribution and the test of hypothesis.
3. Understand the Sample Size in Large and Small Sample Space.

**Subject Code: 17M63**

**Course Name: NUMERICAL METHODS (Global)**

Upon the completion of the course, the students will be able to

1. Demonstrate various numerical algorithms for solving simultaneous linear algebraic equations.
2. Apply numerical methods to obtain approximate solutions to mathematical problems and find the roots of transcendental equations.
3. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear , nonlinear equations, and differential equations.

**Subject Code: 17AA61**

**Course Name: OBJECT –ORIENTED PROGRAMMING WITH C++ (Global)**

Upon the completion of the course, the students will be able to

1. Identify data and understand the basic concepts in Object Oriented Programming C++
2. Apply concepts of arrays and friend function for program development and execution.
3. Evaluate the data and use constructors, destructors and operator overloading in the program for execution.

**Subject Code: 17AA6P**

**Course Name: C++ PRACTICALS (National)**

Upon the completion of the course, the students will be able to

1. Identify data and understand the basic concepts in Object Oriented Programming C++.
2. Apply concepts of arrays and friend function for program development and execution.
3. Evaluate data and use constructors, destructors and operator overloading in the program for execution.

**Subject Code: 17SEM61**

**Course Name: DISCRETE MATHEMATICS (Global)**

Upon the completion of the course, the students will be able to

1. Analyse TF statement and Connectives.
2. Obtain the knowledge about Tautology and Lattices.
3. Understand how to introduce Recurrence relation.

**Subject Code: 17SEM62**

**Course Name: COMBINATORICS (Global)**

Upon the completion of the course, the students will be able to

1. Understand logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions and integers.
2. Identify the numbers of possible outcomes of elementary combinatorial processes.
3. Analyze probabilities, discrete distributions and expectations.

**Subject Code: 17AM1**

**Course Name: ALLIED MATHEMATICS-I (Global)**

Upon the completion of the course, the students will be able to

1. Describe the relations between roots and the coefficients and analyse the roots upto two decimals by Newton's, Horner's method.
2. Formulate the reduction formula for  $\sin^n x$ ,  $\cos^n x$ ,  $\tan^n x$ ,  $\sec^n x$ ,  $\cot^n x$ ,  $\operatorname{cosec}^n x$ , and  $\sin^m x \cos^m x$ .
3. Understand the basic concepts of Hyperbolic functions, complex numbers and To Know the direction cosines, direction ratios of a line angle between two straight line.

**Subject Code: 17AM2**

**Course Name: ALLIED MATHEMATICS – II (Global)**

Upon the completion of this course, students will be able to

1. Applying the differential operator to find Gradient, Divergence & Curl.
2. Prepare the students to apply fundamental concepts & working knowledge in algebra to their field.
3. Understand the concepts of correlation and regression.

**Subject Code: 17AM3**

**Course Name: ALLIED MATHEMATICS –III (Global)**

Upon the completion of the course, the students will be able to

1. Understand the basic concepts of differential equations and particular integral.
2. Obtain the knowledge of how to find the solution of Laplace transform and Inverse Laplace transform and Application of differential equation.
3. Understand the concepts of analytic functions and bilinear transformation and the basic concepts of groups.

**Subject Code: 17AM4**

**Course Name: ALLIED MATHEMATICS –IV (Global)**

Upon the completion of the course, the students will be able to

1. Understand the basic concepts of Linear Programming Problems and solve the problems of Graphical Method, Simplex method, Big-M method and Two phase method.
2. Formulate of the Transportation Problems
3. Construct the assignment problems for the given algorithms.

**Subject Code: 17AMS1**

**Course Name: DISCRETE MATHEMATICS (Global)**

Upon the completion of the course, the students will be able to

1. Understand the basic principles of sets and operations in sets.
2. Solve problems in matrix algebra and Construct Truth table for the given proposition, interpret tautology and equivalences
3. Understand the concept of lattices, Boolean algebra and graph theory.

**Subject Code: 17AMS2/17AMJ2**

**Course Name: RESOURCE MANAGEMENT TECHNIQUES (Global)**

Upon the completion of the course, the students will be able to

1. Explain basic concepts of LPP, Slacks and surplus variable.
2. Solve the simplex methods, two phase method and Big-M method.
3. Illustrate Assignment problem and Transportation problem.

**Subject Code: 17AMS3/17AMJ3**

**Course Name: GRAPH THEORY (Global)**

Upon the completion of the course, the students will be able to

1. Illustrate the different types of graphs.
2. Demonstrate walk, trail and path.
3. Describe Eulerian and Hamiltonian graph

**Subject Code: 17AMS4/17AMJ4**

**Course Name: NUMERICAL METHODS (Global)**

Upon the completion of the course, the students will be able to

1. Describe the relation between roots, coefficient and transformation of equation.
2. Understand the concept of curve fitting algebraic and transcendental equation.
3. Solve the simultaneous equation and Interpolation.